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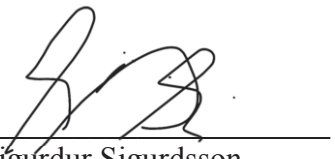
Dissertation and Abstract Approved: 

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ABSTRACT

Title of Document:	EYE MOVEMENT DESENSITIZATION AND REPROCESSING WITH ADULTS WITH INTELLECTUAL DISABILITY
	Lynn Buhler, Doctor of Philosophy, 2014
Directed By:	Sigurdur Sigurdsson Associate Professor School of Behavior Analysis Florida Institute of Technology Graduate Faculty, University of Maryland, Baltimore County

People with intellectual disability have historically been excluded from the benefits of psychotherapy, despite the higher incidence of mental illness, in general, and PTSD, in particular, in this population. It had been thought that intellectual disability precluded the cognitive and emotional ability required to participate in therapy. A growing body of literature is reporting successful application of a number of these therapies, established as empirically effective for the general population, with people with intellectual disability. Typically, minor modifications are required. Criticism continues, now based on the problem of using therapies with a population for which they have not been empirically established as effective. The current study contributes to the empirical process of establishing effectiveness of a specific trauma therapy for people with intellectual disability. It applies the EMDR therapy to six participants in a multiple-baseline, ABA, time-series experiment design. EMDR has previously been used with people with intellectual disability, reporting improved symptoms and functioning for the more than 35 cases published. For the current study, the participants were all diagnosed with PTSD and

other diagnoses reflecting the emotional distress associated with histories of multi- and poly-traumatization, beginning at an early age. They received weekly assessments on multiple measures: self-report, physiological, observer ratings, and continuous actigraph recordings. Each participated for a minimum of 60 weeks, which included: an A phase, the Baseline; a B phase, the Intervention; and, a second A phase, Maintenance. After a Hiatus of six weeks, participants returned for Follow-up testing. The EMDR therapy was delivered during the Intervention phase, only. All participants lost the diagnosis of PTSD and showed emotional and functional improvement on a number of measures. The self-report measures produced the most descriptive time-series data, providing indication of change in a number of dimensions, visually interpretable from graphs of the data, included in this document. Linear regression analyses support visual analysis. Additional research in using the EMDR therapy with people with intellectual disability is recommended, with the purpose of establishing it as appropriate for use with this population. Limitations of the study are addressed.

EYE MOVEMENT DESENSITIZATION AND REPROCESSING WITH ADULTS WITH INTELLECTUAL DISABILITY

By

Lynn Buhler

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, Baltimore County, in partial fulfillment
of the requirements for the degree of
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Dedicated to

Allen C. Buhler

He made it all possible.

Table of Contents

List of Tables

List of Figures

Eye Movement Desensitization and Reprocessing with Adults with Intellectual Disability

There are currently no empirically-validated psychotherapies for people with intellectual disability (ID: Beail, 2003; Butz & Bowling, 2000; Chambless & Ollendick, 2001; *Handbook of intellectual and developmental disabilities*, 2007; Hartley, Horrell, & Maclean, 2007; Jacobson & Mulick, 1996; Norcross, Beutler, & Levant, 2006; Prout & Browning, 2011; Prout & Nowak-Drabik, 2003; Roth & Fonagy, 2005; Sturmey, 2012). This is despite a prevalence rate of mental illness among people with ID of three to six times higher than that found in the general population (Deb, Thomas, & Bright, 2001; Gentile & Gillig, 2012; Matson, 2013). It follows that there cannot yet be a statistically rigorous approach to answering questions such as which psychotherapies are most effective for people with ID, much less for subsets of this population based on severity of ID, etiology of ID, mental illness diagnosis, age, etc.

The current study responds to the need evident in this underserved population, but at a more preliminary stage. It asks if one, specific therapy (Eye Movement Desensitization and Reprocessing; EMDR) can be used successfully with this population. The study approach is supported by clinical findings that psychotherapy can be effective for people with ID, especially when it incorporates adaptations identified as improving effectiveness with this population. The study design follows from the relative simplicity, the defined protocol, and the established effectiveness of EMDR for the general population. Its experimental organization – a multiple-baseline, case-based structure, with time-series data analysis – is appropriate for the current state of research on psychotherapy with people with ID.

Effectiveness of Psychotherapy for People with ID

The question of effectiveness of psychotherapy for people with ID cannot be answered by a single study, and the pool of relevant research is currently too small. The American Psychological Association (APA) Division 12: Society of Clinical Psychologists has produced a number of reports on evidence-based therapies (Chambless et al., 1998; Chambless & Hollon, 1998; Chambless & Ollendick, 2001; Chambless et al., 1996; Levant, 2005), none of which refers to ID. Other respected authorities of psychotherapy research either make no mention of people with disabilities or ID at all (Roth & Fonagy, 2005), or observe that evidence-based practices have ignored people with disabilities (Norcross et al., 2006). The APA Division 33: Intellectual and Developmental Disabilities has participated in various aspects of research on ID, but the treatment focus has been on applied behavior analysis approaches. No indication of change in this emphasis is evident from the Division 33 Mission Statement which lists eight objectives, none of which addresses psychotherapy (American Psychological Association, 2014).

The history of establishing efficacy of psychotherapy, in general, unfolded in incremental steps over the span of decades. Eysenck (1952) summarized his survey of 24 reports (encompassing 8,053 cases) on the improvement of neurotic patients after psychotherapy, as compared with the best available estimates of recovery without such therapy, in words paralleling the conclusions of the early reviews of psychotherapies for people with ID:

> The figures fail to support the hypothesis that psychotherapy facilitates recovery from neurotic disorder. In view of the many

> difficulties attending such actuarial comparisons, no further conclusions could be derived from the data whose shortcomings highlight the necessity of properly planned and executed experimental studies in this important field (p. 662).

This was the prevailing state of opinion through the mid-1970s, both for psychotherapy with adults (Eysenck, 1965; Rachman, 1971) and with children (Levitt, 1957, 1963, 1971). When Smith and Glass (1977) performed a meta-analysis of the effectiveness of psychotherapy, based on specific, quantitative, outcome measures, as opposed to *improved* or *not improved* (the outcomes assessed in all previous surveys), they were able to demonstrate a moderate degree of effectiveness of psychotherapy. Among the 16 features included were type of therapy and IQ of the clients. They reported negligible differences in the effects produced by different therapy types. They found a .15 ($p < .01$) correlation of IQ (1 = low; 2 = average; 3 = high) with effect size, noting that all cases were assumed to be average unless identified as otherwise by diagnostic labels (e.g., mentally retarded) or institutional affiliation (college attendance). Numerous analyses have followed that continued to show effectiveness of psychotherapy, although IQ is no longer included as a factor.

Following a path of progression similar to psychotherapies for the general population, early reviews of psychotherapies for people with ID, executed by researchers within the international ID community (Butz & Bowling, 2000; Hurley, Pfadt, Tomasulo, & Gardner, 1996; Matson & Sevin, 1994; Prout & Strohmer, 1994), concluded that either psychotherapy was not effective or that the question of efficacy remained unresolved. Literature reviews of psychotherapeutic intervention in ID populations, such as those

performed by Hatton (2002) and Willner (2005), agreed that there was very little evidence concerning any form of psychological intervention for people with ID. Yet, both Hatton and Willner see evidence of effectiveness: "There is scattered small-scale evidence suggesting that various psychosocial interventions may be a feasible intervention option for people with mild intellectual disabilities and a range of mental health problems including depression, anxiety, and anger" (Hatton, 2002, p. 368); and, "The research reviewed in this paper suggests strongly that psychotherapeutic approaches developed in able populations can be applied to the treatment of some clients with learning disabilities" (Willner, 2005, p. 81). Prout and Nowak-Drabik (2003) combined a review of 30 years of literature and a meta-analysis of the nine (out of 92) qualifying studies, concluding that psychotherapy with people with ID yields moderate change and is moderately effective.

In an exchange following the Lynch (2004) review supporting psychotherapy for people with ID, Beail (2005), Hurley (2005), King (2005), and Taylor (2005) all argue, from various perspectives, in support of employing psychotherapeutic interventions with people with ID. Sturmey (2005a, 2006) responds, stressing that since there is no evidence-based psychotherapy for people with ID, no therapy (other than applied behavior analysis) should be employed with this population.

The two most recent meta-analytic evaluations of effectiveness of psychotherapy with people with ID (Prout & Browning, 2011; Sturmey, 2012) reach differing conclusions. Prout and Browning conclude that "Despite the somewhat 'less than rigorous' research base, an overall conclusion is that psychotherapy…appears to be at least moderately beneficial" (p. 57). Sturmey argues that evidence of effectiveness for

this population exists only for behavioral interventions. Matson (2013), commenting on the Sturmey review, concurs with the conclusion that there is a relative paucity of published studies compared to the work with other populations. Matson adds that:

> little progress has been made in the last decade. It appears that much of the clinical practice in this area has been bootstrapped from the general literature. This approach is far from adequate, and more treatment research related directly with the ID population continues to be a major problem, and need. The biggest limitations currently are the need for more and better treatment strategies… (p. 44).

The current study, in addition to adding to the research base on effectiveness of trauma therapy with people with ID, in general, also contributes to a new small, but growing, body of case reports on the use of EMDR with people with ID. It is the first study to present quantitative data supporting the use of EMDR with adults with ID, a therapy that was not included in any of the ID effectiveness literature reviewed.

Adapting Established Psychotherapies for Implementation with People with ID

Despite Matson's (2013) call for more and better treatment strategies, and Sturmey's (2012) admonition that treatment of psychopathology for people with ID should emphasize Applied Behavior Analysis (ABA) and other behavioral interventions, there are potent arguments supporting the adaptation of an array of existing therapies for use with people with ID. In a consideration of the ethical challenges in the treatment of people with ID, Adams and Boyd (2010) allude to the frequent inclusion of aversive techniques in behavioral interventions, recommending that such approaches not be used on the grounds of nonmaleficence. They note that the virtue of justice begs consideration

of whether more socially-valued clients would be subjected to this type of intervention. They conclude that "individuals with ID are not fundamentally different from individuals without ID, and most therapists are likely to find ethical psychotherapy with individuals with ID relies on the same qualities that promote successful outcomes for any client"; and, "a range of relatively straightforward accommodations for conventional psychotherapy techniques can yield effective interventions with positive impact on the client's quality of life" (p. 415).

A clinical consensus is developing on recommended approaches to adapting established psychotherapies for people with ID. Starting with an analysis of therapists' and researchers' beliefs as to why people with ID were not capable of benefiting from psychotherapy, Hurley et al. (2005) identified four erroneous assumptions and biases that have limited the availability of psychotherapy for people with ID. They assert that these beliefs are contradicted by numerous case reports, writings, and a few controlled studies, and categorize adaptations to existing therapies that have been shown to be successful. The erroneous assumptions include that people with ID are: 1) unable to generate verbal mediators (to serve as cues in regulating overt, nonverbal behavior); 2) deficient in the ability to develop insight or recognize causes and consequences of behavior; 3) display emotional disorders that are necessarily a function of brain dysfunction and therefore not suitable for psychotherapy; and, 4) that their problems are either due to mental illness which should be treated pharmacologically or behavior disorders that should be addressed by behavioral interventions. Once these are dismissed as barriers to treatment, adaptations to established therapies can be identified that accommodate the realities of this population.

Results of studies of adaptations made across a wide range of therapies, including psychoanalytic, cognitive, and behavioral, demonstrate a coalescing of opinion. First expressed by Hurley et al. (1996), the adaptations they summarize are exemplified and expanded upon in four National Association for the Dually Diagnosed (NADD) publications (Fletcher, Loschen, Stavrakaki, & First, 2007; Mansell & Sobsey, 2001; Poindexter, 2000; Sturmey, 2005b) and supported by studies researching successful adaptations in practice (Focht-New, Barol, Clements, & Milliken, 2008; Gentile & Jackson, 2008; Joyce, Globe, & Moody, 2006; Whitehouse, Tudway, Look, & Kroese, 2006). These adaptations point to candidate therapies as those capable of:

1. modifying techniques to adapt to the cognitive and developmental level of the individual participant, including adaptation of language and vocabulary to be as concrete and simple as necessary, supported by visual aids where possible; inclusion of diverse activities within the intervention; and, incorporation of inter-session activities
2. using a directive style and structured environments, avoiding subtlety, and conveying clear rules and expectations
3. flexibly adjusting to responses of the individual over the course of the intervention
4. incorporating caregiver involvement, and
5. protecting against the special aspects of transference and countertransference present in the therapeutic relationship with ID clients.

The relative importance of individual adaptations varies among studies, with cognitive behavioral therapy (CBT) interventions, for example, relying more on flexibility, and

psychoanalytic approaches stressing transference issues. All were accommodated within the EMDR protocol used in the current study.

Characteristics of the ID Population that Affect Research Design

The simplicity of the criteria for psychiatric diagnosis of ID (an IQ of approximately 70 or below on an individually administered IQ test; concurrent deficits or impairments in present adaptive functioning in at least two of eleven areas of daily living; and, onset before age 18 years: Luckasson et al., 2002) belies the complexity inherent in this population, which defies reductive classification of population characteristics. Modern definitions of ID have changed as conceptualizations of its etiology have become more complex, concluding that tests of IQ and measures of developmental level are not sufficient for the task, and that clinical judgment must be the final basis for determination of ID and associated level of severity (Luckasson et al., 2002). Estimates of prevalence by severity vary among studies and by collection procedures, with the proportion of the population identified as being in the mild range of ID ranging from 70% to 90% (*Handbook of intellectual and developmental disabilities*, 2007).

Historically, the etiology of ID has been considered to fall into two broad categories: ID of biological origin and ID due to psychosocial disadvantage (Grossman, 1983). Until recently, most literature on ID used the two-group approach in discussing ID, indicating the groups by the terms biological and cultural-familial. Based on developmental theory, two pathways had been conceived: one leading to ID via an identified biological disorder and the other leading to ID from other causes. The former group tends to have lower IQs compared to the latter; the latter group comprises much of what has been termed mild ID (Luckasson et al., 2002).

Some experts feel that maintaining the two-group approach is most useful, and the mounting evidence of complexity in terms of multifactorial etiological influences can be handled by defining the first group as one in which there exists a demonstrated biological cause (regardless of what other risk factors may be involved) and the second group as consisting of all other causes (Hodapp, Burack, & Zigler, 1990). The two-group approach has remained surprisingly stable over time in terms of percentages of the ID population partitioned into each group. Despite the rapidly increasing identification of syndromes related to ID, these new disorders account for a small percentage of the population (Ainsworth & Baker, 2004), and at the same time, better assessment is identifying more of the people with ID of unknown etiology (Simonoff et al., 2006); hence, the two-group ratio of 30% to 70% (biological versus cultural-familial) has remained essentially constant.

Looking to the fields of medicine and psychiatry does not provide direction for research design, since their historical approach to ID can be characterized as having been mainly one of neglect (often far from benign: Black, 2003; Joseph, 2005). The subject of ID was omitted from medical training. Kanner (1967) refers to the widespread notion that "medicine had little to offer therapeutically or prophylactically and that whatever amelioration could possibly be offered was primarily the task of educators" (p. 168). Modern medical/psychiatric research in ID is focused on identifying and elucidating genetic syndromes, rather than addressing factors relevant to the ID population, at large. The most dramatic results of biomedical research in ID in recent years have come from genetically-related discoveries. The identification and description of syndromes of genetic origin that include ID as a feature have accelerated to the extent that printed

textbooks are unable to keep current on the number that exist (Routh & Schroeder, 2003). Instead, investigators and clinicians refer to the Online Mendelian Inheritance in Man (OMIM) website maintained by the National Center for Biotechnology Information (2014). Resident there is a database cataloging human genes and genetic disorders that contains information on over 2,000 genetic causes of ID. This trend to specificity in identifying characteristics of a multiplicity of syndromes, when taken together with the state of knowledge in classification of psychosocial etiologies of people with ID, established the need to pursue new research on a broad-based level. This encouraged the development of selection criteria for the current study that allowed for the widest range of inclusion.

The heterogeneity of the population and its multifactorial etiology (and concomitant lack of taxonomy for understanding population differences) warned against a design that compares groups, whether randomly assigned or based on attribute matching. In the first case, groups would have to be very large in order to have sufficient power for outcome variation to be distinguished from inherent variability. In the second case, the type and number of attributes on which to match groups is a question beyond the state-of-the-art's capability to determine (Hodapp & Dykens, 2001). One requirement of this research was, however, clearly established: participants must be comprehensively and multidimensionally characterized by measures that will have meaning for future research in a number of disciplines. This was a principal factor in the selection of the instrument batteries for the current study.

Characteristics of Psychopathology in ID

In designing research that seeks to investigate the effects of a given trauma therapy for people with ID, understanding aspects of psychological problems in that population is important in determining what psychopathological condition(s) might be most suitably targeted for intervention. ID is an Axis II diagnosis that recognizes defects in cognitive/developmental functioning. Such a diagnosis does not imply anything regarding psychopathology. When an individual is given a simultaneous Axis I or personality disorder diagnosis, this is referred to as dual diagnosis (DD). Historical theories vary in terms of when in human experience the conditions of ID and mental illness (MI) were first recognized as distinct (Nezu, Nezu, & Bill-Weiss, 1992) . However, in modern history, they remained separate fields of inquiry and research until recent decades. In addition to the separation of MI and ID in academic and clinical disciplines, the affected populations have been socially and culturally addressed as though people with MI and people with ID existed as two distinct, non-intersecting sets. Despite efforts early in the 20th century to document the existence of emotional and psychological disorders in individuals with ID (Potter, 1922; Tredgold, 1908), the fields of ID and MI continued to diverge (Nezu, 1994) .

Research and theoretical developments, initiated in the 1970s and led by biomedical advances in etiologies of ID, began to elucidate the causes of both the emotional/behavioral and intellectual components of DD. This increase in interest in DD, and the recognition of the gap between the fields of MI and ID, led to the founding, in 1983, of The National Association for the Dually Diagnosed (NADD). Although a considerable body of research has begun to address critical questions in the DD arena, the long-standing gap between the fields of MI and ID remains substantial.

Relative Prevalence of MI Diagnoses in the ID Population

Numerous studies have assessed the prevalence of MI within the ID population, and despite findings of overall rates of MI as being significantly higher than in the general population, most of what is understood of the relative prevalence of specific classes or diagnoses of psychopathology is clinically-based. Reiss and Bouras (1994) reviewed 30 prevalence studies and estimated that between one and two million people in the United States have a DD of ID and MI or a behavioral disorder. Wallander, Dekker, and Koot (2003) reviewed 19 selected international prevalence studies published between 1970 and 2002. As a result, they estimate that significant psychopathology affects at least one third of all children with ID and is about three times more common than in children in the general population.

Reviews of studies of prevalence rates of individual diagnoses or symptom classifications within the DD population have considered the data to be inconclusive. Sturmey (2005b) reviewed 12 such studies of the prevalence of mood disorders, concluding that there was not the quality of information available to confirm or reject the notion that people with ID have a higher risk of developing mood disorders than their counterparts in the general population. Loschen and Saliga (2000) drew the same conclusion after a review of prevalence studies of anxiety disorders. The information that is available on relative prevalence and incidence of MI diagnoses in the ID population is derived from a wide range of catchment sites, from institutional, clinical and civil sources. The American Association on Intellectual and Developmental Disabilities (AAIDD) has collected and summarized the data as presented in Table 1 (Luckasson et al., 2002).

Table 1

Prevalence of Common Mental Health Disorders in People with ID

Disorder	Percent (%)
Anxiety disorder	10 - 35
Posttraumatic stress disorder	22 (range = 19 - 72)
Psychosis	2 - 5
Depression	6 - 30
Personality disorder	~ 3
Substance abuse	2 - 20

Posttraumatic stress disorder (PTSD), although recognized as a subset of anxiety disorders, can be readily identified as a major component of overall MI in the ID population based on these data. Factors contributing to the development of PTSD include a wide array of individual vulnerabilities and co-occurring conditions that can vary among individuals, but one factor – the experience of trauma – is a necessary condition for all cases. Because that aspect of "etiology" is shared across the ID and general populations, therapies that are effective for treatment of PTSD in the general population become candidates for investigation of effectiveness in the treatment of PTSD in people with ID.

PTSD in the DD Population

Clinicians working with the ID population generally agree that PTSD is under-recognized, under-reported, and under-treated (Cooke, 2003; Esralew, 2002; Focht-New et al., 2008; King et al., 2004; Mansell & Sobsey, 2001; McCarthy, 2001; McCreary &

Thompson, 1999; Rosenberg et al., 2001; Ryan, 1994, 2000; Wilgosh, 1993). They report widely ranging incidence rates, based on a variety of samples.

No formal studies of the prevalence of PTSD within the ID population have been conducted. In the general population, interest in PTSD grew following both World Wars and the war in Vietnam. Traumas recognized as inducing PTSD have extended beyond combat experience to include those associated with motor vehicle or other accidents, natural and man-made disasters, and abuse such as sexual assault and violent crimes. Much research has addressed the epidemiology of PTSD, including assessment of biopsychosocial mediators affecting who will develop PTSD in reaction to which types of stressors (Davidson & Foa, 1993; Delahanty & Nugent, 2006; Gurvits et al., 2000; Kinzie, Cheng, Tsai, & Riley, 2006; Vasterling & Brewin, 2005). In general, 25% of people exposed to trauma develop PTSD (Russell & Shah, 2003; Ryan, 2000).

High rates of trauma, particularly abuse, in the ID population have been recognized. The American Academy of Child and Adolescent Psychiatry (Szymanski & King, 1999) states that PTSD in people with ID might be frequent, and that this population is vulnerable to abuse because of their difficulties in reporting it and their tendencies to want to please others. Horner-Johnson and Drum (2006) reviewed studies of prevalence estimates regarding abuse of people with ID. From the 18 studies included, they concluded that, due to the wide variety of data collected and the limited number of studies, data could not be pooled or summarized quantitatively. However, it is clear that rates of abuse are higher than for people with no disability.

Mansell and Sobsey (2001) report on data collected through *The Abuse and Disability Project* begun in 1987 at the University of Alberta, which studied sexual abuse

in victims with a variety of disabilities. For the participants in the study, offenses tended to be severe and chronic. In 22.4% of the cases, there was a single incident of abuse. In 18.4%, two to ten incidents of abuse were reported. In the largest group (48%), victims disclosed abuse on many (greater than 10) occasions. Emotional and behavioral consequences were experienced by 98.9% of the victims. Mansell and Sobsey declare it to be established that people with developmental disabilities are more likely to be abused than people without disabilities of the same age and gender. They also find that children with ID are at the greatest risk: compared to children without disabilities, they were 3.7 times as likely to be neglected, 3.8 times as likely to be physically abused, 3.8 times as likely to be emotionally abused, and 4.0 times as likely to be sexually abused. They were also more likely to be sexually abused than children with physical, sensory, or health-related disabilities or specific learning disabilities.

Symptoms and Systems for Understanding and Defining PTSD in ID

As is the case for studies of prevalence, information regarding symptom presentation in people with ID is available only through clinical observation. The extensive literature on research into a wide range of biopsychosocial characteristics affected by PTSD in adults and children in the general population makes no mention of PTSD in the ID population; hence, characterization of PTSD in the ID population must be extrapolated from data on the general population, supported by a limited clinical literature. Case studies (Neblung, 2005; Turk, Robbins, & Woodhead, 2005) find that PTSD symptoms, as defined by the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-IV-TR*; American Psychiatric Association, 2000) , are identifiable in people with ID, and recommend focusing on the behavioral expressions, especially the

development of new challenging behaviors and exacerbation of existing ones. A study that combined a literature review with the collected opinions of experts in two focus groups (Mitchell & Clegg, 2005), concluded that adults with ID are likely to show reactions to trauma that are recognized for both adults and children with PTSD in the general population. Mitchell and Clegg also recommend that parental bereavement be considered as a potential PTSD-inducing trauma for adults with ID. These findings are congruent with developmental theories of etiology in ID.

The relevant PTSD symptoms for the ID population, therefore, are the same as for the general population, placing emphasis on behavior and incorporating diagnostic considerations that apply to children. Recommendations for implementing the *DSM-IV-TR* standard criteria for PTSD with people with ID are included in the *Diagnostic Manual - Intellectual Disability* (*DM-ID*: Fletcher et al., 2007). The *DM-ID* recommends that each of the standard criteria should be considered at length, and provides an expanded understanding of the disorder in people with ID. It elucidates aspects of variation in presentation that may be observed in people with ID, per criterion. This manual served as the primary reference for diagnostic aspects of the current study.

Therapy for PTSD in People with ID

Clinical reports and case studies of therapy for people with ID and PTSD are beginning to appear. Although none was included in the reviews of effectiveness of psychotherapy for people with ID, cited above, Sturmey, (2012) did note the lack of research on therapies for PTSD. Published material includes two book chapters, a dissertation, literature reviews of published case studies, and the case studies themselves. In a chapter of the NADD monograph on assessment and treatment of anxiety disorders,

Gaus, Palacio, and Carbone (2000) discuss considerations for use of existing PTSD therapies with people with ID. Seubert (2005) presents an overview of case histories and applied techniques, illustrating the use of EMDR with people with ID. Giamp (2004) used EMDR with 17 volunteer incarcerated inmates with cognitive functioning ranging from borderline to mild ID, and found reductions in levels of distress, avoidance, and intrusiveness of the traumatic memory, in addition to an increase in self-esteem. Rodenburg, Benjamin, Meijer, and Jongeneel (2009) report a case study of EMDR in an adolescent with epilepsy and mild ID, with a significant decrease in trauma symptoms toward nonclinical status from pre-treatment to post-treatment.

A recent literature review of published case studies (Mevissen & de Jongh, 2010) found five case reports – two Cognitive Behavioral Therapy [one with exposure (Lemmon & Mizes, 2002) and one with imagery rehearsal therapy (Kroese & Thomas, 2006)], one psychodynamic (Razza, 1997), and two EMDR (Giltaij, 2004; Tharner, 2006). Mevissen and de Jongh conclude that "although these case reports suggest positive treatment effects for various treatment methods applied to clients with mild ID, PTSD treatment in people with ID has proven to be relatively complicated and is still in its infancy" (p. 314). Four additional case series have been published since the Mevissen and de Jongh review was performed (Barol & Seubert, 2010; Mevissen, Lievegoed, & de Jongh, 2011; Mevissen, Lievegoed, Seubert, & De Jongh, 2011, 2012). These case series comprise a total of 16 cases: ten with mild and two with moderate ID and four with severe ID. The Mevissen group reported on six cases, four with participants with mild ID and two with moderate ID, all resulting in symptom reduction within four to 17 sessions, with gains being maintained at follow-ups ranging from 3 months to 2.5 years. This

group also published a case-series with four participants with severe ID (Mevissen et al., 2012), demonstrating similar results. In all cases, PTSD symptoms decreased, and in all but one case, the gains were maintained at 15.5 months to 2.5 years following treatment. Barol and Seubert (2010) present six cases, ranging from mild to severe ID, and report on variations of techniques for use in adapting EMDR therapy based on participant characteristics. All six of these cases reported symptom improvement. All of the case studies to date report findings in terms of symptom reduction and behavioral improvements, but without quantitative outcome measures. Taken together, they do not yet establish EMDR as an evidence-based therapy for PTSD in people with ID, but they lay the foundation.

The EMDR Conceptual Model and Treatment Structure

EMDR is an integrative therapy approach, incorporating aspects of exposure/desensitization, cognitive restructuring and schema processing, and elements of psychodynamic approaches, such as impact of family-of-origin, object relations, insight, making the subconscious conscious, and working through. These elements are integrated within EMDR's adaptive information processing (AIP) model, and they inform specific elements of the eight phases of EMDR treatment. The eight phases of EMDR treatment impose a structure on the process of treatment that allows it to be readily adapted for research purposes (Shapiro, 2001).

Theoretical Assumptions Underlying EMDR Therapy.

The AIP model conceives of all experiences as being stored in the information processing network of the brain, an intricate system of connectivity encompassing an average of 100 billion neurons, each with up to 10,000 synapses. Experiences that are

inappropriately stored in the brain are considered to be the basis of pathology and processed experiences are the basis of health. Dysfunctional/pathological traits, behaviors, beliefs, affects, and bodily sensations are theorized to be manifestations of the unprocessed, physically-stored memories, which need to be accessed and processed (Shapiro & Maxfield, 2002).

The model posits that adaptation within the information processing system is intrinsic (Shapiro, 2006). This can be thought of as analogous to the principle of homeostasis, the inherent, physiological tendency of complex systems to achieve balance. Based on this view, the information processing system integrates incoming sense perceptions, stores them as memories, and moves them from one memory system to the next (sensory, working, short-term, long-term, implicit, explicit). Memories stored in associative networks are the basis of perception, response, attitudes, self-concept, personality traits, and symptoms. Perspectives, affects, and sensations are not ephemeral "learned" reactions, rather they are considered to be manifestations of the stored memory and the reactions to them (Shapiro, 2006).

According to the AIP, memories with disturbing affects and sensations are dysfunctionally stored so as to be unable to (adaptively) connect to other positive life experiences stored within other networks. This dysfunctionally stored memory may contain, within its isolated network location, specific aspects of a disturbing event, including sensory input (images, sounds, smells, touch, taste), thoughts, emotions, and internal physical sensations as they occurred at the time of the event, and beliefs or meta-perceptions that are interpretations of the perceptions of the event. Some theorists have inferred these dysfunctionally stored memories to be of the implicit/non-declarative

memory system. When activated, what occurs is more of a re-experiencing than a remembering, in the view of the AIP model. The negative perspectives, affects, and sensations color the perceptions of the present, and these new experiences are stored as memories within the dysfunctional network. This expanding network reinforces the previous experiences. The dysfunction is hypothesized to exist because the negative networks are unable to link up with the more adaptive information (Shapiro, 2006). It is thought that processing the dysfunctional experiences transfers them from implicit and episodic memory to explicit and semantic memory systems (Shapiro, 2001; Stickgold, 2008).

EMDR Therapy: Mechanisms of Action

EMDR therapy incorporates aspects of a number of psychotherapeutic approaches for which mechanisms of action have not been established, but the component of the EMDR therapy that can be considered unique is the eye movement. Eye movement – the tracking with eyes by the client of the therapist's fingers moving horizontally from left to right – has been part of the EMDR therapy from its inception. Although applications of EMDR using other forms of bi-lateral stimulation (BLS) such as alternating tapping or tones have been accepted in practice, it is the eye movement that has been most extensively researched, including dismantling studies, all of which were reviewed in a recent meta-analysis (Lee & Cuijpers, 2013). This was a systematic review of the literature, addressing two groups of studies. The first group comprised 15 clinical trials and compared the effects of EMDR therapy with eye movements to those of EMDR without the eye movements. The second group comprised 11 laboratory trials that investigated the effects of eye movements while thinking of a distressing memory versus

the same procedure without the eye movements in a non-therapy context. The total number of participants was 849. The effect size for the additive effect of eye movements in EMDR treatment studies was moderate and significant (Cohen's $d = 0.41$). For the second group of laboratory studies the effect size was large and significant ($d = 0.74$). The strongest effect size difference was for vividness measures in the non-therapy studies ($d = 0.91$). The data indicated that treatment fidelity acted as a moderator variable on the effect of eye movements in the therapy studies. Results were discussed in terms of current theories that suggest the processes involved in EMDR are different from other exposure-based therapies.

Although the Lee & Cuijpers (2013) review confirms the additive therapeutic value of eye movements, this debate continues (Lee & Cuijpers, 2014). Explanations of how underlying psychological and neurophysiological functioning produce these effects are posited in these reviews, however, understanding these effects and all aspects of the EMDR therapy are the subjects of ongoing research.

The neurophysiological bases of EMDR therapy are currently unknown, but several mechanisms of action may be interacting to achieve the therapeutic effects. Oren and Solomon (2012) review a number of psychological mechanisms that have been suggested as distinguishing EMDR therapy from traditional cognitive behavioral approaches. One such mechanism involves “extinction” versus “reconsolidation”. In EMDR therapy, the proposed mechanisms of action include the assimilation of adaptive information found in other memory networks that link into the network holding the previously isolated disturbing event (Solomon & Shapiro, 2008). After successful treatment, the memory is no longer isolated, having become appropriately integrated

within the overall memory network. This is consistent with neurobiological theories of reconsolidation of memory (Cahill & McGaugh, 1998; Suzuki et al., 2004), which propose that a memory, once accessed, can become capable of being restored in an altered form. EMDR therapy, by creating new associations with previously isolated memory networks, exemplifies the mechanism of reconsolidation, which alters the original memory. Extinction processes, on the other hand, are understood to create new memories that compete with the old, dysfunctional memories.

Exposure therapies require the client to describe the memory in detail. This requirement is not part of the EMDR therapy. Rather, the clinician assists the client in identifying an image representing the negative memory and the presently held negative belief and desired positive belief, emotions, and sensations associated with the memory. The state that results is the starting point of the unimpeded processing to follow. Experiences that have been insufficiently processed may be stored in fragments (van der Kolk & Fisler, 1995). Hence, the interconnecting of dissociated mental imprints of sensory and affective elements of the traumatic experience may be a procedural element that facilitates processing, allowing the client to reconnect these disparate parts of the experience, helping the client make sense of the experience, and facilitating storage in narrative memory. Shapiro and Laliotis (2011) suggest:

> the presence of these unmetabolized components of memory explains why clients will often describe their childhood traumas in the same kind of language and intonation they used when the event occurred, and demonstrate the emotions, postures, and beliefs consistent with that developmental stage. They do not merely describe the feelings of shame

and helplessness of the past, but actually experience these emotions and physical sensations in the present (p.193).

Cognitive restructuring, as understood within traditional cognitive therapies, identifies an irrational self-belief (negative cognition) and then deliberately challenges, restructures, and reframes the belief into an adaptive self-belief (positive cognition; Beck, Rush, Shaw, & Emery, 1979). With EMDR therapy there is no specific attempt to change or reframe currently held beliefs, rather beliefs are allowed to shift spontaneously during processing. From an AIP perspective, establishing a preliminary association between the negative and positive cognitions should function to facilitate the subsequent processing by activating relevant networks.

One possible mechanism of action, which comes into play during active processing, may be mindfulness. The instruction to "let whatever happens, happen" and to "just notice" what is coming up (Shapiro, 2001) is consistent with principles of mindfulness (Siegel, 2007). Such instructions reduce demand characteristics, and perhaps also assist clients in noticing what they are feeling and thinking, without judging. Research has shown that adapting a cognitive set in which negative thoughts and feelings are viewed as passing mental events, rather than aspects of self (Teasdale, 1997; Teasdale et al., 2002), has a beneficial therapeutic effect. However, where meditation techniques generally expect a return to the original focus (Tzan-Fu, Ching-Kuan, & Nien-Mu, 2004), EMDR therapy clients are asked to simply "notice" the various associations as they arise.

Perceived mastery may be another important procedural element contributing to EMDR results. Exposure techniques require focused attention, and discourage interrupting attention to the incident in order to prevent avoidance. EMDR therapy uses

only short attention to the various associations that arise internally during sets of the eye movements that are used with the EMDR therapy process. Consequently, during EMDR, clients may experience an increase in their sense of mastery in being able to go back and forth between experiencing the event, to notice what is happening and report on it. The client's coping efficacy may be enhanced along with their ability to manage stress, anxiety, and depression in threatening situations (Bandura, 2004). From an AIP perspective, this experience of mastery and efficacy becomes encoded in the brain as adaptive information available to link into memory networks holding dysfunctionally stored information.

Finally, exposure therapies support a high level of disturbance when initially focusing on the disturbing event. In contrast, the eye movements utilized in EMDR may result in an increase in parasympathetic activity demonstrated by a decrease in psychophysiological arousal (Sack, Lempa, Steinmetz, Lamprecht, & Hofmann, 2008), and a decrease in vividness and emotionality of negative material (van den Hout, Eidhof, Verboom, Littel, & Engelhard, 2013) in addition to an increase in attentional flexibility (Kuiken, Bears, Miall, & Smith, 2001). Perhaps such effects allow information from other memory networks to be able to link into the targeted network holding the dysfunctionally stored information (Shapiro, 2001, 2006) resulting in a transformation and then reconsolidation of the memory (Cahill & McGaugh, 1998; Suzuki et al., 2004).

Neurobiological research associated with EMDR has centered on its BLS component (visual, auditory, and tactile) and its relationship to the neural circuitry underlying EMDR's mechanism of action. It was surveyed by Bergmann (2010), who reviewed neuroimaging, psychophysiological, and qEEG studies of EMDR, as well as

theoretically driven speculative models. His summarized findings are presented in Table 2. Consolidating the patterns resulting from this research, he speculated that EMDR's sensory stimulation appears to mediate the orienting response (OR), facilitating parasympathetic, cholinergic, and information processing mechanisms. Bergmann observed that the repetitive sensory stimulation and repetitive OR appear to activate cerebellar, hypothalamic, medullary (vagal), pontine, thalamic, and orbitomedial/prefrontal cortices in the following ways:

> a) Repetitive ORs are proposed to mediate the activation of the ventral vagal complex, located in the nucleus ambiguous, of the medulla, promoting increases in RSA/HRV, a resultant increase in parasympathetic functioning, and the facilitation of information processing.
>
> b) Repetitive ORs are hypothesized to mediate cholinergic mechanisms, leading to pontine-geniculateoccipital (PGO) activation, leading to the activation of REM systems. This may facilitate, through REM-like information processing, the subsequent reduction in both the strength of hippocampally-mediated episodic memories, as well as the amygdaloid-mediated negative affect of PTSD and the subsequent integration of traumatic memories into general semantic networks.
>
> c) Repetitive sensory stimulation and repetitive ORs are predicted to activate the lateral cerebellum, facilitating through its output dentate nuclei the activation of the ventrolateral and central lateral thalamic nuclei. Comprising the major components of the

Table 2.

EMDR Neurobiology: Theoretical Models and Related Empirical Studies

Theoretical model	Proposed areas of neural involvement	Proposed physiological changes	Research support	Research contradiction
Conditioning model (Dyck, 1993)	None	Deconditioning, reciprocal inhibition, distraction	Relaxation response–reciprocal inhibition (Wilson et al., 1996) Increased HRV/parasympathetic tone (Sack et al., 2007, 2008) Increased vagal parasympathetic function (Elofsson et al., 2008; Söndergaard & Elofsson, 2008)	None to date
Orienting response model (Armstrong & Vaughan, 1996; Denny, 1995; MacCulloch & Feldman, 1996)	None	Inhibition of the conditioned response by the repetition of the orienting response	Reduced electrodermal arousal (Barrowcliff et al., 2003, 2004)Reduction of P3a—correlate of orienting response (Lamprecht et al., 2004)Increased vagal parasympathetic function (Elofsson et al., 2008; Söndergaard & Elofsson, 2008)	Increased sympathetic response (Gunter & Bodner, 2008)
Frontal lobe activation model (Bergmann, 2000)	Cerebellum, thalamus, and frontal lobes	BLS-induced sequential, activation of the cerebellum, ventrolateral and central lateral thalamic nuclei, and frontal lobes	Increased thalamic activation (Richardson et al., 2009) Increased dorsolateral cortex activation (Lansing et al., 2005; Levin et al., 1999; Oh & Choi, 2007) Increased HRV/parasympathetic tone (Sack et al., 2007, 2008)	None to date
REM systems activation model (Stickgold, 2002, 2008)	Brainstem, hippocampus, and semantic cortex	BLS-induced activation of REM sleep systems, thereby integrating traumatic memories into general semantic networks	REM-induced adaptive associations and memories (Walker et al., 2002) Decreased cardiac and skin conductance (Elofsson et al., 2008; Söndergaard & Elofsson, 2008)Increased skin temperature, hypercapnia, and hypoxia (Elofsson et al., 2008; Söndergaard & Elofsson, 2008)Sleep dependent memory processing (Rasch et al., 2007)	None to date
			(continues)	

Table 2.

EMDR Neurobiology: Theoretical Models and Related Empirical Studies (continued)

Theoretical model	Proposed areas of neural involvement	Proposed physiological changes	Research support	Research contradiction
Anterior cingulate reciprocal inhibition/suppression model (Corrigan, 2002; Kaye, 2007)	Anterior cingulate cortex (ACC)	BLS-induced deactivation of the ventral ACC and eventual activation of the dorsal ACC	None to date	None to date
Hippocampal remapping model (Lister, 2003)	Hippcampus	BLS-induced reintegration of the hippocampal cognitive map	None to date	None to date
Limbic circuit depotentiation model (Rasolkhani-Kalhorn & Harper, 2006)	Amygdalo-hippocampal limbic circuit	BLS-induced LFS facilitates depotentiation of limbic circuits, resulting in quenching or modifi cation of fear traces	Slowing of the depolarization rate of neurons in the frontal lobes, from 7 Hz to 1.5 Hz (Harper, Rasolkhani-Kalhorn, & Drozd, 2009) Decreased temporal lobe activation (Oh & Choi, 2007; Pagani et al., 2007)	None to date
Thalamic temporal binding model (Bergmann, 2008)	Cerebellum, thalamus, and frontal lobes	Cerebellum, thalamus, and frontal lobes BLS-induced activation of the ventrolateral and central lateral thalamic nuclei, facilitating repair of thalamic hypoactivation, impaired temporal binding, and frontal lobes activation	Increased thalamic activation (Richardson et al., 2009) Increased dorsolateral cortex activation (Lansing et al., 2005; Levin et al., 1999; Oh & Choi, 2007) Increased HRV/parasympathetic tone (Sack et al., 2007, 2008	None to date
Parietal lobe activation model (Pearson, 2009)	Parietal lobes	BLS-induced stimulation of the parietal lobes, facilitating the reintegration and updating of body schema, and concept of self	None to date	None to date

> thalamocortical circuitry that mediates the binding and integration of neural functioning, its activation may facilitate the repair and integration of somatosensory, memorial, cognitive, emotional, and hemispheric functioning. In addition, the activation of the ventrolateral thalamic nucleus (through its projections) may activate the prefrontal cortices, the most consistent finding of EMDR neuroimaging studies (p. 39-40).

For psychotherapies that were developed as an application of established principles of psychology, such as exposure and systematic desensitization, clinical research that demonstrates effective outcomes provides validation of the principles that generated the therapy. Their mechanisms of action – psychological, physiological, and neurobiological – can be researched and understood in relationship to the original, established principles. For psychotherapies that are developed based on theories of psychological functioning, successful outcomes in clinical research are understood as a validation of the psychological theory. That theory, in turn, provides a structure that can inform the direction of research into their physiological and neurobiological mechanisms of action. EMDR is not psychotherapy in the traditional sense, but incorporates aspects of some of those theories. EMDR also includes an element that can be considered an independent element, as it focuses on the role of eye movement. Understanding the mechanisms of action that underlie the effects of eye movement thus presents a broader research challenge because the search must address both the theoretical bases for, as well as the mechanisms of, change. This lack of theoretical underpinning is an additional

limitation to designing research that seeks to illuminate the processes that are involved in successful outcomes.

Efficacy of EMDR Therapy

Although the *how it works* questions of EMDR therapy remain ongoing topics of research, *that it works* in the treatment of trauma has been fairly well established. Based on over 20 controlled studies that entailed comparisons to both pharmaceuticals (van der Kolk et al., 2007) and a number of forms of psychotherapy (Bisson & Andrew, 2007), EMDR has been recommended as a first line treatment in numerous practice guidelines, including those of the American Psychiatric Association (2004), the International Society for Traumatic Stress Studies (Foa, Keane, Friedman, & Cohen, 2008), the Department of Veterans Affairs, Department of Defense (2010), the World Health Organization (2013), and similar organizations in Israel, Ireland, Netherlands, France, and the United Kingdom (EMDR International Association, 2014). None of these organizations make reference to the efficacy of EMDR with people with ID.

Treatment Structure and the Eight Phases of EMDR Therapy

The eight phases of the EMDR therapy are designed to facilitate targeting of dysfunctional memory networks and processing of the targeted memory such that the appropriate connections can be made to the adaptive networks. The associations that arise in consciousness are understood to indicate the connections that are being made, but many other associations are believed to be occurring throughout memory networks without arising in consciousness. In therapy and in research, the eight phases are followed in a specific and orderly manner. Details of the procedure are presented, step-by-step, in Appendix A. The eight phases are summarized below.

Phase 1: client history. Data are collected relating to the experiential contributors of dysfunction and health that need to be processed. History taking allows the therapist to conceptualize the case according to the adaptive information processing model, and to make client selection decisions.

Phase 2: client preparation. Building client rapport proceeds in a more specific manner than that which occurred during the history taking phase. The EMDR process is explained and the types of bilateral stimulation that are available are demonstrated. These include eye movement, alternating tapping of hands or knees, and alternating sounds from left to right ears. Equipment that could be used (e.g., light bars inducing eye movement, ear phones with recorded sounds or music, hand-held tapping devices) is demonstrated. Techniques are established for grounding/returning to sense of comfort and safety (should abreactions occur), as is a specific "stop" signal for the client to use when the intensity of disturbing experience is becoming too aversive/overwhelming. It is also during this phase that clients develop resources, as necessary, to use as supports in addressing and processing of traumatic issues. The number and nature of resources to be developed depend on the current emotional and behavioral functioning of the client and the intensity of the disturbance associated with the trauma. The therapist performs the resource needs analysis and guides the client in her/his development and installation as part of this Phase. It is the extent of resource needs that tends to determine the length of Phase 2, which can require multiple sessions.

Phase 3: assessment. The target for processing is accessed by stimulating the primary aspects of the memory: image, cognition, emotion, and sensation. A form originally developed as a practice worksheet has come into standard use for this purpose,

and was used in the current study (see Figures A1 and A2). The assessment is highly structured in format, and each aspect of the target memory is delineated, in turn. It includes identifying a picture or image or specific sensory representation of the memory, expressing the negative cognition (self-belief) that best matches the memory, the positive cognition that represents the goal of processing the memory, and identifying specific emotions and bodily feelings associated with the memory. At this point, initial measures on the Validity of (positive) Cognition (VoC) and Subject Units of Disturbance Scale (SUDS) are collected (Shapiro, 2001). The VoC ranges from 1 (*completely false*) to 7 (*completely true*). The SUDS ranges from 0 (*no disturbance/neutral*) to 10 (*highest disturbance*). Versions of these scales have been developed for use with children, employing pictographs of faces. Many adults like using these scales; hence, they were used in the current study (see Figure A3).

Although the SUDS and VoC are considered measures of progress, they are process measures associated with the EMDR therapeutic protocol, as opposed to measures employed to determine research outcome. In the current study, the SUDS and VoC were employed as part of the therapy process, not to produce outcome data.

Phase 4: desensitization. Upon eliciting the target dysfunctional memory in its dimensional aspects, processing begins. The therapist introduces the form of bilateral stimulation established as most comfortable for the client. While the client attends to the bilateral stimulation, he/she simultaneously allows the free flow of processing of the target memory to occur. Most typically, the therapist instruction to the client at this point is to "just notice what happens." This dual attention of attending to the bilateral stimulation while "just noticing what happens" to the image, feelings, sensations, and

thoughts following from the elicitation of the target memory promotes adaptive processing of the dysfunctional memory network. After each set of bilateral stimulation, the therapist says, "Blank it out. Take a deep breath. What do you get now?" The trained therapist, noting the verbal response as well as other indicators, will take the VoC and SUDS measures at the appropriate stage. Desensitization continues until the SUDS rating equals 0.

Phase 5: installation. This phase focuses on increasing associations to positive cognitive networks. The positive cognition is elicited accompanied by brief sets of bilateral stimulation. This phase is complete when the VoC rating equals 7.

Phase 6: body scan. The client is asked to perform a body scan, being particularly aware of the sensations that were originally associated with the target memory. Processing continues until the client reports a clear body.

Phase 7: closure. The client is returned to the present and client equilibrium is maintained. This phase can occur at the end of completely processing a target (when the SUDS rating is 0, the VoC rating is 7, and the body is clear) or at the end of a session when processing of the target is to continue next time. Information and guidance regarding potential inter-session experience are given.

Phase 8: reevaluation. During a return session that occurs after completing processing of a target at the previous session, the target memory is re-elicited. The therapist asks, "What is the experience of bringing it up now? Was it, indeed, completely processed?" If so, and if there was only one target to be processed, therapy is complete. If further processing of this or other targets is required, the therapist returns the client to the appropriate phase.

Adapting EMDR for Implementation with People with ID.

The discussion above, regarding *Adapting Established Psychotherapies for Implementation with People with ID*, applies directly to EMDR. In addition, two clinicians who have experience using EMDR with people with ID participated in the current study as advisors: Karyn Harvey, Ph.D., Assistant Executive Director (Quality Supports), The Arc Baltimore, Maryland, and Andrew Seubert, LPC, NCC, ClearPath Healing Arts Center, Corning, New York. Their advice and recommendations regarding adapting EMDR for people with ID were remarkably consistent with the recommendations made by Hurley et al. (1998). For some examples of how these adaptations are applied in EMDR, see Seubert (2005).

Rationale for Study Approach

Factors influencing the selection of research approach and experimental design include the heterogeneity of the population, the history and state of current psychological research, the biopsychosocial nature of the symptoms of the diagnosis of interest, the pool of available, potential participants, the research setting, and the theoretical effects and established protocol of the intervention.

As described earlier, people with ID comprise a population that varies on many dimensions, and for many of those dimensions, theoretical understanding of factors influencing the variations is lacking or debatable. Additionally, empirical evidence of the variations presents many discrete instances that are not readily classifiable into higher order groups. One variable is IQ, but it is not clear if this variance is continuous, with levels of severity determined by arbitrary cut-off points, or if etiologies of ID are such that people tend to fall into a category (e.g., mild or severe) depending upon whether the

cause was biological or cultural-familial (psychosocial) or upon an interaction of factors. The necessary condition of deficits in adaptive functioning has many of the same concerns, with the added disadvantage of there being no agreed-upon standard for measuring such deficits. The picture is further complicated because, for most people with ID, the etiology is believed to be multifactorial, including more than one factor in both the biological (indeed perhaps even more than one factor in chromosomal variation, alone) and psychosocial domains. Hence, randomized controlled trials would require either very large groups (in order to statistically distinguish between experimentally-introduced and all other variations), or very carefully matched groups (with extensive exclusion criteria).

An experimental approach for avoiding the problems of population heterogeneity is that of the single-participant or case-based design. This is a design that has been widely used in behavioral research, but is equally applicable to psychodynamic investigations (Roth & Fonagy, 2005). In this design, data are collected for a single participant in order to determine the effects of an intervention. The participant serves as his/her own control because the dependent variables are measured within the same person over the course of manipulation of the independent variable. Case-based designs provide an empirical method for understanding the uniqueness of the person (the ideographic approach), and serve to guide treatment development as a precursor to research using group designs (the nomothetic approach (Kazdin, 2003, 2008). As case-based experiments assessing effectiveness of a given intervention accumulate, they generalize to establish treatment effectiveness for broader classes of symptoms and populations. This was recognized by Chambless et al. (1998) when they established criteria for empirically supported

therapies, identifying the case-based design as one of the acceptable research methods for assessing treatment validity, and developing solid criteria for its use in establishing treatment effectiveness.

Perhaps the most compelling support for the appropriateness of a case-based versus randomized-controlled-trial design is the lack of previous applicable research to the current question. There exists no organized body of research to guide design of any aspect of a controlled-group design assessing psychotherapeutic interventions with people with ID. Intervention research to date has included only that addressing psychopharmacy, behavioral techniques, and to some extent, educational approaches. Psychological research in ID has attempted to discover principles defining attributes of ID in terms of memory, perception, neurocognition, learning processes, and related fields. Although these efforts produced some interesting observations regarding concepts such as rigidity and spread of activation, no cohesive body of evidence has emerged, and no unified theories have been established.

Quantitative research on psychotherapeutic interventions with people with ID is virtually nonexistent. Thus, research done at this stage should be fundamental in aim, seeking to play a role in laying the groundwork for future research. In support of this goal, the current study seeks to contribute to knowledge regarding measures that are appropriate, practical, and potentially discriminatory of change states in characteristics of significance in the expression of psychopathology in people with ID.

PTSD appears to be one of the most prevalent of psychiatric diagnoses in the ID population, and one that no doubt causes great suffering, community disruption, and social cost. It also appears to be amenable to psychotherapeutic intervention. Symptoms

of PTSD are also multidimensional in nature, which dictates the desirability of multiple dependent measures, since it would be useful to understand if change resulting from a particular intervention occurred in more than one dimension, and if so, which dimension(s). Again, the lack of previous research leaves open the question as to which dependent measures are those which will best serve future research investigating the effectiveness of trauma therapy.

The selection of EMDR as the intervention in the current study was based on its clearly-established, eight-phase protocol, the relative ease with which it is adapted to the ID population, its theoretically integrative nature, and its empirically established validity as being effective for PTSD in the general population. Clinical and case reports of its effective application with people with ID were also a strong factor supporting its selection. Its impact on the experimental design is that there is an established format for executing the intervention, that the format incorporates measures that dictate when the intervention is completed, and that EMDR addresses the biopsychosocial nature of PTSD and its symptoms.

Experimental Design

Responding to the considerations identified above, the current study employed a multiple-baseline across participants A-B-A with Follow-up design. A multiple-baseline across participants design "involves the evaluation of the impact of a particular intervention across at least two individuals matched according to relevant variables, who are presumed to be exposed to identical (or at least markedly similar) environments" (Thomas & Hersen, 2003, p. 196). The current study evaluated the impact of the EMDR intervention across six individuals, all of whom have ID and psychopathology reflecting

histories of trauma. The study was carried out at a single location managed by the principal investigator (PI). During the course of the study, all participants were residents of supported living agencies operating under the auspices of the Developmental Disabilities Administration of the Department of Health & Mental Hygiene of the State of Maryland.

A-B-A refers to the three primary stages of the current study, also referred to within the protocol as Baseline, Intervention, and Maintenance. A-B-A experimental designs have an established history in behavioral analysis as a "reversal design" which, as described by Cooper, Heron, and Heward (2007):

> entails repeated measures of behavior in a given setting that requires ... three consecutive phases: (a) an initial baseline phase in which the independent variable is absent, (b) an intervention phase during which the independent variable is introduced and remains in contact with the behavior, and (c) a return to baseline conditions accomplished by withdrawal of the independent variable (p. 177).

"A" refers to the experimental stage during which the independent variable (the intervention) is not present, and "B" refers to the stage during which the intervention is present. Ordinarily, behavior exhibited during the first A stage is expected to be modified during the B stage (in the presence of the intervention) and then to display a reversal to original responding in the second A stage (upon removal of the intervention). In clinical applications such as the current study, however, a reversal to the originally observed behavior upon removal of the intervention (i.e., completion of the EMDR therapy) is not expected. Indeed, a central hypothesis of the current study was that behavior change

brought about by the intervention would not reverse to pre-intervention conditions. To further test this hypothesis, participants returned after a hiatus following the second A (Maintenance) stage for repeated assessment during a Follow-up stage. Clinical interventions also address behavior in its broader context of overall biopsychosocial functioning. For the current study, two complements of instruments were developed: the Participant Characterization Battery (PCB) and the Participant Response Battery (PRB). These batteries contain psychological, physiological, intellectual, emotional, social, and behavioral measures.

The PCB served two purposes. The first was to respond to the requirement that individuals who participated in the study be particularly well-characterized. This stemmed from attributes of the ID population and of research in relevant fields, including: the heterogeneity of the ID population; the early stage of research on outcomes of psychotherapy with this population; the complexity of the clinical picture of trauma-induced psychopathology, and the on-going development of theory and research findings regarding the physiological and psychological effects of trauma, particularly in complex PTSD; and, the lack of a research base on both the expression of trauma-induced psychopathology in people with ID and outcomes of EMDR in people with ID. The measures of the PCB provide an array of data that served to comprehensively describe each participant. Although some of these measures are considered to be more trait than state measures, reports of the ability of EMDR to bring about trait changes suggested that retesting after the Intervention stage (during Maintenance, and Follow-up) may show improvement in components of this battery over Baseline stage results. Thus, the second

purpose of the PCB was to serve as pre- and post-intervention outcome measures of interest.

The PRB, by contrast, contains the complement of measurements taken and instruments administered each week throughout the A-B-A and Follow-up stages, comprising the primary dependent variables of the experiment. This battery produced the time-series data used to determine whether the EMDR intervention brought about significant change in the participants' post-trauma negative experience.

Although the multiple-baseline across participants design requires the application of the independent variable across at least two participants, and the data derived from the dependent variable measures may certainly be looked at in comparing one participant to another, this comparison is not the data analysis objective of the case-based design. In the case-based approach, each participant is her or his own control. Data obtained during and after the Intervention stage are compared to data from the Baseline (control) stage. As employed in behavior analysis, the resulting time-series data are typically presented graphically, and the true data analyses are performed by the consumer of the research results as he or she interprets the data, visually, comparing levels of dependent variable measures among the stages (A-B-A) of the experiment. Graphs of data resulting from the current study are presented across all experiment stages, for all dependent variables, and all six participants. They are supported by statistical analyses of trends.

Method

Participants

Participants were six adult clients of The Arc Baltimore, a service agency operating under the Maryland Department of Health and Mental Hygiene, Developmental Disabilities

Administration. Dr. Karyn Harvey, Associate Executive Director of Quality Supports, supervised Participant selection.

Inclusion criteria. Inclusion criteria included that participants be adults (age 18 - 65) and meet *DSM-IV-TR* criteria for two diagnostic categories: 1) ID (borderline to mild and mild to moderate, and in particular for this study, cognitive functioning equivalent to IQ levels within the range of approximately 55 to 75) and 2) either PTSD, with criteria as adapted for individuals with mild to moderate ID by the *DM-ID*, or diagnoses reflecting the components of complex PTSD with a history of multiple traumas, or diagnoses reflecting the behavioral/physiological/psychological sequelae of trauma history. Participants also were required to be able to communicate through both receptive and expressive language modes, be aware of and able to report facts of their trauma/abuse history, and have been deemed capable of providing informed consent by a qualified representative of the Developmental Disabilities Administration.

Exclusion criteria. Exclusion criteria included the presence of a concurrent disruptive life event, such as a major life transition, bereavement, or recent and ongoing problem that effectively prevents a focus on therapeutic issues during treatment. Additional exclusionary criteria were: a history of sexual aggression, necessary because evidence exists that separate developmental pathways lead from childhood sexual abuse to either PTSD symptom clusters or to perpetration (Firth et al., 2001); current diagnosis of dissociative identity disorder (DID); and, previous trauma treatment with EMDR.

Selection process. Dr. Harvey initiated the selection process by performing a review of the psychiatric records of all Arc Baltimore clients who had received psychological services through that agency. Of a pool of 310 candidates, none were found to have a

previously determined diagnosis of PTSD. Upon a more in-depth review of client histories, she identified 30 people who had both current symptoms and/or diagnoses suggestive of PTSD, and records of past trauma. She interviewed all 30 individuals, resulting in an initial pool of 12 candidates who met criteria.

Of the pool of 12 selected candidates, all presented with diagnoses of PTSD, although none was single-incident. All had histories of multiple traumas, with childhood onset. During the onsite screening process, four were eliminated due to inability to meet the receptive/expressive language criteria. Six began the protocol. Two of these were eliminated during Baseline, one due to an assessed IQ above criteria (and a suspected diagnosis of autism rather than ID) and one due to excessive expression of psychotic symptoms, resulting in three hospital visits during Baseline. These two were replaced by two from the pool, and they began the protocol during the same week. One of the replacements was found to have very limited receptive language capabilities. He had become so adept at appearing to understand what was being said that he was able to pass the language screens and part of the consent process before it became evident that he did not meet the receptive language inclusion criterion. Of the three remaining in the pool, two did not pass the initial screening, and so the last person in the pool entered the research protocol, completing the cohort of six.

Participant demographics and information for the six participants, all of whom completed a minimum of 60 weeks of active research protocol visits, are given in Table 3 for females and Table 4 for males. Beyond the commonalities imposed by the inclusion and exclusion criteria, they are diverse in age, racial make-up, medical histories, psychotropic medications prescribed, and level of support required in daily functioning.

Table 3

Participant Demographics and Information: Females

	Participants		
Information	050	052	053
Age at Start	37	53	48
Race	AA	C/Native American	C
Housing	Group home	Group home	Independent
Support Staffing	Transportation and home supervision. Self-medicates 8 hr per day unsupervised	Transportation and home supervision Medication administered. 12 hr per day unsupervised	Transportation and financial assistance. Self-medicates 24 hr per day unsupervised
Presenting Diagnoses	• PTSD, Chronic • Dissociative Disorder, NOS • Mild ID	• PTSD, Chronic • Major Depression • Mild ID	• PTSD, Chronic • Mild ID
Psychotropic Medications	Prozac	Trazadone, Paxil	N/A
Medical Conditions	Gastritis, seasonal allergies, gum disease	Diabetes type II, edema, high cholesterol, hypertension, hypothyroidism, osteopenia, seborrhea, rosacea	Allergies, high cholesterol, nocturnal enuresis, encopresis, signs of Fetal Alcohol Syndrome
Other Medications	Depo-Provera, Doxycyclin, Chlorhexidine, Loratadine, calcium	Synthroid, Furosemide, Avapro, Lipitor, Zetia, Colace, Desonide, Fexofenadine.	Mevacor Ranitidine
Protocol Start	11-30-2010	12/02/2010	12/02/2010
Protocol End	05-15-2012	05/03/2012	05/10/2012
# of Visits	60	69	96
Attendance	98%	98%	97%
Employment	Janitorial	Janitorial	Janitorial

Table 4

Participant Demographics and Information: Males

	Participants		
Information	051	066	068
Age at Start	69	62	41
Race	C	C	AA
Housing	Independent	Independent	Group home
Support Staffing	Transportation and supervision for up to 12 hr per week Self-medicates 24 hr per day unsupervised	Transportation and supervision for 12 hr per week Self-medicates 24 hr per day unsupervised	Transportation and home supervision Medication administered 24 hr per day unsupervised
Presenting Diagnoses	• PTSD, Chronic • Mild ID	• PTSD, Chronic • Major Depression • Mild ID	• PTSD, Chronic • Psychotic Disorder, NOS • Mild ID
Psychotropic Medications	N/A	Lexapro, Seroquel , Trazadone	Zyprexa, Depakote
Medical Conditions	Hypertension, acid reflux, gout, arthritis, high cholesterol, edema, cataracts, metal plate in left knee	Migraines, arthritis, high cholesterol, hypertension, degenerative disk disease, gastritis	Gastritis, osteoarthritis, chronic back pain
Other Medications	Tenoretic, Furosemide, Niaspan, Potassium extended release	Tricor, Flonase, Nizoral, Prinvil, Zestril, Glycolax, Prilosec, Proctosol, Monodox, Robaxin, Carafate	Clotrimazole, Docusate sodium, Chlorhexidine Gluconate rinse
Protocol Start	12-01-2010	2/24/2011	04/13/2011
Protocol End	04-04-2012	10/11/2012	05/09/2012
# of Visits	65	80	73
Attendance	100%	98%	95%
Employment	Retired	Unemployed	Landscape

Setting and Apparatus

The research was conducted at the offices of the PI, in downtown Baltimore, Maryland. The building housing the site was renovated to comfortably meet the requirements of the study. In addition to three large rooms on the first floor that served as the location for data collection, intervention delivery, and researcher workspace, there were rooms on the second floor furnished to accommodate support staff accompanying participants, including separate kitchen and bathroom facilities. The first floor also had a separate reception area with an attached bathroom, as well as a protected bathroom accessible from the researcher work space and an isolated back exit from the researcher work space, with access to the building's rear entrance and to the second floor. All rooms were fitted with locks operated by unique keys (i.e., each room had a different key).

The apparatus employed in the research included: equipment necessary to take physiological measures; computers to monitor and control experiment equipment, to record and analyze data, and to house all participant and research records; working materials associated with the administration of psychological instruments; video recording equipment for taping of sessions for intervention fidelity assurance; and, devices for delivering bilateral stimulation (BLS).

Sensor monitoring and experimental data collection equipment. This equipment was dedicated to the purposes of the current research. It included:

Basic Motionlogger Wrist Watch (Ambulatory Monitoring, Ardsley, NY) . Features include: event marker; audible feedback; 2MB memory; 2 3 Hz filter; sensitivity .01G at mid-band; waterproof (shower safe); and easy coin cell battery exchange (60 day battery life) via compartment isolated from sealed interior electronics. Epoch lengths are

adjustable from one second to minutes. Participants wore the watch continuously from the time they left the research site until their return the following week. The data acquired by the Motionlogger verified that participants were almost universally compliant.

Motionlogger Interface (Ambulatory Monitoring, Ardsley, NY). A device that, connected to a computer via a USB cable, works with associated software to program the Motionlogger and to download collected data.

Critikon 8100t Vital Signs Monitor (Soma Technology, Bloomfield, CT). A blood pressure monitor claiming accuracy that correlates to central aortic pressures. It also collects pulse rate and temperature data. Bias or inconsistencies between readings are eliminated because measurements are automated. It stores up to 99 min of data (up to 100 readings). A rear panel data interface connector provides a serial data communications interface at 600 Baud. Visual, flashing LED display of readings is selectable ON/OFF and by vital sign of choice, affording manual recording of data simultaneous with automated data collection. The Critikon 8100T was cable-connected to the iWorx data recorder hardware.

iWorx Physiology Lab Data System (CB Sciences, Dover, NH). This system consisted of the iwx214 data recorder hardware and the LabScribe software, residing on a lenovo X60 laptop computer with Windows XP operating system. The iwx214 data recorder hardware connects to the laptop via a USB connecter. This system can accept input analog data from up to four sensors simultaneously, and display the data forms in pre-programmed screen formats.

Information system environment. All data collection and storage, experiment-specific and general record keeping, and written and electronic communications were

supported by a secure and redundant Information System Environment, which included networked hardware, practice management software, and standard security procedures. Data security and integrity were ensured via the following procedures:

- Password protected network access
- Locked computer room
- Redundant server hard drives
- External tape backup (all server data was backed up to tape each weekday and one of the two data back-up tapes was always kept offsite)
- External CD back-up (data were backed up each week night in addition to and separate from total server back-up)
- Redundant network switch allowing immediate failover
- External power supply (in case of electrical power failure)
- Firewall protection
- Anti-virus software on server and all workstations

This information management system exceeded HIPAA requirements for protection of client integrity and privacy in a clinical setting, and HIPAA clinical requirements are more stringent than those established for maintenance of research-setting participant data.

Video recording equipment. Recording of sessions was performed via a Canon HG10, HD (Canon U.S.A., Melville, NY) camcorder, mounted on a tripod, which remained in the same position throughout the research protocol. All sessions, beginning with the session wherein consent to videotape was obtained, were digitally recorded to an external hard drive (one per participant), and a randomly selected 25% of sessions containing trauma processing were securely transferred to the EMDR fidelity assessor.

After review by the EMDR fidelity assessor, these video data were erased, leaving only those videos originally recorded to external hard drive to remain after the research study was completed.

EMDR bilateral stimulation equipment. In addition to the manual technique of a therapist moving fingers from to side to side in front of the participant's face, equipment was available to induce visual, auditory, or tactile BLS. Research options included use of the EyeScan Deluxe (Neurotek Corporation, Wheat Ridge, CO) with cordless remote control, tactile pulsers, headphones, audio cable, and tripod. The visual BLS was presented via a bar with a set of horizontal lights that operate in three color modes (blue, green or red lights) selectable by remote control. It also allowed for light brightness setting from remote control, and connected to any music source for delivery of bilateral music. Hand-held pulsers provided tactile BLS. All participants expressed interest in, and were given opportunity to experience light-bar visual and pulsar tactile BLS; all preferred manual means.

Independent Variable: The EMDR Therapy Intervention

The EMDR therapy intervention was delivered according to the theory and techniques established by its originator and developer, Francine Shapiro (Shapiro, 2001, 2006), as taught by the EMDR International Association (EMDRIA; Shapiro, 2005a, 2005b), by the PI who is an EMDRIA-trained therapist. Although EMDR therapy allows for considerable flexibility in therapist style and approach in response to a given client's symptoms and characteristics, in the current study the intervention was operationalized to be applied in a standardized manner by systemized implementation of the standard protocol, incorporating predetermined scripts where possible, throughout the eight EMDR phases of

the intervention. The research protocol was based on the EMDR Treatment Manual Research Protocol by Korn and Spinazzola (2001) which is available to researchers from EMDRIA. In all cases, scripts were reviewed by the research team for appropriate content for adults with ID, with only minor modifications made.

Fidelity to the protocol was assessed by Andrew Seubert, LPC, NCC, of ClearPath Healing Arts Center in Corning, New York, an EMDRIA-approved consultant experienced in using EMDR with people with ID. He employed the EMDR Fidelity Rating Scale for Inter-rater Reliability, Clinician Instructions, and Rater Instructions (2010a, 2010b, 2010c), which updated the work of Korn, Zangwill, Lipke, and Smyth (2001), rating 25% of sessions during which active trauma processing occurred. The average fidelity rating across all categories was 2.18 (acceptable), and for the Critical Items of Overall Fidelity, Assessment, and Desensitization, fidelity was scored at100%.

Although each of the eight Phases of the EMDR protocol has a specific purpose, they can be thought of as falling into two broad segments: preparation (Phases 1 and 2: Client History and Preparation) and processing (Phases 3 through 8: Assessment, Desensitization, Installation, Body Scan, Closure, and Reevaluation; Greenwald, 2007; Shapiro, 2001; Shapiro & Forrest, 2004; Shapiro, Kaslow, & Maxfield, 2007). This separation is of importance to the study design for the following reason: the EMDR protocol requires that Phase 3 not begin until the therapist is assured that the client is sufficiently stable, with demonstrated skills in emotional tolerance and behavioral control, in order to experience the trauma processing without undue disruption. If participants began the protocol with sufficient skills, such that only reviewing their abilities and standardizing them in the form of intervention-specific techniques would have been required, they could have

been expected to complete EMDR Phases 1 and 2 within fewer than six sessions. However, all six participants required a period of learning such skills and developing supporting techniques necessary to meet requirements to continue with trauma processing. Thus, EMDR Phases 1 and 2 extended to more than six sessions. Implications for protocol flow and timelines are discussed in later sections.

Dependent Variables: The Outcome Measures

Two batteries of instruments/measures, one administered on a pre- and post-intervention basis (PCB) and one administered on a weekly basis throughout the course of the protocol (PRB), produced two classes of outcome data: experimental and exploratory. Each experimental instrument/measure was associated with a hypothesis regarding the expected outcome resulting from anticipated improvement following the EMDR intervention. For these measures, the nature and direction of values representing improvement are clear, and they have established histories of use in psychological research. Instruments/measures considered exploratory do not meet these requirements, yet the research data they provide have potentially important value in understanding aspects of the interaction between existing PTSD symptoms and improved functioning, over time, and in providing context for understanding the effects of EMDR.

Data associated with these measures were collected via a variety of methods, including direct observation by staff and wrist-worn motion sensors, clinician-administered self-report, and physiological recording. The classification of the outcome measures providing data for the current research is presented in Table 5.

Table 5

Outcome Measure Classification

	Research Instrument/Measure	Class		Data Collection Method			
		Experimental	Exploratory	Observation: Sensor	Observation: Staff	Clinician-Administered Self-Report	Physiological Recording
Participant Characterization Battery	The Personality Assessment Inventory - Adolescent (PAI-A)		✓			✓	
	Developmental Behaviour Checklist for Adults (DBC-A)	✓			✓		
	Children's PTSD Inventory (C-PTSD-I)	✓				✓	
	Impact of Events Scale - Revised (IES-R)	✓				✓	
	Wechsler Abbreviated Scale of Intelligence (WASI)		✓			✓	
Participant Response Battery	Trauma Symptom Checklist for Children (TSCC)	✓				✓	
	Brief Symptom Inventory (BSI)	✓				✓	
	The Aberrant Behavior Checklist (ABC)	✓			✓		
	Social Performance Survey Schedule (SPSS)	✓			✓		
	Activity/Hyperactivity		✓	✓			
	Sleep Disturbance		✓	✓			
	Blood Pressure and Heart Rate		✓				✓

Participant Characterization Battery (PCB). Because the current study is among the earliest to experimentally measure the effects of any trauma therapy on people with ID, it is important to describe participants on all dimensions that may be affected by the experimental manipulation (the delivery of the EMDR intervention). Because the experimental design is case-based, each participant's attributes must be recorded in a manner that would most readily allow for accumulation of research cases, over time. Thus, a comprehensive, individual assessment of each participant is included. Descriptive data collected as intake history and symptomology are important, but objective measures of the participants' biopsychosocial profile will better serve integration with, and meta-analyses of, future research. The PCB served this purpose by providing: a comprehensive psychiatric profile of the participant via The Personality Assessment Inventory - Adolescent (PAI-A; Morey, 2007) ; an observer (staff) reported inventory of emotional and behavioral disturbance via the Developmental Behaviour Checklist for Adults (DBC-A; Einfeld & Tonge, 2002); a structured interview rating of aspects of the qualifying traumatic event(s), trauma-induced symptoms, and current functioning, via the Children's PTSD Inventory (C -PTSD-I; Saigh, 2004) ; a self-report-based assessment of symptoms of intrusion, avoidance, and hyperarousal via the Impact of Event Scale - Revised (IES-R; Weiss & Marmar, 1997) ; and, estimates of Full Scale, Verbal, and Performance IQ measures via the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999) . Data produced by this battery also served as pre- and post-intervention outcome measures.

The Personality Assessment Inventory - Adolescent. The PAI-A (Morey, 2007) was included in the PCB in order to provide a comprehensive psychiatric profile of the participants. It is a self-administered, objective test of personality containing 264 items and

comprising 22 non-overlapping scales. In this study, it was administered by research staff who read the questions to participants and recorded their answers.

The PAI-A closely parallels the adult version of the instrument. It retains both the structure and most of the items from the PAI (Morey, 1991), which when first introduced was described as "a substantial improvement from a psychometric perspective over the existing standard in the area" (Helmes, 1993, p. 417). It has since been ranked fourth by directors of internship training (Piotrowski & Belter, 1999), fourth in terms of objective tests in APA-approved graduate testing coursework (Belter & Piotrowski, 2001), and among the most widely used measures relied on in legal cases involving emotional injury (Boccaccini & Brodsky, 1999).

Selection of items from the PAI was based on 15 parameters, with the rule that no single parameter be used as the sole criterion for item selection. Item selection parameters included bias panel review by multicultural professional and lay evaluators, expert and research team evaluations, adequacy of item variances, lack of redundancy, group mean differences of normal versus clinical samples, minimal group mean differences related to gender, etc. The clinical constructs of the PAI-A assess experiences (e.g., suicidal ideation, depression, anxiety) that are expressed with reasonable consistency across the life span versus constructs that are specifically pertinent to diagnostic concepts applicable to adolescents. The PAI-A includes four Validity Scales (Inconsistency, Infrequency, Negative Impression, and Positive Impression), 11 Clinical Scales (Somatic Complaints, Anxiety, Anxiety-Related Disorders, including phobias, traumatic stress, and obsessive-compulsive symptoms, Depression, Mania, Paranoia, Schizophrenia, Borderline Features, Antisocial Features, Alcohol Problems, and Drug Problems), five Treatment Considerations Scales

(Aggression, Suicidal Ideation, Stress, Nonsupport, and Treatment Rejection) and two Interpersonal Scales (Dominance, and Warmth). An individual's score in each scale, when displayed on the PAI-A profile form, can be compared with 10 empirically-determined configural profiles associated with 10 personality clusters.

The PAI-A was normed using both community (707 adolescents from 21 states) and clinical (1,160 adolescents from 78 different sites) samples. Though it includes no norms for the ID population, no existing instrument that is comprehensive in scope and has broad-based application across population segments has included ID norming. Although over 600 studies have been conducted using the PAI, its developer was not aware of any information on its use with people with ID (L. C. Morey, personal communication, March 24, 2008). The language characteristics of the PAI-A are in a range that was suitable for the current study's cohort: a fourth-grade reading level, 8.5 word average sentence length, 4.1 letter average word length, and with 99% of the items in the active voice. It has also had extensive psychometric testing, with reliability values for internal consistency for the substantive scales of .79 and .80 for the community and clinical standardization samples, respectively. Several widely-used instruments in the field of personality and psychopathology were applied in the examination of external correlates of various PAI-A scales. These included broad-based assessment instruments that served as referents for a wide variety of PAI-A scales, as well as more focused measures that targeted specific PAI-A constructs. A typical administration of the PAI-A takes 30 - 45 minutes. Alternatives to independent reading and self-recording of responses for those participants with insufficient reading, cognitive, attentional, motor, and motivational capabilities are discussed in the PAI-A professional

manual (Morey, 2007). These recommended alternatives were employed in the current study, and are outlined in the Procedures section of this document.

Because the development of the PAI emphasized the importance of both the convergent and discriminate validity of the instrument, interpretation of PAI protocols is relatively straightforward. For example, scales were designed to be generally pure measures of the constructs in question; thus, an elevation on the Depression scale may be interpreted as indicating that the respondent reports a number of experiences consistent with the symptomatology of clinical depression (Maruish, 2004). This approach informs the structure of the PAI-A, and its interpretive information is based on two sources – the theoretical nature of the constructs assessed by the instrument and the available validity evidence on the PAI. A detailed guide to the interpretation of all scale scores and for the ten cluster profiles is included in the professional manual (Morey, 2008).

Developmental Behaviour Checklist for Adults. The DBC-A (Mohr, Tonge, & Einfeld, 2005) is a caregiver-completed checklist of emotional and behavioral disturbance in adults with ID. Development of the DBC-A followed an approach similar to that of the PAI-A, but from within the ID population. It is based on the DBC, which was originally created for use with children with ID, and is recognized as "one of the more conscientiously derived instruments in the field. It was carefully assembled and has sound psychometric characteristics. Its developers have pursued a programmatic line of research that has resulted in progressive refinement of the DBC" (Matson, Laud, & Matson, 2004, p.173). These same developers produced the adult version by changing, deleting, and adding to the DBC items.

The DBC-A contains 107 items reporting problems over a six-month period and produces a total scale score assigning examinees to one of five developmental levels. Factor

analysis of the DBC-A yielded six subscales: Disruptive, Self-absorbed, Communication Disturbance, Anxiety/Antisocial, Social Relating, and Depressive. Reliability studies were conducted with paid and family caregivers yielding an internal consistency α of .95 for the total scale, with subscales ranging from α = .60 to .88. The test-retest reliability of the DBC-A was found to be good for family members (r = .85) and adequate for paid caregivers (r = .75). Inter-rater reliability for family members (r = .72) was considered acceptable (Mohr et al., 2011). Concurrent validity was established between the DBC-A and two established instruments, the Aberrant Behavior Checklist (ABC) and the Psychiatric Assessment Schedule for Adults with Developmental Disabilities (PAS-ADD). Comparing total scores on all instruments using Pearson Product Moment Correlation Coefficient yielded r =.61, n = 70, p <.01 for the ABC and r =.63, n = 77, p <.001 for the PAS-ADD. Hobden and LeRoy (2008) conclude that further research is needed to establish the validity of the DBC-A. The developers (Mohr et al., 2011) recommend that it be scored by someone who knows the subject well. The instrument required about 15 - 20 minutes to complete and was appropriate for all participating staff members (reading level of grade 6.4).

Children's PTSD Inventory. The C-PTSD-I is a structured interview for diagnosing PTSD in children and adolescents (ages 6 to 18 years). It directly corresponds to the DSM-IV-TR diagnostic criteria, categorizing results in one of five categories: PTSD negative, acute PTSD, chronic PTSD, delayed onset PTSD, or no diagnosis. The last category is:

> reserved for the examinee who does not acknowledge that he or she experienced, saw, or was confronted by an event that involved actual or potential serious injury, death, or a threat to the bodily integrity of the

examinee or other individuals, despite documented evidence to the contrary. (Saigh, 2004, p.1).

In comparison with other available structured interviews for children/adults (e.g., the Clinician-Administered PTSD Scale for Children and Adolescents; CAPS-CA), the C-PTSD-I is the shortest (least time to administer, fewest options for extended questioning) without sacrificing anything in validity (Greenwald, 2004) .

The C-PTSD-I covers aspects of the qualifying event, symptoms, and current functioning within the *DSM-IV-TR* diagnostic criteria areas of exposure, situational reactivity, re-experiencing, avoidance and numbing, increased arousal, and significant distress. Saigh (2004) reported reliability in samples of 150 stress-exposed children ages 7-18 six months after the stressor (Sample 1), and of 42 children ages 6-17, some stress-exposed and some not (Sample 2). For Sample 1, internal consistency for overall diagnosis was $\alpha = .95$; for subscales, $\alpha = .58$ (situational reactivity), .88 (re-experiencing), .89 (avoidance and numbing), .80 (arousal), and .70 (distress). Inter-rater reliability, measured by Cohen's kappa, was .96 (overall diagnosis), with an ICC of .91 (overall diagnosis). For Sample 2, test-retest reliability at two weeks for overall diagnosis ($n = 42$) resulted in kappa = .91. Saigh also reports on convergent, discriminant, and construct validity, finding good psychometric properties.

Impact of Event Scale - Revised. The Impact of Event Scale (IES: Horowitz, Wilner, & Alvarez, 1979) is a frequently used self-report measure comprised of 15 questions which assess the impact of trauma, with responses reported via a 5-point Likert-type scale. It was developed prior to the adoption of PTSD as a legitimate diagnosis in the *DSM-III*, and only tapped two of the four criteria areas for PTSD in the *DSM-IV* (intrusion and

avoidance). The IES-R (Weiss & Marmar, 1997) revision adds items addressing hyperarousal cluster symptoms. Six of the new items tap hyperarousal symptoms such as anger and irritability, heightened startle response, difficulty concentrating, and hypervigilance. One new intrusion item taps the dissociative-like re-experiencing when experiencing true flash-back.

Although the IES-R has not been normed for, nor previously used with the ID population, it was developed for and is commonly used in PTSD research, and is recommended for use in EMDR research. Procedures for administering self-report scales to people with ID were employed, and IES-R language was at a level that required little or no modification for study participants.

The hyperarousal subscale and the new intrusion item, along with the existing intrusion and avoidance subscales, parallel the *DSM-IV-TR* criteria for PTSD. The internal consistency of the three subscales has been found to be very high across samples (Weiss & Marmar, 1997) with intrusion α ranging from .87 to .92, avoidance α ranging from .84 to .86, and hyperarousal α ranging from .79 to .90 (Briere, 1997). Test-retest data are available for two of the samples in the Weiss and Marmar study. Data from Sample 1 (n = 429) yielded the following test-retest correlation coefficients for the subscales: intrusion = .57, avoidance = .51, hyperarousal = .59. From Sample 2 (n = 197), the correlation coefficients were considerably higher: intrusion = .94, avoidance = .89, hyperarousal = .92. It is believed that the shorter interval between assessments and the greater recency of the traumatic event for characterizing Sample 2 contributed to the higher coefficients of stability.

Weiss and Marmar (1997) point to research showing that the hyperarousal subscale of the IES-R has good predictive validity with regard to trauma (Briere, 1997), and that the

intrusion and avoidance subscales, which are original IES components, have been shown to detect change in respondents' clinical status over time and detect relevant differences in the response to traumatic events of varying severity (Horowitz et al., 1979).

Wechsler Abbreviated Scale of Intelligence. The WASI (The Psychological Corporation, 1999) is a short (two to four subtests), individually-administered test of intelligence for children and adults ages 6 through 89. It provides estimates of Full Scale, Verbal, and Performance IQ consistent with other Wechsler tests. It was designed to provide a consistent, well-normed, and technically adequate brief measure of intelligence. According to the manual, the WASI is appropriate for screening, estimating IQ when a full evaluation is not possible, reevaluations when time is limited, research estimates of IQ, and other situations when a more comprehensive evaluation is not needed or possible. The WASI may be thought of as a short-form version of a combination of the Wechsler Intelligence Scale for Children--Third Edition (WISC-III) and the Wechsler Adult Intelligence Scale--Third Edition (WAIS-III). It was standardized on a national sample of 2,245 children and adults, ages 6 through 89. With few exceptions, the standardization sample appears to be representative of the U.S. population based on sex, racial and ethnic group, socioeconomic status (education level), and geographic region (Stano, 2004).

The WASI was the IQ measure best suited to this study, as it was capable of characterizing individual participants in a manner that can relate to future research, and served at the same time as an aid in determining the nature and degree of supportive devices each participant required to understand and respond to self-report measures. It is the only instrument of the PCB that was not repeated during the Maintenance stage.

Reliability and validity data are presented in the WASI manual. Corrected split-half reliabilities are given for all tests and composites for all age levels, and range from .81 to .98 for the subtests, and .92 to .98 for the IQs. These internal consistency reliability estimates were slightly higher for adults than for children. Stability (test-retest with administration intervals of 2 to 12 weeks) coefficients are presented for 222 members of the normative sample, spread equally across the age levels. Test-retest coefficients range from .83 (FSIQ-2, ages 6-11) to .95 (FSIQ-4, ages 12-16); almost all were above .85. Most stability coefficients for the subtests were in the high .70s to high .80s.

There is also considerable information concerning the validity of the WASI, including correlations with other tests and exploratory and confirmatory factor analyses (Stano, 2004). The correlations between same-named subtests and scales on the WASI and WAIS-III were moderate to high (.66-.88 for subtests; .76-.92 for IQs). Likewise, it appears that the WASI IQs are capable of predicting achievement, as measured by the Wechsler Individual Achievement Test (WIAT). Stano (2004) concluded: "The Wechsler scales have always been considered the gold standard of cognitive assessment devices for the assessment practitioner. The WASI carries on this tradition with sound construction and outstanding psychometric properties" (p. 57).

Other independent reviewers note caution in using the WASI to predict WAIS-III scores, finding that in a mixed clinical sample of 72 participants, the WASI did not consistently demonstrate desirable accuracy (Axelrod, 2002). However, studies of WASI concurrent validity with an inpatient psychiatric sample using the Kaufman Brief Intelligence Test (Hays, Reas, & Shaw, 2002), a child sample using standardized Canadian tests of cognitive skills and achievement (Saklofske, Caravan, & Schwartz, 2000), and a

WAIS exploratory factor analysis (Ryan et al., 2003), all reached positive conclusions regarding WASI psychometrics. One study looked at the WASI with disabled people (Meyer, 2001). The sample was 120 individuals who were referred to a state vocational rehabilitation program. The relationship of the WASI to Wide Range Achievement Test - 3 (WRAT-3) and the Career Abilities Placement Survey (CAPS; described as two of the most widely used instruments in vocational assessment situations) was compared to the relationship of both the WAIS-III and the WISC-III to these instruments. Results indicate that the WASI and the full versions of Wechsler Intelligence scales bear a similar relationship to the WRAT-3 and CAPS in this disabled population.

Participant Response Battery (PRB). This battery produced the time-series data used to determine whether the presentation of the EMDR intervention brought about significant change in the participants' negative post-trauma experience, over time. For each participant, every visit to the research site included an administration of the PRB.

The PRB included measures anticipated to respond to changes in those symptoms most commonly reported as sequelae to the experience of traumatic stress. Additional considerations in selection of measures were that they, in themselves, did not produce undue stress [e.g., direct observation of induced startle response, questionnaires focusing too extensively on descriptions of traumatic experience(s), scales or tests that would be experienced as too challenging and hence potentially demoralizing, for ID participants], and that they did cover as wide a range as possible of relevant biopsychosocial functioning. The resulting battery included physiological measures [systolic blood pressure (SBP), diastolic blood pressure (DBP), and heart rate (HR)] which have been shown to be related to resting hyperarousal (Hopper, Spinazzola, Simpson, & van der Kolk, 2006; Pole, 2007; Tulen,

Boomsma, & Man in 't Veld, 1999); self-report measures [Trauma Symptom Checklist for Children (TSCC; Briere, 1996) , and the Brief Symptom Inventory (Derogatis, 1993)] that assess improvement in emotional and psychological disturbance; and observational measures, via both support staff report [Aberrant Behavior Checklist (ABC; Aman & Singh, 1986), and Social Performance Survey Schedule (SPSS; Lowe, 1985)] and sensor monitoring [sleep disturbance and hyperactivity, achieved through use of the Motionlogger and its associated movement analysis software (Ambulatory Monitoring, 2009)] that record changes in sleep patterns and hyperactivity.

Physiological measures: blood pressure and heart rate. Studies addressing the psychophysiology of PTSD have looked at a number of hyperarousal parameters that were considered to have the potential to distinguish cohorts of individuals with PTSD from non-PTSD cohorts; SBP, DBP, and HR are included in these measures. They have been investigated under a number of conditions, including resting baseline. Pole (2007) performed a meta-analysis of 58 resting baseline studies, 25 startle studies, 17 standardized trauma cue studies, and 22 ideographic trauma cue studies comparing adults with and without PTSD on a variety of psychophysiological variables, including SBP, DBP, and HR. Of these studies, 19 looked at blood pressure (BP) (combined n = 1,721 for SBP and combined n = 1,653 for DBP) and 55 looked at HR (combined n = 3,315). Overall, Pole found reliable relationships between PTSD and laboratory measures of psychophysiological activity and reactivity. Even after applying the most conservative tests of statistical significance, PTSD was associated with aggregated indices of higher resting arousal. Taken individually, SBP, DBP and HR were all among the main findings of the study. Unweighted mean effect sizes for resting baseline measures were: HR (r = .20; 95% CI = .15, .26); SBP

(r = .12; 95% CI = .02, .21); and DBP (r = .23; 95% CI = .13, .32). Among these unweighted effect sizes, DBP was the most robust (CR = 6.87). All of the significant findings were safe from file-drawer threats, and all except for SBP were statistically significant at the 99% confidence limit. When the more conservative weighted mean effect sizes were estimated, the relationship between PTSD status and aggregate resting psychophysiology continued to be significant (r = .12; 95% CI = .07, .17). However, among the individual resting psychophysiological measures, only HR (r = .18; 95% CI = .13, .23). HR was the most robust of these significant weighted mean measures (CR = 4.42).

For the current study, physiological measures including HR, SBP, and DBP were the first to be taken from each participant upon his or her arrival at the research site so that introduction of topics related to trauma did not occur prior to these measures, nor was any other measure-taking that might be experienced as challenging, both to avoid experimentally induced activation (beyond the "white coat" effect). In addition, two further conditions were adapted from Pole (2007): first, the sequence of PRB instruments was established so that no challenge follows soon after the physiological measures; and, second, participants were asked to recline to a supine position. Pole found that, contrary to expectation, in studies in which HR and BP data were collected prior to an experimental challenge (personal trauma memory cues, which were expected to cause anticipatory anxiety), smaller effect sizes were found than in no-challenge studies. Pole observed that in most of the studies that were without challenge, data were collected from participants in the supine position rather than in the sitting position, and that because:

> the supine position increases the parasympathetic influence on psychophysiology, one would expect reduced physiological arousal in

> relevant domains such as HR (Tulen et al., 1999). However, it could be that the supine position augmented the effect of PTSD on resting psychophysiology by activating a functional parasympathetic system in the non-PTSD groups and a dysfunctional parasympathetic system in the PTSD groups. Though speculative, this process would be consistent with evidence that deficits in parasympathetic tone are a root cause of elevated resting HR in PTSD (Hopper et al., 2006). It would also be consistent with other evidence from this meta-analysis showing that HR plays a dominant role in elevated resting physiology in PTSD (Pole, 2007, p. 739).

Self-report measures.

Trauma Symptom Checklist for Children (TSCC). The TSCC is probably the most widely used measure of children's post-trauma symptoms (Greenwald, 2004). For many purposes, the TSCC sub-scales can be used in the place of additional measures. It does not address some important aspects of trauma symptomology, such as somatic complaints and pessimistic future, but the items are clear and well-written. The language of the items is also appropriate for adults because children, parents, etc. are not mentioned. It is a 54-item scale that includes two validity scales (Underresponse and Hyperresponse), six clinical scales (Anxiety, Depression, Anger, Post-traumatic Stress, Dissociation, and Sexual Concerns), and eight critical items. The TSCC scales are internally consistent (alpha coefficients for clinical scales range from .77 to .89 in the standardization sample) and exhibit reasonable convergent, discriminant, and predictive validity in normative and clinical samples. The TSCC was standardized on a group of more than 3,000 inner-city, urban, and suburban

children and adolescents from the general population. Data from trauma and child abuse centers are also provided (Briere, 1997).

The Brief Symptom Inventory (BSI). The BSI is a 53-item, self-report measure of psychological distress developed by Derogatis and Melisaratos (1983) for use in the general, adult population. The measure assesses a broad range of symptoms experienced by adults with psychiatric disorders (Kellett, Beail, Newman, & Frankish, 2003). It yields nine symptom subscales: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. The BSI also produces three global indices of psychopathology: the Global Severity Index (GSI), the Positive Symptom Distress Index (PSDI), and the Positive Symptom Total (PST). It was included in the PCB as a measure of global psychological distress because 1) the BSI was developed from the Symptom Check List-90-Revised (SCL-90-R), a measure with an extensive history of use in a broad range of research related to PTSD, well-established reliability and validity (Elliott et al., 2006), and demonstrated applicability with people with ID (Kellett, Beail, Newman, & Mosley, 1999), and 2) the BSI has psychometric properties similar to the SCL-90-R, but with enhanced validity in patients with affective disorders (Prinz et al., 2013), it is shorter (and quicker to administer) than the SCL-90-R, and its utility with people with ID has recently been supported (Wieland, Wardenaar, Fontein, & Zitman, 2012).

In developing the BSI, Derogatis and Cleary (1977) performed a construct validation study of the structure of the SCL-90-R, and found that "five to six items on each subscale were sufficiently *loaded* to sustain an effective operational definition of each syndrome construct. The items that loaded highest on each dimension were selected

to form the BSI" (Derogatis, 1993, p. 2). The manual for administration (Derogatis, 1993) describes various studies on the reliability and validity of the BSI, which can be summarized as: internal consistency reliability is very good for all nine dimensions, with alpha coefficients ranging from a low of .71 on Psychoticism to a high of .85 on Depression; test-retest reliability coefficients (for 2-week retest) range from .91 for Phobic Anxiety to .68 for Somatization; high convergent validity was demonstrated for the dimensions of the BSI with MMPI scales; very high correlations were found between all nine BSI symptom dimensions and the SCL-90-R; the agreement demonstrated between the empirical factor structure and the dimensional structure lends strong weight to construct validation; and, the predictive validity and sensitivity to change in psychological status has been demonstrated in studies on various populations (e.g., as a psychiatric screen in community and medical cohorts, with cancer populations, psychoneuroimmunology cohorts, general psychopathology, pain assessment and management, therapeutic interventions, HIV research, and student mental health; Derogatis, 1993).

The psychometric properties of the BSI used with people with ID were investigated by Kellett et al. (2003). In a sample of 200 adults with mild ID, internal consistency and split-half reliability of the subscales was low to moderate (*r*s ranged from .63 to .78). They examined construct validity by comparing mean scores on the subscales among three subgroups in the study: individuals living in the community, but referred for testing for ID (community group); individuals with ID, referred for psychiatric assessment (clinical group); and individuals with ID who had also been convicted of a crime (forensic group). Group means differed significantly on eight of the

nine subscales and two of the three global indices, with the community group displaying the fewest symptoms. The authors concluded that the BSI can be employed as an assessment instrument and as a treatment outcome measure in people with ID.

Utility of the BSI in psychiatric outpatients with ID was assessed by Wieland et al. (2012). They assessed practical utility and psychometric properties in a cohort of 224 psychiatric outpatients with either borderline intellectual functioning or mild ID. The internal consistency of the BSI was calculated using Cronbach's coefficient alpha, with the different subscales ranging from .70 to .86, and with an alpha of .96 for the BSI total. Subscale inter-correlations ranged from .39 to .79, allowing the conclusion that there is a degree of differentiation between the subscales, based on their content. Discriminant validity was found by comparing participants with *DSM-IV-TR* Axis I disorders (mean total BSI = 1.10) with those without a diagnosis (mean total BSI = .72) which difference was significant (p = .03); and patients diagnosed with a personality disorder or both an Axis I and a personality disorder (mean total BSI = 1.51) scored much higher than patients with only Axis I disorders (p = .001). Factor analysis based on the original nine-factor structure of the BSI (Derogatis, 1993) indicated that, as used in their study, the underlying structure of the BSI can be described by the same nine-factor model. Wieland et al. (2012) suggested that their study especially demonstrated the practical utility of the BSI, reporting that questions of the BSI were easily understood by most participants. On average, only four questions needed explaining (about 7.5% of the total of 53 questions). They found a relationship between IQ and the number of questions participants found difficult, with one more item of the BSI needing explanation for each decrease of 5 points in IQ.

Observational measures: support staff reports.

The Aberrant Behavior Checklist (ABC). The ABC was primarily developed as an outcome measure in treatment studies in the ID population. It was derived and cross-validated by factor analyses (Aman, Singh, Stewart, & Field, 1985). It has five factors comprised of 58 items: 1) Irritability, Agitation, 2) Lethargy, Social Withdrawal, 3) Stereotypic Behavior, 4) Hyperactivity, Noncompliance, and 5) Inappropriate Speech. The ABC was derived from a sample made up of adults and adolescents, but has also been used with children and has been found to have a consistent factor structure over the age span (Brown, Aman, & Havercamp, 2002). More than 150 studies using the ABC have been published (Rojahn, Aman, Matson, & Mayville, 2003) including psychometric studies, behavioral phenotype investigations, and drug trials. Aman states that the psychometric reports have consistently been positive and supportive of the original factor structure, and reliability/validity estimates (i.e., internal consistency coefficients α) were high; interrater reliability across readers and subscales were satisfactory (r = .63); and criterion and congruent validity have been established. This scale is described as one of the most researched and proven instruments in the developmental disabilities literature (Matson et al., 2004).

Each week, the participant's regular, accompanying support staff person filled out the ABC checklist, assigning a rating from 0 to 3 on each of the 58 listed behaviors based on his or her observation of the participant. Checklist instructions directed the staff to take relative frequency into account for each behavior specified, to consider the experiences reported by other care providers, and to consider whether a given behavior interfered with

the participant's development, functioning, or relationships. The checklist takes 20 to 30 minutes to complete.

Social Performance Survey Schedule (SPSS). The SPSS (Matson, Helsel, Bellack, & Senatore, 1983) is a commonly used questionnaire that probes for a range of social skills. It collects ratings from 0 (*Not at All*) to 4 (*Very Much*) on the occurrence of 50 positive social behaviors and 50 negative behaviors. It yields four scores, two in positive (Appropriate Social Skills and Communication Skills) and two in negative (Inappropriate Assertion and Sociopathic Behavior) areas of behavioral expression. It has been shown to be sensitive to differences in skill level and it has demonstrated reliability and validity in developmentally disabled, psychiatric, and normal populations (Lowe, 1982; Lowe, 1985; Lowe & Cautela, 1978).

Observational measures: sensor monitoring of activity. Continuous monitoring of participant activity was accomplished by use of the Ambulatory Monitoring Inc. (AMI) Basic Motionlogger. The Motionlogger is a watch-shaped actigraph, a portable device that records movement over extended periods of time. It is comprised of a piezoelectric sensor, an accelerometer, a band pass filter, an A/D converter, and a memory unit. A lithium battery allows for data collection for over two weeks at a time. When the actigraph is moved, the accelerometer flexes and applies pressure on the piezoelectric sensor causing it to produce an electric potential or voltage proportional to the flexion. Voltages are recorded according to preset time intervals and data collection modes. The band-pass filters out voltages below and above 2-3 Hz which derive from non-behavior movements such as holding onto a vibrating object.

The Motionlogger was used in two modes of data collection: the Zero Crossing (ZC) Mode, which records movement counts, and the Proportional Integrating Measure (PIM) Mode, which measures activity level or vigor of motion. AMI provides the ACT Millennium software to pre-program the actigraph and to download the recorded data, an interface unit to transfer the data to a computer, and the AW2 software that analyzes motion data in order to assess measures of sleep and hyperactivity. The current study employed Motionlogger data collected in the ZC mode for sleep measures and in the PIM mode for activity measures.

Sleep disturbance. Polysomnography has been considered the standard method for diagnosing sleep disorders. Actigraphy assesses sleep disturbance through the measurement of movement. The accuracy of actigraphy in detecting and differentiating sleep and wake episodes has been tested in validation studies that compare its performance to polysomnography. High agreement between actigraphic data and polysomnography recording has been documented (Sadeh, 2011; Sadeh & Acebo, 2002). Accuracy rates ranged from 78.2% in insomniacs, to 89.9 % in children, and 98.8% in normal subjects. In addition, actigraphy allows for a non-intrusive, longitudinal method of obtaining sleep activity-based data in the natural environment.

Sleep is differentiated from wake by counting zero-crossings and applying the scores to a sleep algorithm. The Cole-Kripke algorithm was used for the current study because, in addition to its high validity rate (88%), supporting research has included subjects with comorbid sleep and psychiatric disorders (Cole et al., 1992). The algorithm determines sleep by taking into consideration activity counts (zero-crossings) prior to and after the current sleep epoch.

The current study assessed the following sleep measures:

- *Sleep, 24 hr Mean* represents the number of minutes per 24 hr scored as sleep, averaged per week
- *Sleep Efficiency* is the percentage of time that the participant is actually asleep from the beginning of sleep (sleep onset) to wake time (sleep offset) per day, averaged per week
- *Sleep Latency* is the length of time, in minutes, it takes to complete the transition from full wakefulness to sleep (i.e., the number of minutes between the initiation of downtime and sleep onset), per day, averaged per week
- *Wake After Sleep Onset* is the time spent awake between sleep onset and offset, in minutes per day, averaged per week
- *Sleep Fragmentation Index,* a measure of the amount of interruption of sleep by physical movement, indicates the number of brief arousals occurring throughout the night (i.e., occurring during the interval between sleep onset and offset) by counting the number awakenings per total sleep time (24-hr total) in minutes, multiplied by 100.

Hyperactivity. The Motionlogger PIM mode was used to measure energy expenditure as a reflection of hyperactivity. As a measure of energy expenditure, the PIM mode was compared against oxygen consumption and heart rate in a group of 13 young males aged 18 to 29 (Moran, Heled, & Gonzalez, 2004). The activity measure included 30 minutes of continuous walking/running on a level treadmill. The PIM mode data correlated well (r = .84) with the energy expenditure data. In a study that measured agitated behavior in 110 patients diagnosed with various levels of dementia (Nagels et al., 2006), activity level

scores derived from PIM mode were compared with scores in the Cohen-Mansfield Agitation Inventory (CMAI). Patients with high CMAI scores also had higher levels of diurnal activity compared to those patients with low CMAI score. No studies have yet assessed activity levels of subjects with PTSD with this instrument. The current study explored the use of the Motionlogger in the PIM mode as a measure of hyperactivity in participants.

Study Timeline

Factors driving the timeline of the experiment stem from the experimental design, the ID population characteristics, the EMDR intervention protocol, the dependent measures, the data analysis requirements, and practical constraints. This section aims to chronologically outline these factors.

Baseline stage. Although there were pre-experiment activities associated with participant selection, history/medical and other record collection, support staff initiation and training, and behavioral data collection system assessment and standardization, the actual experiment began with the initiation of the Baseline stage upon the participant's first visit to the research site. During this stage, the pattern of site visits was established, with each of the six participants visiting once per week. The day of the week and time of day that each participant attended remained constant throughout the A_1-B-A_2 and Follow-up stages. On the first visit, after completion of introductory and consent procedures, the initial PRB was administered. When there was time remaining, the first measure of the PCB was administered. All six participants completed the PRB on their first visit; two had sufficient time to begin the PCB.

The length of the Baseline stage was dependent on two factors. First, a minimum of six complete PRB data sets had to be collected, and because it was thought that it might be difficult to complete a PRB on the participant's first visit, the minimum length of the Baseline was established to be seven weeks. Second, one PCB had to be completed within the Baseline. Each of the measures of the PCB was required to be administered once in order to complete one PCB. The PCB measures were administered during time available after each session's PRB data were collected. The time necessary to complete the PCB was dependent on participant attributes, such as focus, comfort with test administration, cognitive and language abilities, personality, and response to questioning. With the maximum Baseline length of 18 weeks having been established by the protocol, each participant determined the length of her or his Baseline, with a possible range of 7 to 18 weeks, and an actual range of 10 to 16 weeks.

The determination of a given participant's baseline was affected, in practice, by two additional considerations. First, it was desirable for the participant to achieve a *stable baseline* (Barlow, Nock, & Herson, 2009) from the data analysis perspective, which is indicated by reaching stability in outcome data, viewed on a weekly basis. For some participants, this was obtained after a period longer than it took to complete the PCR, and longer than six weeks. Second, for some participants, the weekly questioning about the traumatic events in their lives seemed to bring with it signs of escalating emotional disturbance. The research staff who administered these batteries was trained to notice such developments and apprise the PI, on a weekly basis, of any such concerns. The PI was then responsible for determining if it was necessary for the participant to enter the Intervention earlier than the pre-established guidelines would have indicated.

Intervention stage. The Intervention stage nominally began with EMDR Phase 1, Client History and Treatment Planning. Most of the information needed for this phase had already been accumulated, but at least one meeting between the participant and the PI was necessary to review and discuss the history and characterization data as they related to the EMDR protocol. EMDR Phase 2, Client Preparation, includes aspects that can be considered pre-intervention (i.e., prior to the actual EMDR trauma processing), although they might be therapeutic in nature (e.g., establishing client safety and stabilization techniques). These could be accomplished in as little as two weeks, although up to six weeks were allowed in the protocol. When more than six weeks were required for the first two EMDR Phases, it indicated that this particular participant was experiencing symptoms of a complexity and intensity such that extended therapy (on the order of years) would be required to achieve symptom remission. It might, however, be a consequence of a participant's history having included no previous opportunity to learn techniques for managing emotions. Once these skills were learned, such a participant might have been able to proceed relatively quickly through the remainder of the Intervention stage. The PI was charged with making the determination as to which condition applied. If it were the first, the participant exited the experiment cohort (although therapy continued). If it were the second, the participant continued within the research protocol. All participants presented with both complex symptoms and lack of emotion and behavior management skills. The six participants who completed the research protocol each followed differing trajectories in terms of completing Phase 2, with some having to return to Phase 2 activities after experiencing some or all of the processing phases (Phase 3 through 8). This happened when, during the processing phases, either 1) new traumatic material which was previously not

remembered or not reported emerged, and was distinctive enough from the material currently being processed so as to require returning to history taking, or 2) once processing was under way, it became evident that the participant required additional skills training and resource development so as to better tolerate the trauma processing. The time it took to reach this stage of the first EMDR trauma processing varied among participants from 16 to 35 weeks. All participants returned at least once to earlier phases as the protocol proceeded.

Intervention progress. Each weekly stage B (Intervention) visit incorporated the administration of the PRB and an EMDR therapy session. Progress in terms of therapeutic improvement was monitored via measures embedded within the EMDR protocol – the Subjective Units of Distress Scale (SUDS) and the Validity of Cognition (VoC). The SUDS and VoC are process measures, rather than measures employed to determine research outcome. When processing a specific trauma target, they indicate when the target has been resolved: the trauma can be recalled without distress (SUDS = 0), and that the positive self-statement (positive cognition) is believed to be completely true (VoC = 7). Because it was anticipated that participants in the current study would represent examples of single-trauma PTSD, the end of the Intervention stage (B) was specifically defined by the EMDR protocol (i.e., by the SUDS level reaching 0 and the VoC rating reaching 7), with appropriate closing procedures. Because the participants all had histories of multiple traumas beginning in childhood, or earlier, completion of processing of a single trauma did not determine the end of Intervention.

Duration of intervention. Two factors determined the planned length of stage B. First was the requirement of completing a minimum of six weeks of Intervention data collection so that there would be a sufficient data stream to display change in outcome

measures from Baseline through Intervention. Second was the participant's response to therapy. If a single-trauma participant appeared to be treatment-resistant, defined as having reached week 12 of the Intervention stage without having achieved the required SUDS = 0 and VoC = 7, the progress was to be reassessed. If at that time it appeared that treatment progress was trending in the right direction, with the SUDS/VoC ratings moving toward goal and likely to soon be obtained, the Intervention would continue. The maximum length of time to have been allowed was a total of 18 weeks in Intervention or a total of 36 weeks in Baseline (A_1) plus Intervention (B). The complexity of the histories and experiences of the participants in this study were such that all took over a year from the start of the protocol until the completion of Intervention: three completed Intervention based on the PI's judgment that sufficient progress had occurred (they had successfully processed the most disturbing of their target traumas and had achieved functional stability) for them to go without therapy for the 18 weeks necessary to complete Maintenance, Hiatus, and Follow-Up; two participants (both with histories of trauma that began in infancy or prenatally) continued in therapy while the Maintenance and Follow-Up data were collected (these data cannot be considered *maintenance* and *follow-up* in conventional experimental terminology because they were collected while therapy was continuing, but they can provide indicators of progress); and, one participant's Intervention was interrupted at Week 53 by events outside of the research protocol, with Maintenance data collected within the two -week window available (while therapy continued) and Follow-up data collected after a forced 20-week Hiatus.

Maintenance stage. Upon completion of the Intervention stage (B), the Maintenance stage (A_2) began. Activities during the Maintenance stage were scheduled in precisely the

same fashion as for the Baseline (A_1) stage. Participants continued to come to the research site, and continued to have PRB measures taken according to the established routine, for six weeks. During this time, the second administration of the PCB (minus the WASI) also occurred. At the conclusion of the Maintenance stage, support staff were informed that the Intervention was complete (they had been blind to the transition from stage A_1 to B to A_2). Once visit length was established in the initial three to four Baseline visits to the research site, the same length was maintained throughout the A_1-B-A_2 stages. During visits when required experimental tasks were accomplished in less than the time allotted, enjoyable pastime activities were offered to the participant.

Follow-up stage. In A-B-A designs within traditional behavioral modification experiments, dependent variables are typically expected to return to baseline levels during the second A stage. In the current study, however, dependent variables were expected to be maintained at levels achieved at the end of the Intervention stage, and perhaps even to continue to change in the direction of improving health. This is due to the proposition that EMDR brings about permanent (trait) changes in peoples' biopsychosocial functioning, and once trends toward better health are established, the trend (improvement) may continue. This proposition was investigated by bringing participants back for a Follow-up assessment. After a Hiatus of six weeks, the six-week Follow-up occurred, with the same tasks to be executed as for the six-week Maintenance stage (but including the WASI). During Follow-up, there was no rigid requirement regarding visit length. The timelines associated with participants' progression through the research are given in Figure 1.

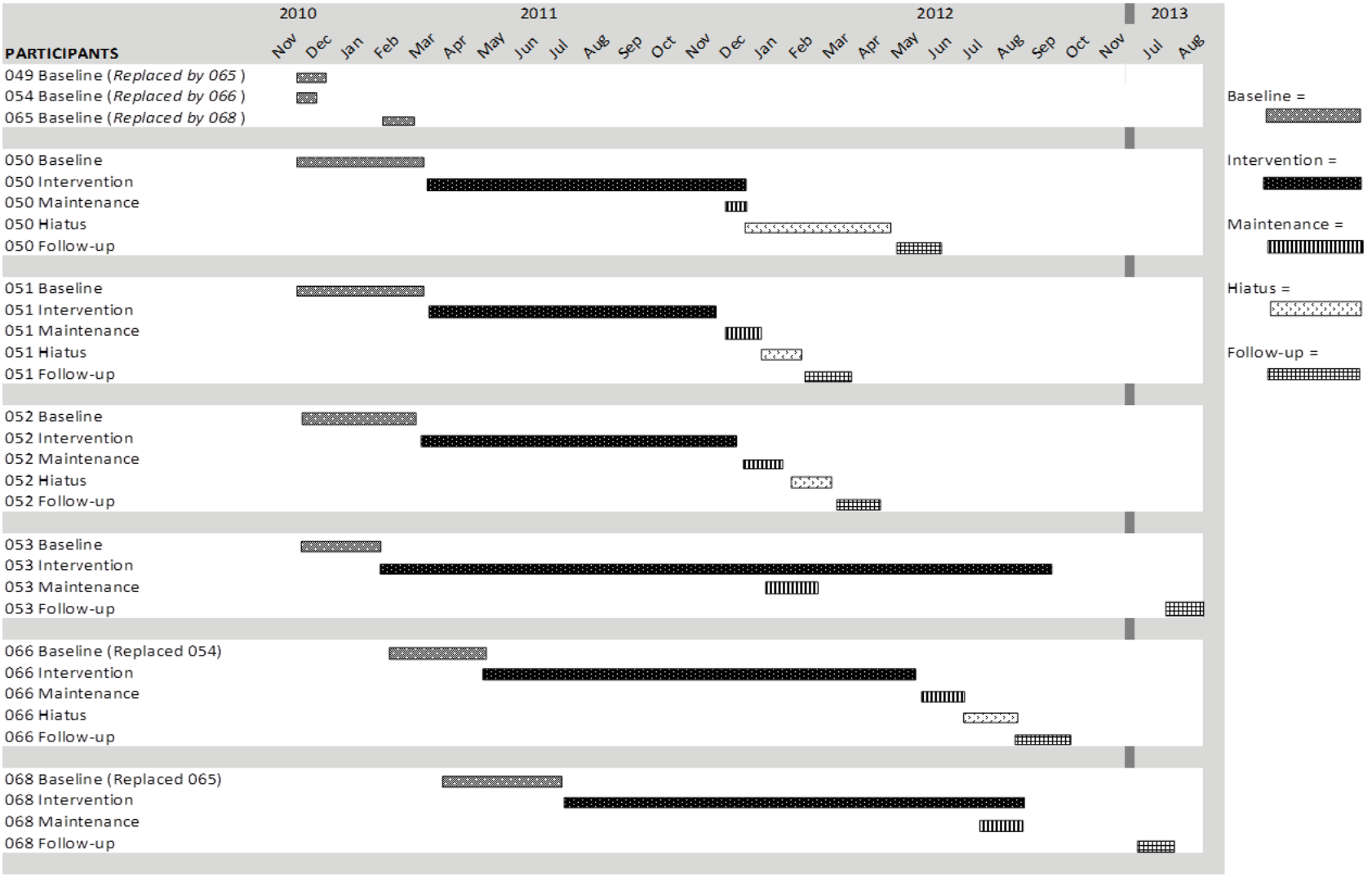

Figure 1. Timeline for all participants, nine of whom started and six of whom completed the research protocol

Procedure

Preparation stage. The preparation stage incorporated all tasks that needed to be accomplished prior to the initiation of the research protocols. Although its activities were performed at two locations − at the offices of The Arc, Baltimore and at the research site − staff from both organizations cooperated as necessary.

Tasks performed primarily at The Arc.

- Select participants − performed by Dr. Harvey following the guidelines provided in the DM-ID
    - formally diagnose each candidate, rendering a multi-axial assessment
    - verify that the participant had been deemed capable of providing consent
    - provide an informal description of the research to, and obtain preliminary consent from, those selected to enter the participant pool
- Select participants' *Key Support Staff* personnel who were responsible for accompanying participants to the research site; for observing and recording the participants' behavior; and, for reporting those observations in the specific formats required by research protocols − performed by Dr. Harvey and the PI.
    - if the participants' support staff were known to Dr. Harvey, she recommended the staff member she believed was best-suited
    - if Dr. Harvey was not well acquainted with the participant's support staff and she had no clear recommendation, the participant's full staff were interviewed
    - if no member of the participant's current staff was appropriate for the task, other personnel within the residential agency were considered and, with

the concurrence of the agency's management, interviewed for the position
    - complete Key Support Staff selection by ensuring that each selected staff member understood the responsibilities, specific task requirements, and fee payment schedule of the position, and signed a contract
    - selection of any given participant was not considered complete until his or her Key Support Staff had been contracted
- Collect and complete necessary files of participant history, demographics, diagnoses, and behavior support plans including challenging behaviors − a collaborative effort involving Arc Baltimore Psychology Associates and Technicians who were currently supervised by Dr. Harvey and who were familiar with the selected participants, and members of the team at the research site, all under the supervision of the PI
    - review participant files for completeness of records regarding personal, medical, and psychiatric history
    - identify gaps, indicating where further information was needed from other institutions/organizations and where information should be solicited from the participant during the history gathering activity of the Baseline stage
    - review existing behavior support plans and procedures for recording observed occurrences of challenging behaviors
    - prepare behavior support plans if not currently in place
    - identify challenging (or maladaptive) behaviors suitable for monitoring on a daily basis and reporting on a weekly basis for the duration of the research program

- Train support staff − performed by Dr. Harvey and the PI, who met with Key Support Staff to
    - review the challenging (or maladaptive) behaviors identified for each participant and the standardized procedures for recording of observations
    - solicit agreement with selection of behaviors and implementation of procedures; obtain recommendations for changes/improvements
    - confirm final forms and plans for daily behavioral observation data collection (note that these were designed to minimize additional burden to, and process modification of, the existing methods associated with each participant's current, established Behavioral Support Plan practices)
    - provide preview copies of the instruments used in the observational measures components of the PCB and PRB, and review and ensure understanding of instructions for those measures which were completed by Key Support Staff
    - support each Key Support Staff member in meeting with the full complement of her or his participant's staff in order to explain any changes in established routines that were required to accommodate the research protocol
    - establish schedules according to which each participant, with Key Support Staff, reported to the research site each week on the same day of the week and at the same time of day throughout the course of the research protocol.

Tasks performed primarily at the research site.

- Acquire, calibrate, and develop practical expertise in the routine collection of data

as required for execution of the experiment protocols − responsibility of the PI

- train Arc Psychology Associates and Technicians and the team at the research site to administer the various data collection measures in the specific protocols of the experiment
- develop and disseminate schedules for all experiment support activities
- establish routine communications among all research team members, including methods for reporting plans and progress to cognizant management of participating agencies − responsibility of the PI
- Enter preliminary biopsychosocial history into the research information system database

Baseline stage. The Baseline Stage for each participant began when he or she walked in the door of the research site for the first protocol visit. This also signaled the initiation of the research protocols which were followed throughout the A_1-B-A_2 (Baseline-Intervention-Maintenance) and Follow-up stages. Participants were transported to this location on a routine, weekly basis, with each participant scheduled for a specific day of the week and time of day, without any requirement for coordinating his or her schedule with that of other participants beyond that of all participants beginning Baseline during the same week and limiting overlapping visits to two participants (two participants would be allowed to overlap to the extent that one could begin the PRB portion of the visit while an earlier-scheduled participant was in the therapy portion of the visit). Additional schedule limitations included that visits occurred during the five-day work week, were scheduled to begin between the hours of 9 a.m. and 6 p.m., and were completed within 2 to 3 hr.

During these scheduled visits, Motionlogger and behavior observation data acquired during the previous week were downloaded/delivered. By the end of the fourth session, the fixed length (between 2 to 3 hr) of all following sessions was established for each participant. This schedule was maintained for the remainder of the Baseline stage and throughout the Intervention and Maintenance stages so as to keep Key Support Staff blind to introduction and termination of the Intervention. As the Baseline stage proceeded, administration of the PRB became more routine, and additional pastime activities were introduced to fill the allotted session time. A flow chart of the research protocol is presented in Appendix B. The flow begins with the arrival of the participant at the research site for the first (Baseline Stage) visit.

First visit. Upon arrival for the first Baseline session, the participant was greeted by the PI, given a tour of the research site (focusing on the rooms that were used in data collection and intervention activities), and introduced to research staff with whom he or she would be interacting during the course of the research protocol. This was done with three specific objectives in mind. First, it was an opportunity to make the participant feel comfortable and at ease with the research setting, equipment, and staff. Second, it afforded an opportunity to explain the purpose of the study, the procedure, the benefits of participation (weekly visit payments, in particular), possible risks and discomforts of participation, and how privacy would be protected. This was done in an informal style, with careful attention being paid to the participant's level of verbal receptivity and production, cognitive ability, social skills, acquiescence to authority, response to a novelty, etc., thereby achieving the third objective of obtaining an informal initial assessment of the participant.

At the conclusion of the tour, the formal consent process began. Prepared statements regarding the purpose of the research, its procedures, risks and benefits, and confidentiality practices were read to the participant, allowing as much time as was necessary for questioning and discussion of any and all aspects that may have required clarification, simplification, reiteration, and illustration. When the PI determined that the participant understood these statements, she showed to, and read with the participant, the informed consent document, which echoed the information just presented in the prepared statements (see Appendix C for details of the consent process). The informed consent process was repeated at the beginning of the second visit of the Baseline stage, resulting in two signed consent copies. In addition, the participant was reminded of individual aspects of the consent statements at appropriate times throughout the course of the study.

Upon obtaining the first informed consent, the participant and the Key Support Staff received appropriate information from the Participant Progress Checklist. The checklists contained the week number of the current visit within the protocol, Key Support Staff's name, the participant's unique identifying code, and a list of the items to be accomplished by either the Key Support Staff or the participant for the current visit. All data collected from the participant and his or her Key Support Staff were identified (on instrument/survey response sheets, in automated equipment data sets, and in computer databases) by this unique identifying code only. The purpose of this was to add an additional layer of participant privacy protection beyond that afforded by HIPAA medical record requirements. Because the research protocol was conducted within a private practice, and because the data collected were maintained in accordance with HIPAA requirements, participants' privacy and confidentiality were therefore protected

at a higher level than could be afforded within research facilities (O. Boikess, personal communication, April 18, 2008). Identifying participants by code, alone, within all research-related databases assured protection of participant privacy during any subsequent use of research data. The checklist itself, which was updated each week, based on the previous week's accomplishment within the protocol procedures, served as a guide to the tasks to be accomplished during the current visit.

After the PI indicated on the first session checklist that the tour, introductions, and consent were completed, administration of the first PRB began. It was anticipated that the amount of time required to obtain informed consent would vary considerably among participants and that participants would not complete a PRB on their first visit. The minimum accomplishment objective for the first visit was for the participant to be fitted with a wrist-worn Motionlogger device and to have physiological data (SBP, DBP, and HR) taken.

For this visit, the degree of participation of Key Support Staff was decided by the participant. At each activity juncture of the first visit, the participant was asked if he or she would prefer to be accompanied. This participation was neither encouraged nor discouraged, but was gently suggested as not being expected for subsequent visits. For example, the participant was asked, "for today, would you like [Key Support Staff's first name] to be with you while we [undertake a given activity]?" For subsequent visits, activities were undertaken as though the participant was not accompanied, but from time to time she or he was advised, "if at any time you feel you would like [Key Support Staff's first name] to be with us while we are [proceeding with a given activity], just let me know." By the third visit, however, the participants were able to make it through

without Key Support Staff involvement, beyond the knowledge that the staff person was nearby. This was necessary in order to keep Key Support Staff blind to the transition from Baseline to Intervention stages.

On the first visit, Key Support Staff completed the first on-site instance of the ABC and the SPSS of the PRB. If they were not requested to accompany the participant throughout this first visit, Key Support Staff also completed the DBC-A of the PCB.

When not accompanying the participant, Key Support Staff personnel spent their time in an area designated for them on the second floor of the research site. This area was equipped with a small kitchen, bathroom access, and comfortable chairs, all for their use, comfort, and entertainment during waiting periods, as well as a table and chairs suitable for use in completing research questionnaires and surveys. Access to the second floor was made directly from the front reception area of the building and was thus completely isolated from areas in which participants were located during involvement in all the activities throughout all stages of the research protocol. This was designed so that Key Support Staff personnel could remain blind to ongoing research activities occurring in the main research and intervention areas on the first floor of the site. In further support of this, the building was equipped with background white noise generators to protect against sounds of activity/voices from the first floor being heard in the Key Support Staff waiting area.

At the conclusion of the visit, the participants were paid the $30 weekly participation fee, in cash, which was the amount approved by the Institutional Review

Board (IRB), operating under the auspices of the University of Maryland, Baltimore County (UMBC) Office for Research Protections and Compliance.

Second visit. Upon arrival for the second Baseline session, the participant was greeted by the PI and was asked to sign the consent agreement for a second time. This occurred without the presence of Key Support Staff, who proceeded directly to the second floor waiting area, unless the participant spontaneously asked the staff person to stay with him or her. Upon completion of the second consent signing, the participant was told that she or he would now begin the scheduled activities for this visit, and that most of the things that he or she would be doing would be just like the things she or he did last week, but some things would be new and a little different. The participant was told, "for today, if at any time you would like [Key Support Staff's first name] to be with you, just let [research assistant's first name] know."

The participant then began the PRB, starting at the initial step (submitting the Motionlogger actigraph for data download), and followed the protocol in the specified order regardless of how far through the battery the participant had progressed the week before. If the participant completed the PRB, he or she began the PCB. As on the first visit, Key Support Staff submitted the record of challenging behavior observations from the previous week and completed the current week's ABC and SPSS. If she or he had not had the opportunity on the first visit to complete the DBC-A of the PCB, it was done on this visit (again, progress was tracked via the Key Support Staff version of the Participant Progress Checklist). At the conclusion of the visit, the participant was paid the weekly participation fee.

Subsequent visits. On the third and all following visits during the Baseline stage, when the participant arrived at the research site, she or he was greeted by the receptionist, who handed the participant and Key Support Staff their respective version of the Participant Progress Checklist and directed the participant to the first station of the PRB, where the Motionlogger actigraph data download occurs. The participant proceeded through each step of the PRB, and then moved on to the PCB, picking up at the point in the PCB at which the previous visit concluded. If the PCB and six PRBs had been completed, the participant was then eligible to move into the Intervention stage and the EMDR protocol was initiated.

Intervention stage. With initiation of the EMDR Treatment Protocol (detailed in Appendix A), the participant began to interact with the PI for the first time since the initial greeting, site tour, and consent process. This was also the first occasion for video recording of participant sessions. The first EMDR Phase, History Taking and Treatment Planning, had been very nearly accomplished via preceding research activities, but carrying out this phase provided the opportunity to establish therapeutic rapport, to fill in details and missing chapters of relevant history, and to refine case conceptualization. This phase presented the participant's first opportunity to begin to learn about EMDR therapy and what to expect throughout the process of treatment. It also allowed for further assessment of the participant's current emotional functioning, sense of safety and stability, and other attributes which informed planning for EMDR Phase 2, Client Preparation, in which skills identified as underdeveloped were taught and enhanced.

EMDR Phase 3 began when the PI judged that the participant was ready to begin processing the trauma incident. In this phase, the explicit memories, emotions, cognitions, and bodily sensations associated with the target trauma were activated. As such, it marked the end of the period of time during which participants who dropped out were replaced. All those who dropped out prior to initiation of Phase 3 were replaced, with the intention of starting all of them together (i.e., a second multiple-baseline). Once a participant began the actual Intervention (Phase 3), however, she or he was not replaced.

Maintenance and follow-up stages. During these stages, administration of the PRB occurred just as it had for earlier stages. No EMDR or psychotherapeutic intervention took place. The PCB that had been given during the Baseline stage was repeated during the Maintenance stage (without the WASI). On occasions when the PCB was completed before six Maintenance stage PRBs were acquired, the participant continued, completing one PRB per visit. Time left at the end of each of these visits was occupied by pastime activities. Note that the scheduled length per visit established early in the Baseline stage continued throughout the Maintenance stage so that Key Support Staff remained blind to the transition into and out of the Intervention stage. Upon completion of the six-week Maintenance stage, there was a six-week Hiatus during which participants did not visit the research site.

The Follow-up stage then began and activities during this stage were scheduled in a similar fashion to those of the Maintenance stage. The PRB was administered upon each visit, and the PCB (including the WASI) was administered once over the six-week duration of this stage. Because it was no longer necessary to maintain uniform visit

lengths, the PCB was scheduled across the six Follow-up visits so as to be most convenient for the participant and Key Support Staff.

At the conclusion of each Baseline, Intervention, Maintenance, and Follow-up stage visit, the Participant was paid the weekly participation fee; this fee was not paid during Hiatus. At the conclusion of the Maintenance stage, Key Support Staff were to be paid 4/5 ($4000) of their IRB-approved research stipend. Each Key Support Staff member was to receive the last payment of the research stipend ($1000) at the conclusion of the Follow-up stage. This research stipend payment, however, had to be eliminated due to Arc policy requiring that employees relinquish any monies received via participation in research; therefore, the stipends were paid directly to the Arc.

Results

Data and information collected over the course of the study are presented in two groupings. First, data from the PCB, which serve both to characterize participants and as pre- (Baseline), post- (Maintenance), and Follow-up outcome measures, are combined with collected historical information and observations of the PI and research staff to form a profile characterizing each participant. Second, data from the PRB, which are the basis of the time series analyses, are addressed.

Participant Characterization

Participant 050. Participant 050 was chronically, physically abused by her mother (beatings with hands, electrical cords, objects) from before she can remember until she was removed as a preteen. During this period, she also participated in sibling violence, and toward its end, was raped by an uncle. Later, while living with her grandmother, she suffered emotional and other abuses. In recent years, she has

experienced explosive episodes of violence, elicited by various trauma-related triggers, occurring mainly at work.

Participant 050 was the first to enter the protocol. At visit 51, she reported that she would be having a long-awaited knee surgery in three weeks, and would be in recovery for a minimum of six weeks. We interrupted the course of intervention, which was incomplete in terms of trauma processing, and during the next two visits 050 spent additional time at the research site in order to receive the PCB that would have been associated with Maintenance. At these visits, she was also given therapy aimed at closing down trauma processing and preparing for surgery. The surgery was subsequently postponed, due to health insurance problems. After waiting over three months without the surgery occurring, she returned to the research for the six-week Follow-up battery.

The PCB data collected for 050 found her cognitive functioning consistent across intellectual domains, with WASI scores in the Extremely Low range [Full Scale IQ (FSIQ) = 64]. She performed significantly better on nonverbal reasoning tasks than verbal reasoning tasks, yet seemed equally engaged and focused during each. Her lowest scores were on tasks where she was asked to give the meanings of words and to describe how two words were alike. These scores fell in the Extremely Low range of functioning. Her performance fell in the Low Average range on a task of abstract non-verbal reasoning, which required her to identify a missing piece of a patterned design. This performance revealed a relative strength of hers, and resulted in a significant difference between scores reflecting her ability to reason with and without the use of words [Verbal IQ (VIQ) = 55; Performance IQ (PIQ) = 75]. The follow-up administration of the WASI resulted in a similar pattern of relative strengths and weaknesses, but with a poorer

performance on the nonverbal reasoning task, resulting in a lowered FSIQ score of 59 (VIQ = 55; PIQ = 67), which are all within the Extremely Low range.

Results of the three (Baseline, Maintenance, and Follow-up) administrations of the PAI-A are given in Figure 2. At Baseline, her responses to items were consistent, indicating that she likely attended appropriately to the items. Her profile suggests that she had a forthcoming approach to the test and there is little evidence of negative distortion. She endorsed a wide variety of mild to moderate symptoms, including Somatization (T = 71), Anxiety-related Disorders (T = 67), Depression (T = 61), Paranoia (T = 60), Stress (T = 64), and Nonsupport (T = 71). All other subscales were in the normal range of functioning. Note that the two horizontal reference lines on the PAI profile indicate score levels of T = 50 (typical for nonclinical adolescents), and T = 70 (includes 98% of nonclinical adolescents).

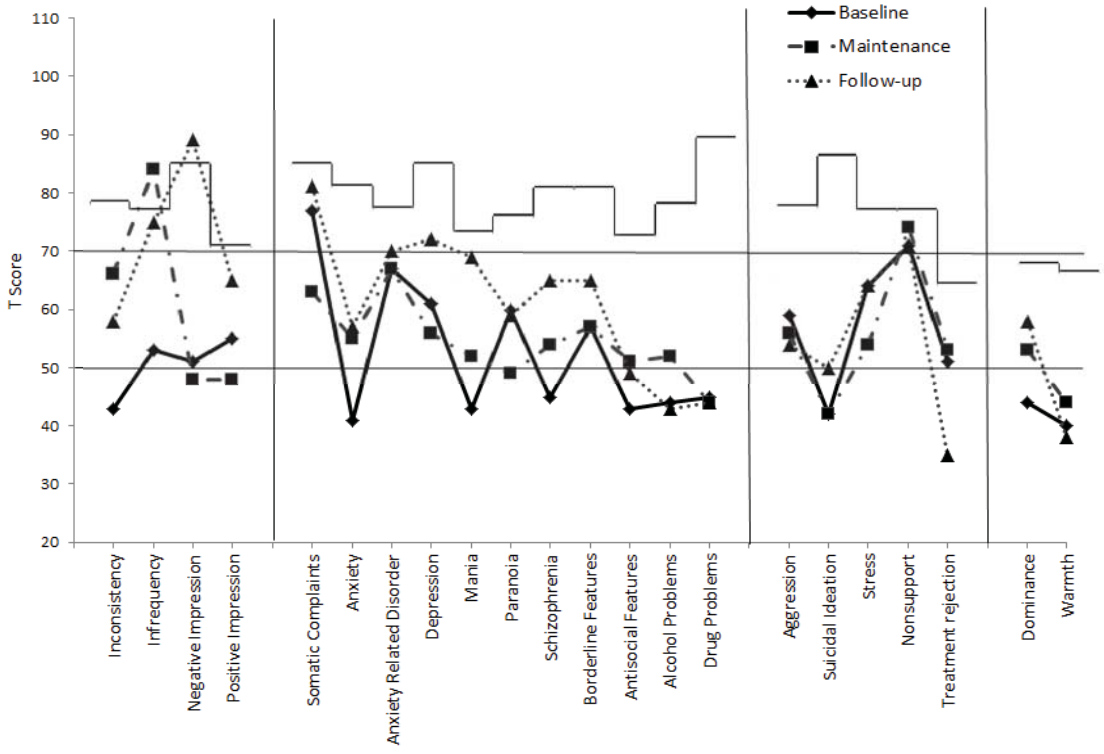

Figure 2. Personality Assessment Inventory – Adolescent, profile for Participant 050.

The stepped clinical skyline of the PAI-A profile includes 98% of a representative clinical sample of 1,160 adolescents seen in a variety of clinical settings (Morey, 2007).The later administrations, especially at Follow-up, indicate increases in some of the clinical scales, including Depression ($T = 72$), Mania ($T = 69$), and Schizophrenia ($T = 65$); and in the validity scales, especially for Negative Image Management ($T = 89$).

The alexithymia and somatoform dissociation screens did not indicate clinically severe levels of these conditions; however, the TAS-20 did indicate moderate alexithymia at Baseline and Follow-up, but not at Maintenance.

When administering the C-PTSD-I, the assessor reported that 050 appeared sad and tearful, and admitted that she tries to avoid thinking or talking about events in her traumatic history so that she does not become upset. Her responses indicated that she experiences symptoms in each of the interview's categories of criteria for PTSD; however, she did not endorse "significant distress" in any area of her life, other than her frequent efforts at avoidance. The result was a lack of PTSD diagnosis via this instrument, at all three administrations.

The results of the three administrations of the IES-R are depicted in Figure 3. All three subscale areas of experiencing (Intrusion, Avoidance, and Hyperarousal) decreased from Baseline to Maintenance, with the decline in Avoidance continuing at Follow-up.

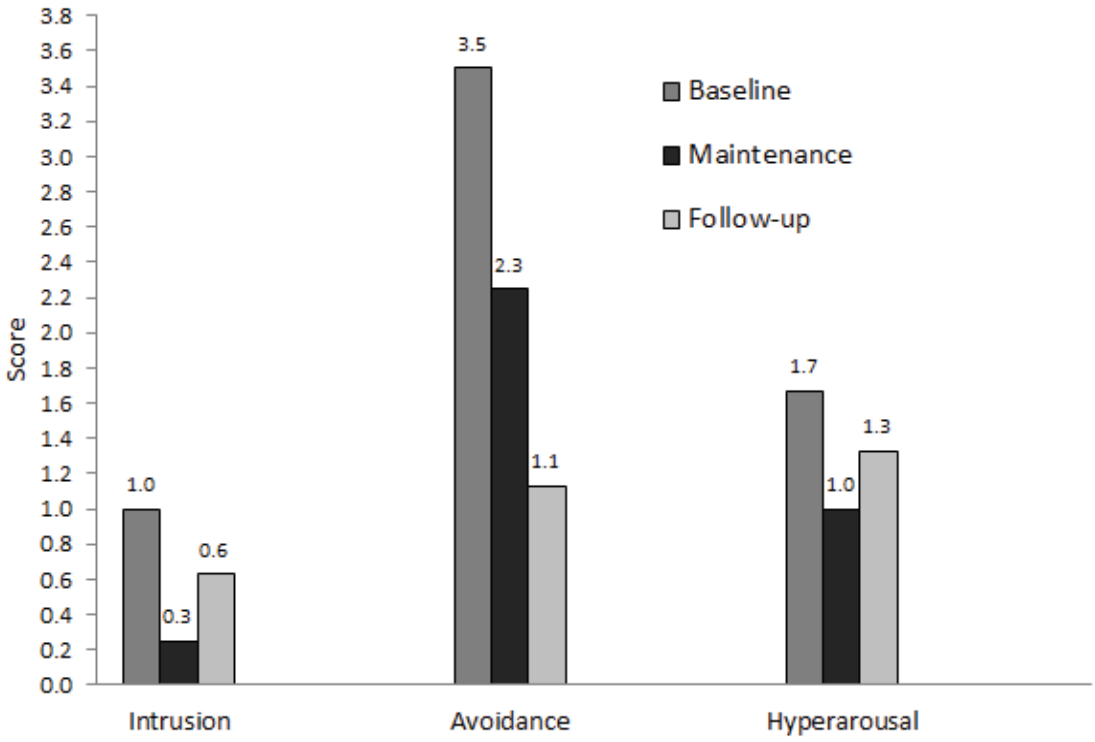

Figure 3. The Impact of Event Scale – Revised, profile for Participant 050.

Participant 051. Participant 051 was the ninth of thirteen children living in extreme poverty in a rural area. All of the children were disbursed into foster care settings when 051 was 6 years of age, and he was remanded to a state-run institution for people with ID at 9. Despite what one might expect was a traumatic early history, 051 denied any difficulty either during his childhood and teen years, or during the years that followed of living in various state-supported placements. He admits it was sad to be taken from his home and siblings, but recalls only positively expressed vignettes of this period. At the age of 49, he moved out of state to live with his brother, who had legal custody of 051, and who reportedly misappropriated a retirement/trust fund belonging to 051.

All of 051's life story was recorded, visually, via his drawings of the chapters of his life. We used this method of communication because 051 was unable to verbally relate events in an organized fashion, either in terms of chronology of events or in terms

of intensity of emotional content. Once the 20 chapters of his life were drawn and organized chronologically, he was able to discuss his recollection of events and frequently of his feelings, although most of his reports of feelings were in the present tense. The one trauma which 051 acknowledged was a work-related accident involving a three-story fall after hanging on to a downspout for some period of time. The accident, which occurred while in the custody of his brother, resulted in an extended coma and permanent damage to both legs and back, with one leg damaged severely enough to have warranted amputation, both shortly after the accident and again in a more recent medical recommendation. He refused on both occasions.

051 is the second of the four original starting participants. He did not begin trauma processing (EMDR Phases 3 and 4, Assessment and Desensitization) until visit 30, due to the time required to record his history through drawings. His single reported trauma processed without the emergence of any feeder memories. Additional intervention time was spent reviewing and adding dimension to the story of his life. He completed intervention at visit 53, followed by the standard six weeks each of Maintenance, Hiatus, and Follow-up.

The PCB data collected for 051 found his cognitive functioning to fall in the Extremely Low range, with WASI FSIQ = 66. He performed significantly better on nonverbal reasoning tasks (PIQ = 79) than verbal reasoning tasks (VIQ = 57), yet seemed equally engaged and focused during each. This reflects a significant difference between his ability to reason with and without the use of words. The follow-up administration of the WASI resulted in a similar pattern of relative strengths and weaknesses, but with an upward shift of two points in FSIQ = 68 (VIQ = 59; and PIQ = 80).

Results of the three (Baseline, Maintenance, and Follow-up) administrations of the PAI-A are given in Figure 4. At Baseline, his PAI-A profile shows that his responses were fairly consistent (a low Inconsistency *T* score of 40) and that he likely attended appropriately to the items. It suggests a slight positive distortion based on a Positive Impression score of 68. This finding is consistent with Participant 051's demeanor and interpersonal style as observed by his assessor that he is a very sensitive person with a need to be liked and well thought of. On the PAI-A there were symptoms of clinical concern in the area of Somatization (*T* = 88). This is consistent with statements offered during the testing sessions, remarking that he has "steel plates in his legs", one bad eye, stomach problems "like ulcers" and a bad back which he says causes him to sleep in a chair instead of a bed. There was a moderate elevation in Schizophrenia (T = 56).

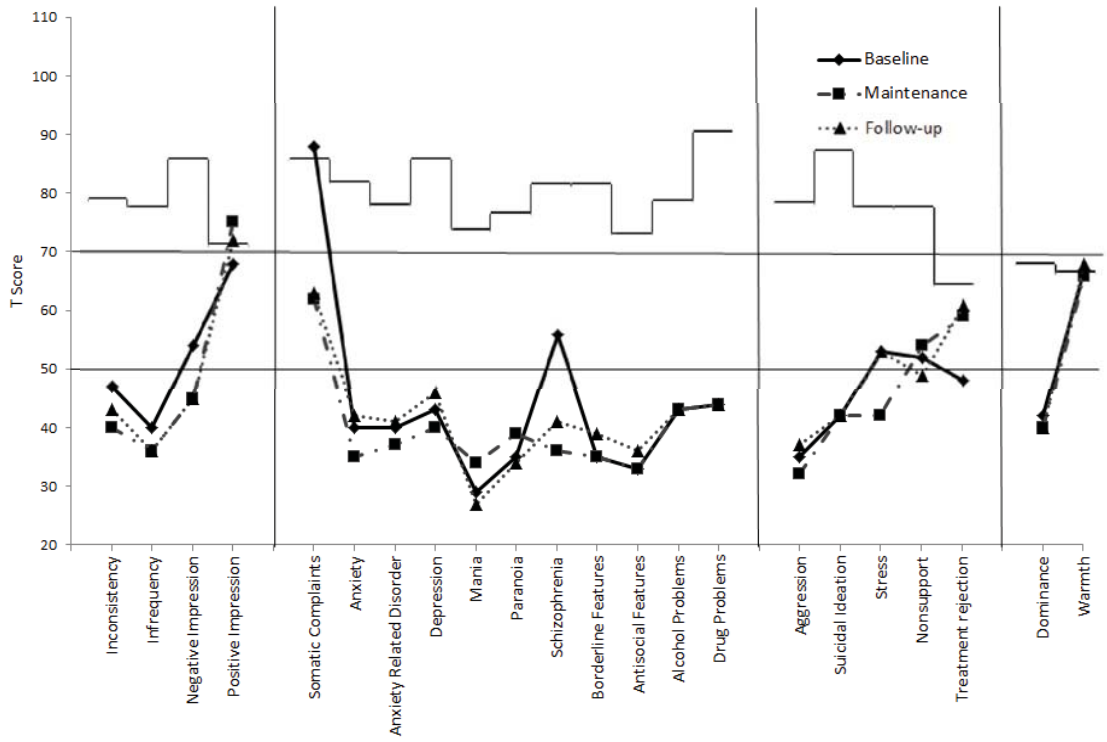

Figure 4. Personality Assessment Inventory – Adolescent, profile for Participant 051.

The later administrations of the PAI-A reflect similar profiles, but with significant drops in the elevated clinical scores: Somatization (T = 62 at Maintenance; T = 63 at Follow-up) and Schizophrenia (T = 36 at Maintenance; T = 41 at Follow-up).

The alexithymia and somatoform dissociation screens did not indicate clinically severe levels of these conditions; however, the TAS-20 did indicate low alexithymia at all administrations.

Participant 051's responses on the C-PTSD-I indicate that at Baseline he met criteria for chronic PTSD. Subscale scores were Exposure to Trauma (3 points out 4), Re-experiencing (5 points out of 11), Avoidance and Numbing (5 points out of 16), Increased Arousal (2 points out of 7) and Significant Distress (1 point out of 5). At Maintenance, administration of the C-PTSD-I revealed that 051 had lost the PTSD diagnosis, which was confirmed at Follow-up.

The results of the three administrations of the IES-R are depicted in Figure 5.

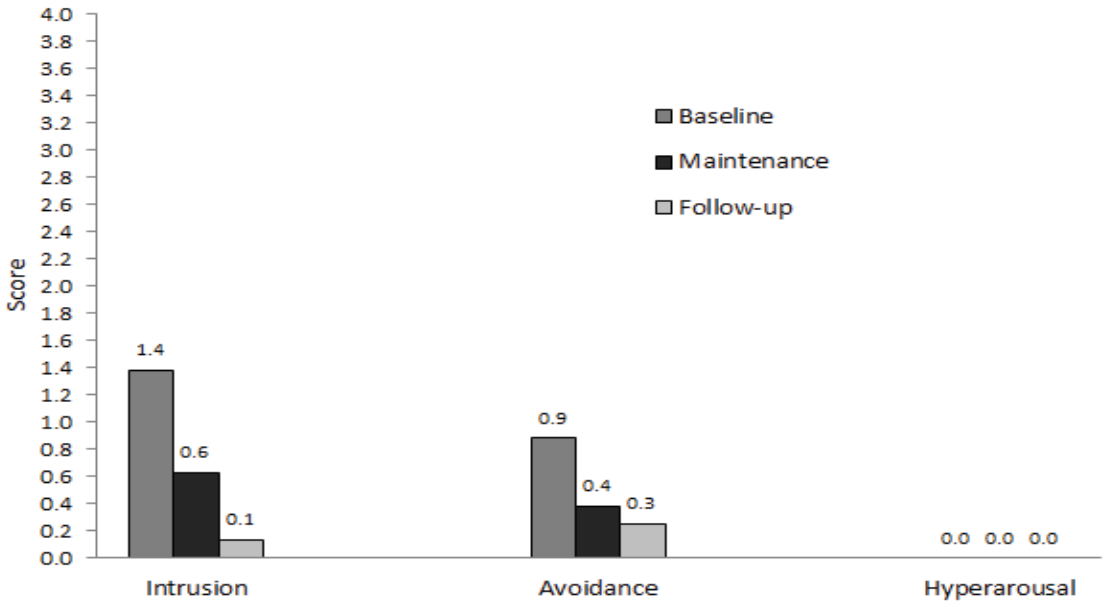

Figure 5. The Impact of Event Scale – Revised, profile for Participant 051.

For the two subscale areas of Intrusion and Avoidance, reported symptomology decreased from Baseline to Maintenance, and again at Follow-up. 051 reported no Hyperarousal symptoms at all administrations.

Participant 052. Participant 052 was nominated for the research study based on the known, recent trauma of a large tree crashing into her group home during a tornado. In the course of Baseline assessment and Intervention processing, memories of traumas emerged, starting as early as 6 years of age and continuing into her recent, adult life, including a number of sexual assaults, parental abuse, fires, and deaths of parents, boyfriend, and pets.

Participant 052 is the third of the four original starting participants. She proceeded through the research without any exceptions to the protocol. At the end of Baseline, she was hospitalized and learned that she has diabetes, which elevated the level of health concerns to more of a focus than had been in the original treatment plan. Nonetheless, she worked through a long list of traumatic experiences, maintaining a persistent, if at times lethargic, dedication to the therapeutic process, completing Intervention at week 56 and the final three phases in six weeks, each.

The PCB data collected for Participant 052 demonstrated consistency across intellectual domains with WASI scores falling all in the Borderline range. Her overall reasoning abilities exceeded those of approximately 3% of individuals her age (FSIQ = 71). She performed slightly better on nonverbal (PIQ = 77) than verbal reasoning tasks (VIQ = 71), though she seemed equally engaged and focused during both. Her lowest score was on a task where she was asked to give the meanings of words. She often would give vague definitions, or omit important parts of a definition. The follow-up

administration of the WASI resulted in a reversed pattern of relative strengths and weaknesses, with a decrease in performance on nonverbal reasoning tasks (PIQ = 70) and an increase in verbal reasoning (VIQ = 73) and with a resulting drop of two points in overall IQ (FSIQ = 69).

Results of the three (Baseline, Maintenance, and Follow-up) administrations of the PAI are given in Figure 6. At Baseline, 052's PAI-A profile shows that her responses to items were consistent and that she likely attended appropriately to the items. Her profile suggests that she had a forthcoming approach to the test, and there is little evidence of negative distortion. She endorsed a wide variety of mild to moderate clinical symptoms that appear to be of concern, including Somatic Complaints ($T = 68$), Anxiety ($T = 65$), Anxiety Related Disorders ($T = 62$), Depression ($T = 64$), Paranoia ($T = 65$), Suicidal Ideation ($T = 68$), and Nonsupport ($T = 65$).

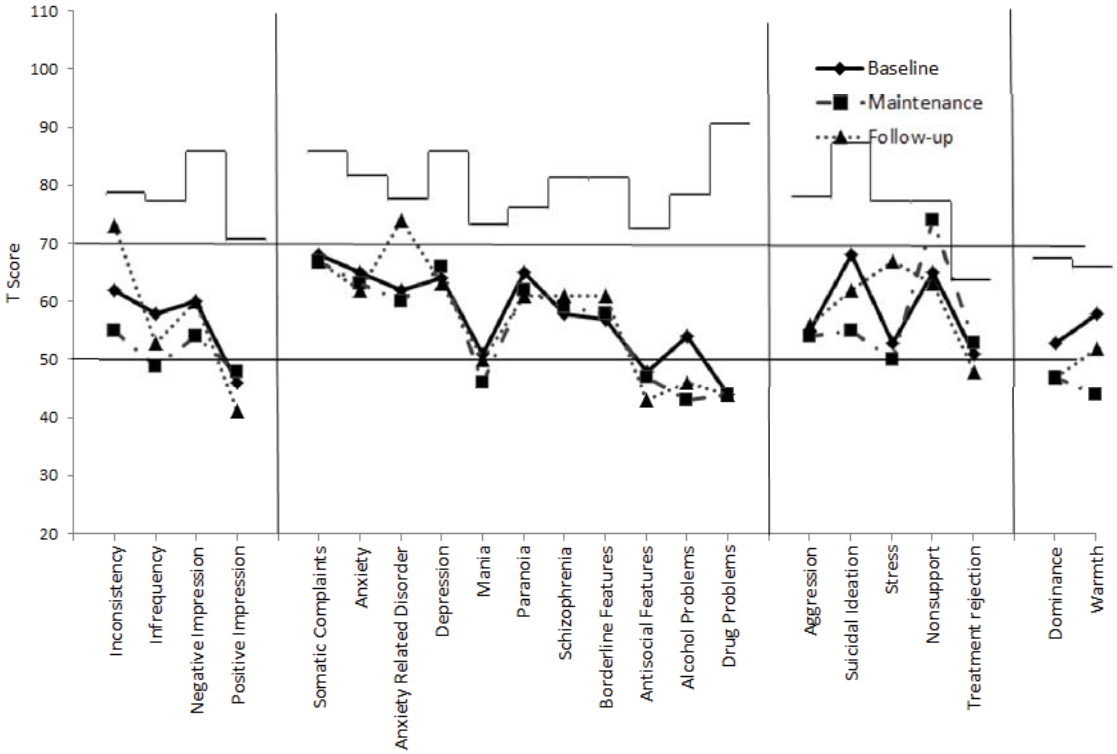

Figure 6. Personality Assessment Inventory – Adolescent, profile for Participant 052.

All other subscales were in the normal range of functioning. Participant 052's examiner reports that there is a possibility that these results are an underestimate of her true level of symptomatology, given her cognitive disability, desire to please the research staff, and the high level of friendliness and encouragement offered during the research sessions. These factors may have improved her mood, and in turn, may have affected her coping and interpersonal interactions, thereby suppressing negative results (see Negative versus Positive Impression management scores). The Maintenance and Follow-up administrations produced profiles that are similar in most respects, but with noticeably higher Nonsupport ($T = 74$) at Maintenance and higher Anxiety Related Disorders ($T = 74$) and Stress ($T = 67$) at Follow-up.

The somatoform dissociation screen did not indicate clinically severe levels of dissociation or somatization, with 052 scoring at a constant 33 at all administrations. The screens for alexithymia produced varying results both across time, with TAS-20 scores going from 49 (non-alexithymia) at Baseline, to 61 (high alexithymia) at Maintenance, and to 57 (moderate alexithymia) at Follow-up and across screens, with The Overt Aggression Scale (OAS) scores going down from 34 at Baseline to 26 at Maintenance, and then back up to 40 at Follow-up, reflecting a differing perspective between the participant's self-report (TAS-20) and her staff's observations (OAS).

Participant 052's responses on the C-PTSD-I indicate that at Baseline she met criteria for chronic PTSD. Subscale scores were Exposure to Trauma (4 points out of 4), Re-experiencing (8 points out of 11), Avoidance and Numbing (13 points out of 16), Increased Arousal (6 points out of 7) and Significant Distress (3 points out of 5). At

Maintenance, administration of the C-PTSD-I revealed that she had lost the PTSD diagnosis, which was confirmed at Follow-up.

The results of the three administrations of the IES-R are depicted in Figure 7. At Baseline, she responded to the IES-R in relation to the trauma of her home being set on fire, killing her pet. She obtained the highest score on the Avoidance subscale. For example, she indicated that the following difficulties have been "extremely" distressing: "I tried not to think about it" and "I tried to remove it from my memory." She also reported moderate distress on 13 of the 20 remaining items, indicating she was experiencing a significant amount of posttraumatic stress in her daily life. For all three subscale areas, her reported symptomology decreased from Baseline to Maintenance, and from Baseline to Follow-up. Scores for Hyperarousal and Intrusion showed an increase from Maintenance to Follow-up.

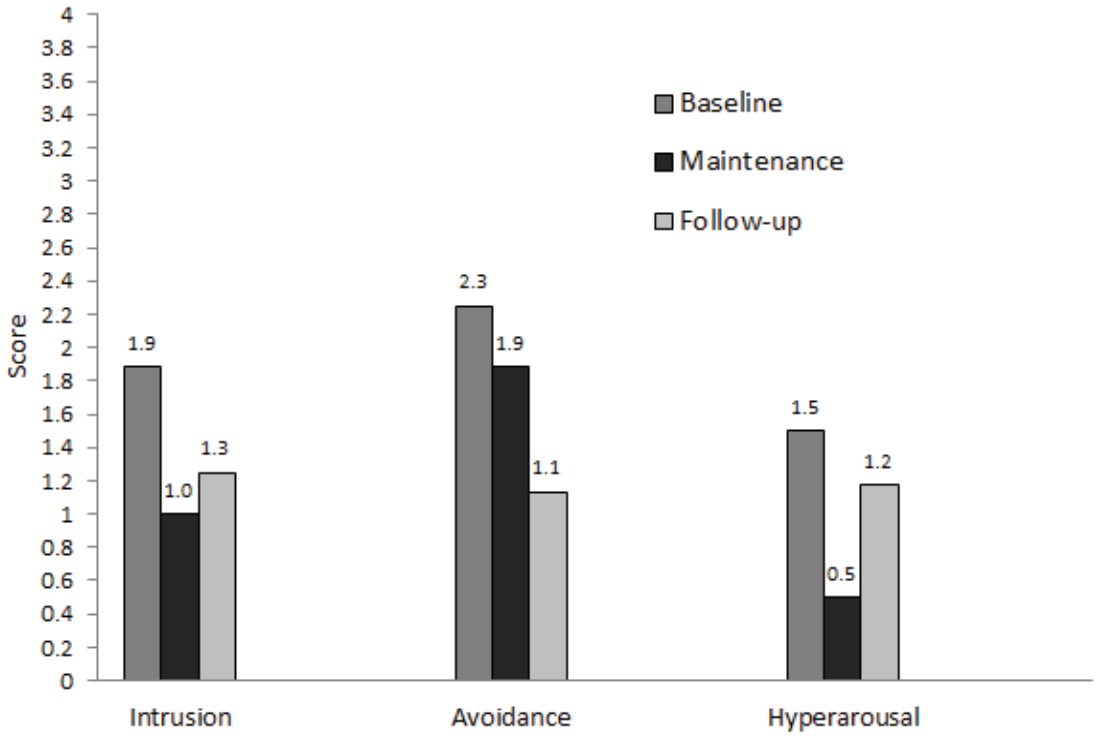

Figure 7. The Impact of Event Scale – Revised, profile for Participant 052.

Participant 053. Participant 053 is the second youngest of nine children. Both parents were alcoholic and unable to care for the children. As an adult, she displays signs of Fetal Alcohol Syndrome. While living with her biological parents, it was reported that she roamed the streets, without proper clothes, unclean and without adequate food. At age 4, she was removed and placed in foster care, where she reports physical abuse by her foster father. Despite this abuse, she remained there until she was approximately 15 years old when it was finally determined that "this was not the best place for her".

Participant 053 then moved to another foster home where her younger sister resided. Soon after the move, she saw the foster mother hit her sister over the head with a metal frying pan. Three years later, at the age of 18, she was moved to a state institution at the request of her foster father who claimed he "couldn't do anything with her". She left the institution at the age of 21 and was accepted into ARC supportive accommodations.

Although 053 entered the study with a list of traumatic events such as described above, it became evident early in Intervention that the experiences underpinning her most intractable life problems were from the preverbal era, resulting in an array of attachment-related issues. The intensity of the traumatic material arising from the earliest stages of her life, and of the nature of the therapeutic relationship that developed over the course of Intervention, dictated that she was not ready for separation at the time when Hiatus would have occurred in the protocol. She therefore continued through 96 weeks of research without taking the six-week Hiatus break. The Maintenance PCB assessment was performed starting at week 60, running concurrently with Intervention. Follow-up PCB data were acquired in August of 2013, almost one year after the end of the formal

research protocol. For the Maintenance assessment, she would spend additional time at the research site in order to accommodate both the PCB and Intervention. The Follow-up assessment, however, was administered during a period when she was still coming for therapy at the research site, but was with a new therapist at that time.

The PCB data collected for 053 at Baseline demonstrated IQ scores falling in the Extremely Low range. Her overall reasoning abilities exceeded those of approximately 1% of individuals her age (FSIQ = 66). She performed slightly better on performance (PIQ = 70) than on verbal tasks (VIQ = 66). Despite saying that she was very tired after a long day at work, she was engaged and gave her full attention to the task at hand. The follow-up administration of the WASI resulted in almost identical scores, with a difference occurring in only one subtest, Similarities, increasing by one point.

Results of the three (Baseline, Maintenance, and Follow-up) administrations of the PAI are given in Figure 8. At Baseline, 053's profile shows that her responses were consistent (a very low Inconsistency *T* score of 36) and that she likely attended appropriately to the items. Her profile suggests that she had a forthcoming approach to the test, and there is little evidence of either negative or positive distortion. She endorsed a wide variety of symptoms that appear to be of concern, including Somatic Complaints (*T* = 85), Anxiety (*T* = 65), Anxiety Related Disorders (*T* = 77), Depression (*T* = 67), Borderline Features (*T* = 70) and Aggression (*T* = 75). Based on testing, there appeared to be no drug or alcohol abuse or suicidal ideation. The Maintenance and Follow-up administrations produced profiles that were similar in form, but with noticeably lower scores in areas of clinical concern, especially Somatic Complaints, Anxiety Related Disorders, and Aggression.

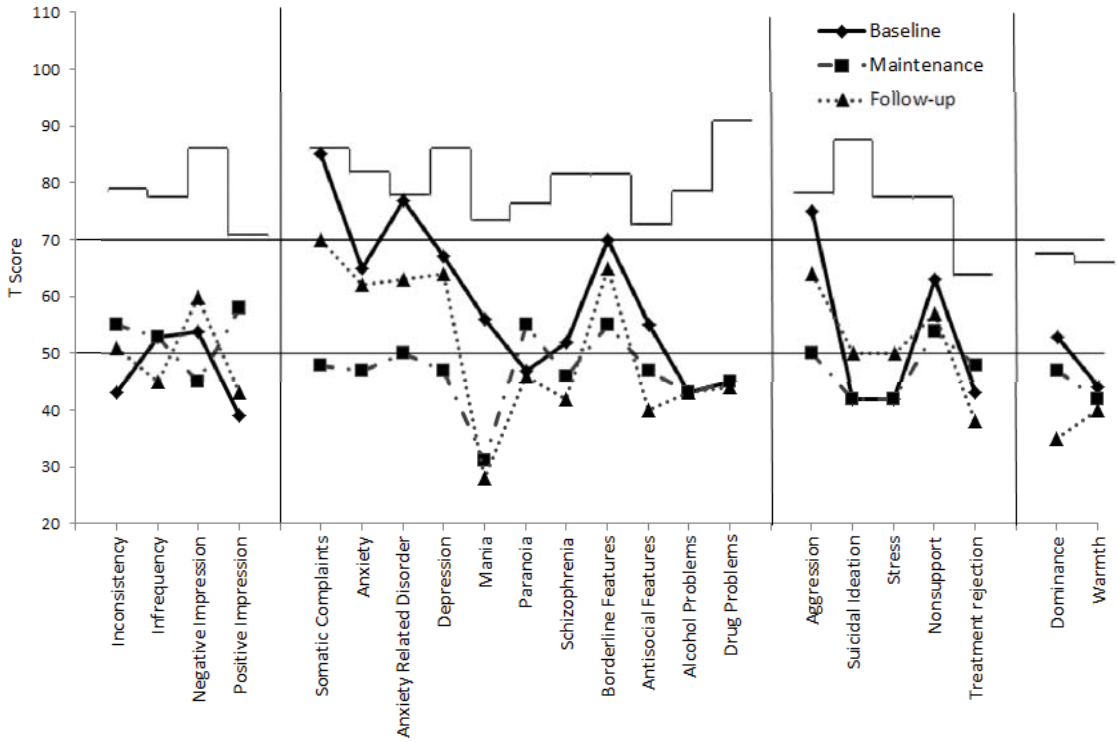

Figure 8. Personality Assessment Inventory – Adolescent, profile for Participant 053.

Participant 053 completed the TAS-20 at Baseline. Results indicate she has a high degree of alexithymia with a score of 67 out of a possible 100 points. Her support staff person completed the OAS with a Total score of 56 out of a possible 99 points, indicating she witnesses a moderate to high degree of alexithymia in 053. Out of the five subscales, 053 was rated the highest on being "Distant" and "Uninsightful". The Maintenance and Follow-up administrations of the TAS-20 dropped from High Alexithymia to Moderate Alexithymia. We were not able to obtain results of the OAS at Maintenance and Follow-up. Results from the SDQ-20 completed at Baseline by 053 yielded a score of 30 out of a possible 100. The lowest score possible on the SDQ-20 is 20. Therefore, she scored very low on this measure at Baseline (30), and at Maintenance and Follow-up she scored 20.

Participant 053's responses on the C-PTSD-I indicate that at Baseline she met criteria for chronic PTSD. Subscale scores were Exposure to Trauma (4 points out of 4), Re-experiencing (7 points out of 11), Avoidance and Numbing (9 points out of 16), Increased Arousal (5 points out of 7) and Significant Distress (5 points out of 5). At Maintenance, administration of the C-PTSD-I revealed that she had lost the PTSD diagnosis, which was confirmed at Follow-up.

Results of the three administrations of the IES-R are depicted in Figure 9. At Baseline, she displayed elevations in all three areas of experiencing: Avoidance, Hyperarousal, and Intrusion. Scores in all three decreased at Maintenance and again at Follow-up.

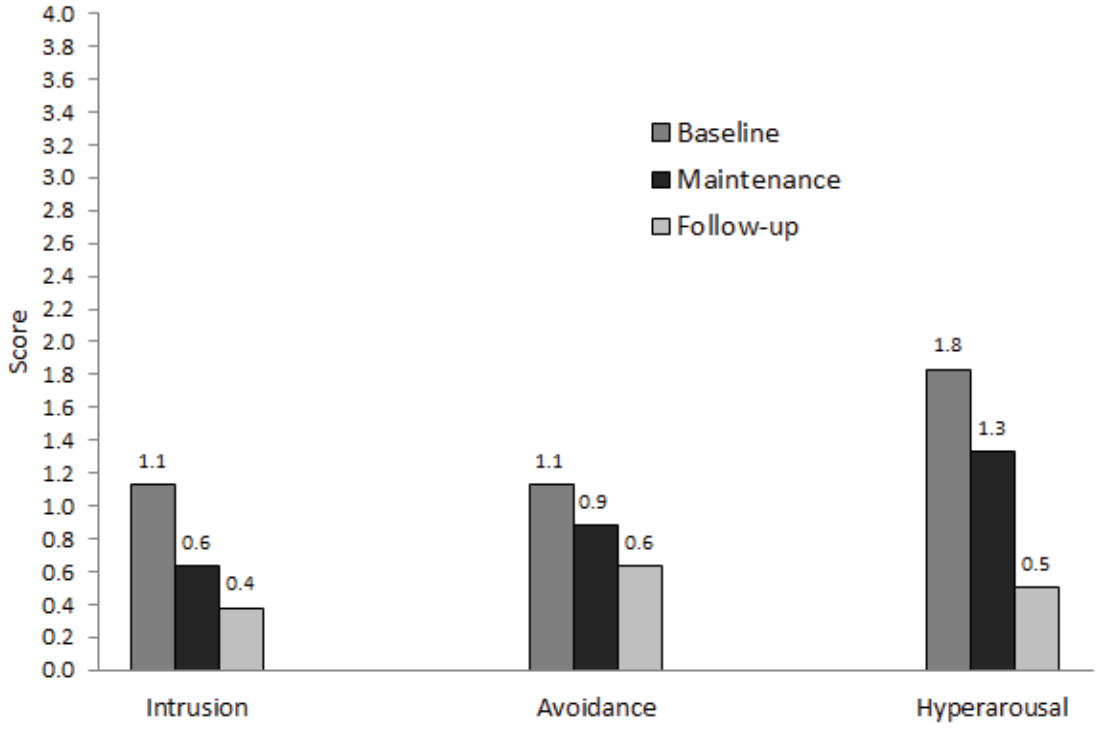

Figure 9. The Impact of Event Scale – Revised, profile for Participant 053.

Participant 066. Participant 066 was born with the umbilical cord around his neck, constricting his airway. He reports stories of the event, saying he turned blue

because he had stopped breathing, and that he was told later that this asphyxia caused brain damage. He lived his entire life in his parental home, at first with mother, brother, and step-father, then for many years with just his mother, until her death in 2006. He was nominated as a candidate for the research study based upon staff observations of his traumatic response to the death of his mother – persistent complaints of loneliness, crying, isolating, self-harm – all of which appeared to begin at her death and continue at increasing levels, along with intrusive memories of caring for her as she became more and more ill, her death (at home), and its immediate aftermath. During assessment, history taking, and intervention, many additional trauma incidents were recalled. Most were of episodes of bullying and violence perpetrated upon him as a child by his brother, an entire class at school, neighborhood children, and strangers.

Participant 066 was a replacement participant, starting the protocol 12 weeks after the first four. He proceeded through the protocol in standard fashion, except for the additional time demanded in therapy by the number and extent of his traumatic experiences. He completed the Intervention at his 66th visit, and proceeded through Maintenance, Hiatus, and Follow-up at six weeks, each.

The PCB data collected for 066 at Baseline demonstrated scores falling in the Extremely Low range. His overall reasoning abilities exceeded those of approximately 1% of individuals his age (FSIQ = 68). He performed significantly better on nonverbal reasoning tasks (PIQ = 80) than on verbal tasks (VIQ = 60). The follow-up administration of the WASI resulted in similar scores, with a difference of one point in two subtests, Vocabulary and Similarities. This closed the gap between PIQ and VIQ from 20 to 18

points, still a very pronounced difference highlighting the relative weakness in his verbal skills.

Results of the three (Baseline, Maintenance, and Follow-up) administrations of the PAI are given in Figure 10.

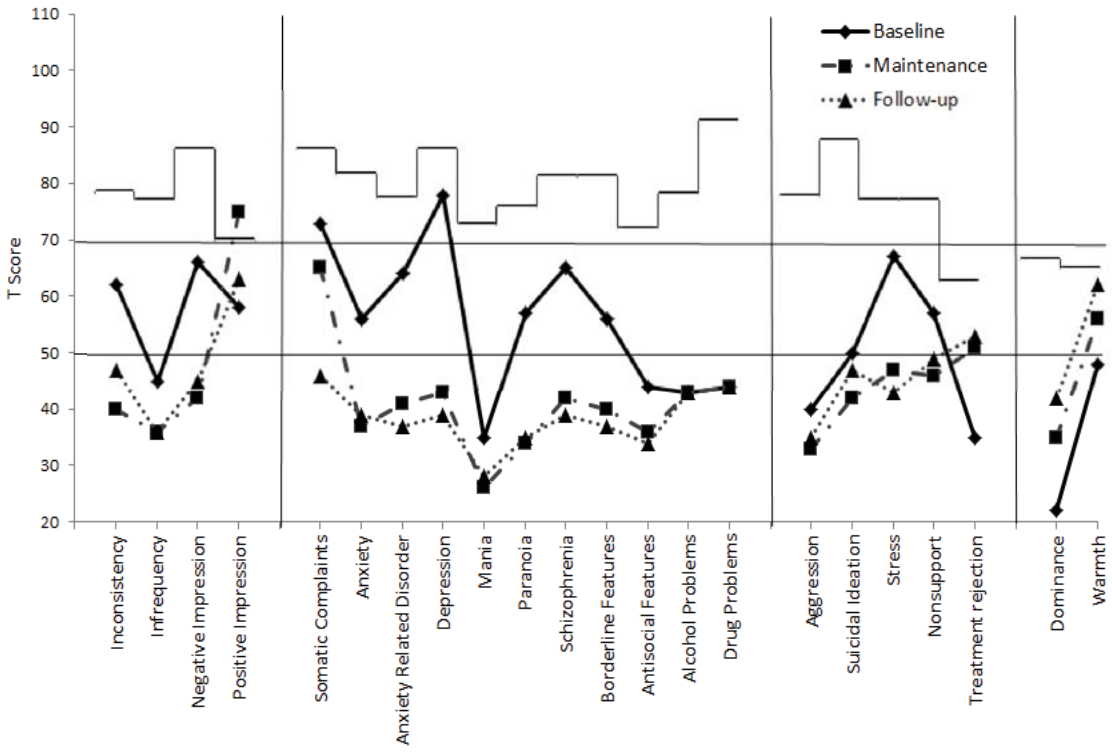

Figure 10. Personality Assessment Inventory – Adolescent, profile for Participant 066.

At Baseline, 066's PAI-A profile shows that his responses were consistent and that he likely attended appropriately. Symptoms of concern on the PAI-A were highest in the area of Depression with a high score of 78. Other subscales yielding high scores were Somatization (T = 73), Schizophrenic tendencies (T = 65), Anxiety Related Disorders (T = 64) and Paranoid Ideation (T = 57). Based on testing, there appeared to be no drug or alcohol abuse, but the effect of recent stressors in major life appeared to be high. The Maintenance and Follow-up administrations produced profiles that show markedly

decreasing scores in all the areas of clinical concern, and even the area of recent life stressors. Dominant Behavior and Warmth both increased, which are personal style qualities in which he was lacking. The drop in Somatic Complaints from Maintenance to Follow-up is also noteworthy.

Participant 066 completed the TAS-20 at Baseline. Results indicate that he is non-alexithymic, with a score of 42 out of a possible 100 points (< 51 = non-alexithymia). His support staff person completed the OAS. Total score on the OAS was 42 out of a possible 99 points, indicating that 066's support staff person sees more alexithymia in 066 than the TAS-20 reveals. Out of the five subscales of the OAS, 066 was rated the highest on being "Distant" and "Uninsightful". Results from the SDQ-20 completed by 066 yielded a score of 20 out of a possible 100; this is the lowest score possible on the SDQ-20. The Maintenance and Follow-up administrations of the TAS-20 continued to produce non-alexithymic results, although the OAS from 066's staff continued to indicate the presence of some alexithymia.

Participant 066's responses on the C-PTSD-I indicate that at Baseline he met criteria for chronic PTSD. Subscale scores were Exposure to Trauma (3 points out of 4), Re-experiencing (3 points out of 5), Avoidance and Numbing (5 points out of 7), Increased Arousal (2 points out of 5) and Significant Distress (3 points out of 5). At Maintenance, administration of the C-PTSD-I revealed that 066 had lost the PTSD diagnosis, which was confirmed at Follow-up.

The results of the three administrations of the IES-R are depicted in Figure11. At Baseline, Participant 066 displayed elevations in all three IES-R areas of experiencing. Scores in all three decreased from Baseline to Follow-up. The decline was steady through

Maintenance for Avoidance and Intrusion, but went up for Hyperarousal from Baseline to Maintenance before falling to its lowest level at Follow-up.

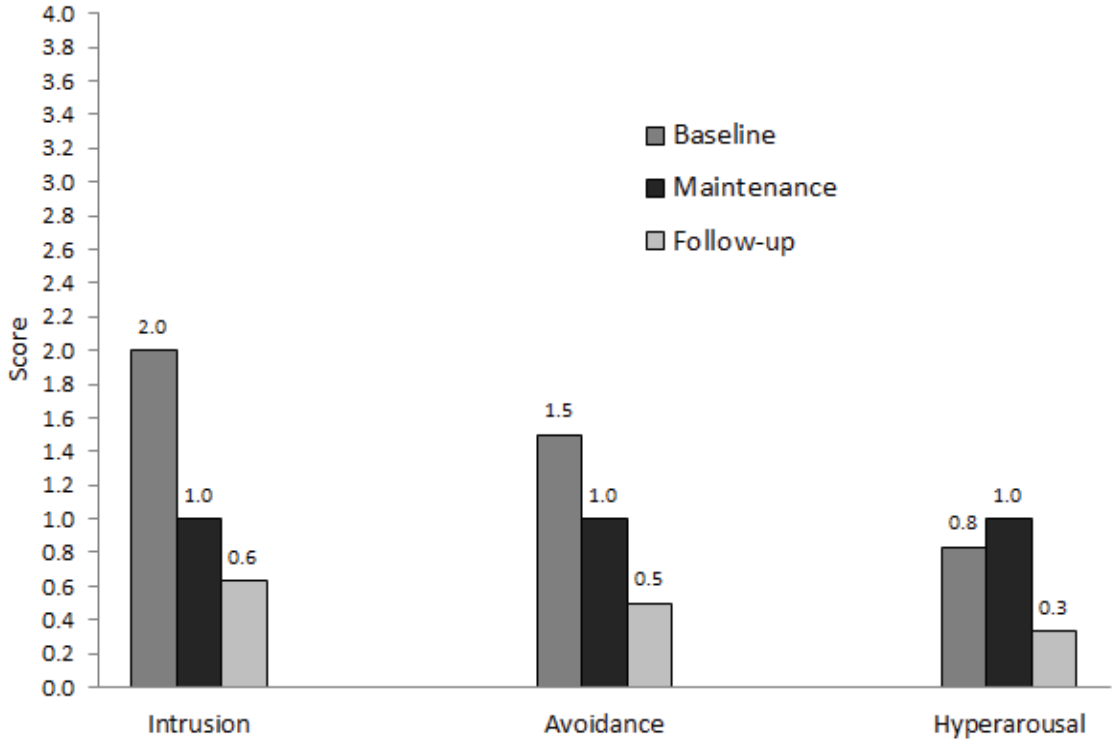

Figure 11. The Impact of Event Scale – Revised, profile for Participant 066.

Participant 068. Participant 068 was the only participant with a psychotic disorder (along with PTSD) to complete the research study. His psychotic experiences/expressions were ephemeral and nuanced, typically interwoven with his signature behaviors of singing, joking, storytelling, preaching, and other manner of entertainment. As a result, both his assessor and therapist found it difficult to distinguish the "truth" from "fantasy" in much of what he related. His earliest known traumatic experience is legally documented. As an infant, he was raped by his father. This abuse was flagrant and damaging enough to send the father to prison. There is recorded evidence of numerous, life-long traumas, including childhood physical abuse by his mother, which continued throughout his pre-teen and teen years while in foster care. He

also witnessed much violence, including deaths of brothers and other family members and friends. In Intervention, he was able to participate in trauma processing, apparently responding well, and reporting additional traumatic memories as they emerged.

Participant 068 was the last participant to enter the study, starting seven weeks after 066. Due to the necessarily extended period of time required for Intervention with 068, and his late start in the research study, there was not sufficient time for him to reach the therapeutic conclusion of Intervention such that successive, independent Maintenance, Hiatus, and Follow-up stages could be executed. Maintenance PCB data for Participant 068 were collected during weeks 68 through 73, while Intervention continued. For the Maintenance assessment, he would spend additional time at the research site in order to accommodate both the PCB and Intervention. The Follow-up assessment, however, was administered during a period when he was still coming for therapy at the research site, but was with a new therapist at that time.

The PCB data collected for 068 at Baseline demonstrated a slight inconsistency across intellectual domains with most scores falling in the Extremely Low range, and one score in the Borderline range. His overall reasoning abilities exceeded those of approximately 0.2% of individuals his age (FSIQ = 58). He performed better on nonverbal reasoning tasks (PIQ = 67) than verbal reasoning tasks (VIQ = 55) and seemed equally engaged and focused during each task. His lowest scores were on tasks where he was asked to give the meanings of words, and where he was given two words and asked how they are alike. He often would give vague definitions, or omit important parts of a definition. This was surprising to the examiner, who found him to be extremely verbal and well-versed in his interactions with the research staff. On the two nonverbal tasks,

which required 068 to manipulate blocks to form designs and to look at a picture of a design to choose the missing piece, he performed significantly better. At Follow-up, a 5-point drop on the Block Design subtask resulted in a 5-point drop in PIQ (PIQ = 62) and a two point drop in FSIQ (FSIQ = 56).

Results of the three administrations of the PAI are given in Figure 12.

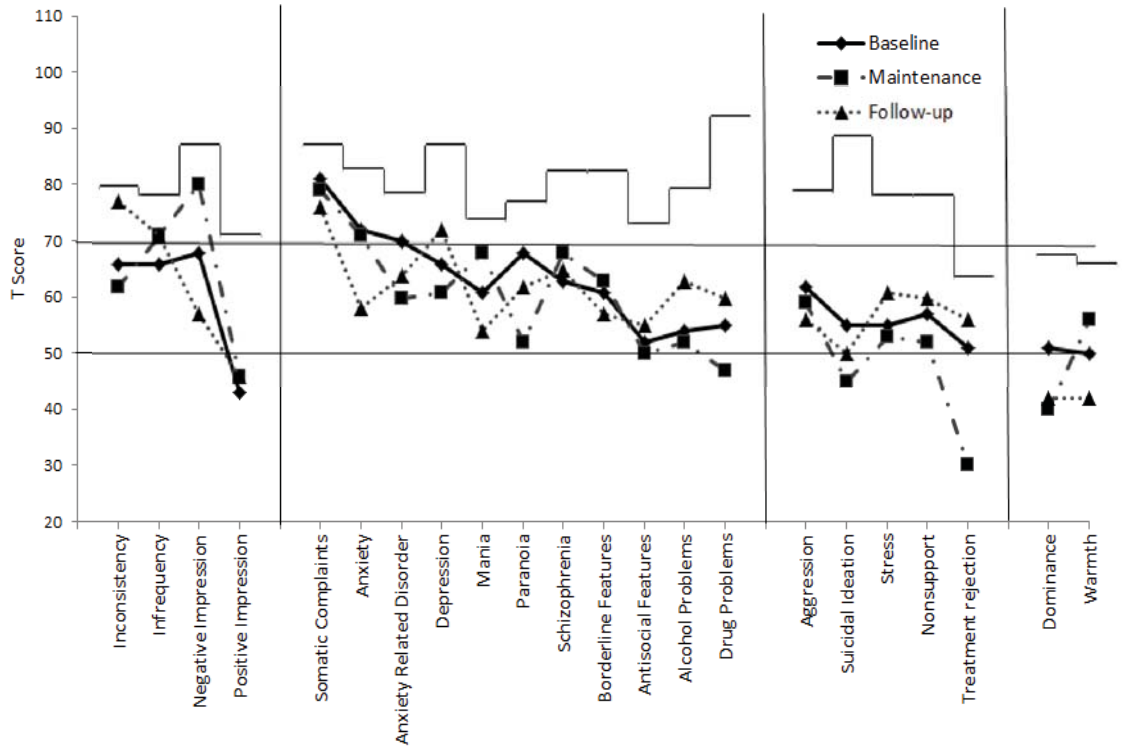

Figure 12. Personality Assessment Inventory – Adolescent, profile for Participant 068.

The Baseline PAI-A profile shows that 068's responses were consistent and that he likely attended appropriately. It suggests that he had a forthcoming approach to the test, and there is little evidence of negative distortion. He endorsed a wide variety of moderate to severely elevated symptoms which appear to be of concern, including Somatic Complaints (T = 81), Anxiety (T = 72), Anxiety-related Disorders (T = 70), Paranoia (T = 68), Depression (T = 66), Schizophrenia (T = 63), and Aggression (T =

62). All other subscales were in the normal range of functioning and do not appear to be of concern at this time.

The Maintenance and Follow-up administration profiles show mixed-directional changes on a number of scales, but generally trend lower for the clinical scales. Of note at Maintenance are the elevated score for Negative Impression and the significantly lower score for Treatment Rejection. The Follow-up profile is notable for the elevated score for Inconsistency and the increase over Baseline in Alcohol Problems and Drug Problems, given that Participant 068 is not known to drink or use non-prescription drugs.

Participant 068 completed the TAS-20 at Baseline and Follow-up. Results were moderate alexithymia at the first administration, dropping to low alexithymia at Follow-up, with scores dropping from 56 to 51 out of a possible 100 points (< 51 = non-alexithymia). The two instances of the OAS were prepared by two different staff who produced results so different from each other that they were juried to be unreliable. Results from the SDQ-20 completed by 068 were indicative of moderately elevated levels of dissociation and somatization at Baseline, which is consistent with his self-reported physical ailments and elevated score on the PAI-A somatic complaints subscale. At Follow-up, his SDQ-20 score lowered, approaching normal levels.

Responses by 068 on the C-PTSD-I indicate that at Baseline he met criteria for chronic PTSD. Subscale scores were Exposure to Trauma (4 points out of 4), Re-experiencing (8 points out of 11), Avoidance and Numbing (9 points out of 16), Increased Arousal (7 points out of 7) and Significant Distress (1 point out of 5). Maintenance and Follow-up administrations of the C-PTSD-I revealed that 068 had lost the PTSD diagnosis.

The results of the three administrations of the IES-R are depicted in Figure 13. At Baseline, he displayed elevations in all three areas of experiencing, Avoidance, Hyperarousal, and Intrusion. At Maintenance, scores in all three decreased significantly. At Follow-up, Intrusion decreased further, and although Avoidance and Hyperarousal each increased slightly, they remained at levels below Baseline.

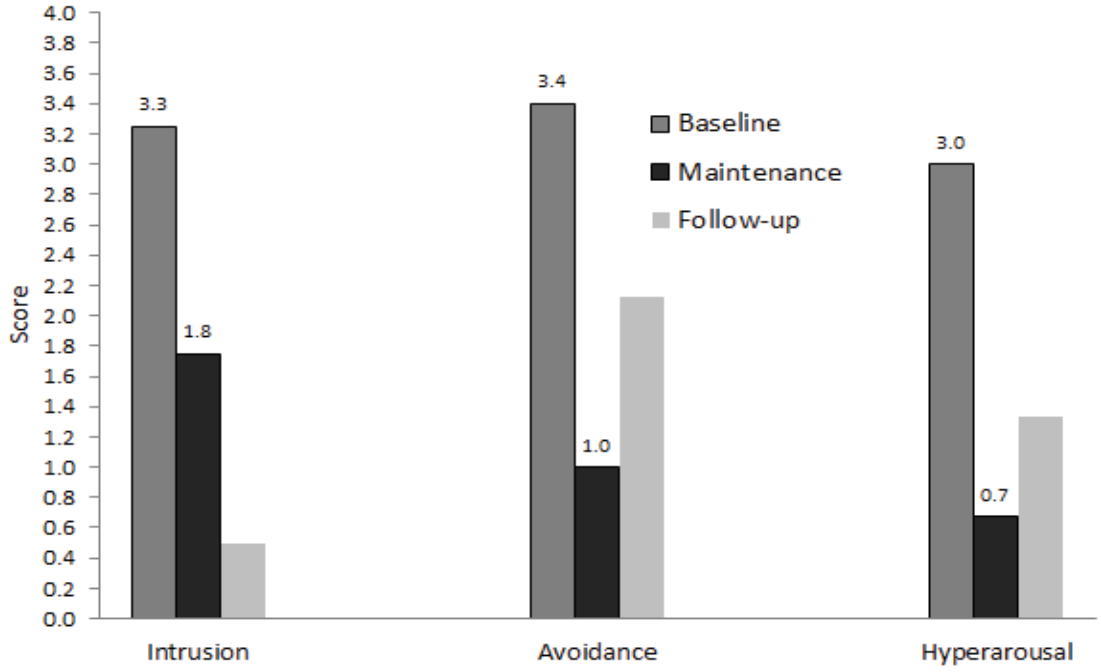

Figure 13. Impact of Event Scale – Revised, profile for Participant 068.

Time-Series Data and Analyses

Individual participant data charts. In order to support visual analysis of the time-series data collected weekly over the course of all phases of the research (except Hiatus), charts of these data are given in Appendix E (Figures E1 through E45). All data are displayed with time as the horizontal (x) axis, running from 0 to 100 weeks, and with the value obtained at the first instance of data collection plotted at week 1. The week

associated with the last instance of data collection varies per participant, ranging from week 71 for Participant 051 to week 96 for Participant 053.

The charts are organized by measure, with one measure per page. Every page has the same arrangement of six charts, one per participant. Thus, on a given page, the vertical (y) axis is the same for all six charts, representing the units in which that measure's data are given. The measures are grouped into self-report, physiological, and observational categories, as follows:

- Self-report
    - Trauma Symptom Checklist for Children; 12 subscales
    - Brief Symptom Inventory; 9 subscales and 4 indices of global severity
- Physiological
    - Blood pressure (2)
    - Heart rate (2)
    - Activity (2)
    - Sleep (5)
- Observational
    - Social Performance Survey Schedule; 4 subscales
    - Aberrant Behavior Checklist; 5 subscales.

Individual participant models data. Individual participant data were analyzed for each measure using a simple linear regression model. The results are summarized in Appendix E (Tables E1 through E6), organized by self-report, physiological, and observational measures. The tables give the intercept (b) and slope (m) of the fitted line ($y = mx + b$) estimated for each measure; and the standard error, t value, and value of p

associated with the slope. Measures for which we can say with a 95% certainty that the value of the slope of the fitted line is not 0 are those for which *p* is less than or equal to .05; they are indicated in the tables by asterisks. For these measures, we can say the slope of the fitted line is increasing (positive value of *m*) or decreasing (negative value of *m*).

Thus, for a measure with a *p* value of less than or equal to.05, we can reject the null hypothesis that the slope is 0, at a 95% confidence level. These measures can be said to be increasing (or, if the slope is negative, decreasing) on average over the entire course of the protocol, for the identified participant. The value of the slope provides an estimate of the amount of the weekly increase (or decrease).

Group data charts. In order to investigate whether any of the measures used in the current study could be said to have shown trends for the six participants, as a group, the individual growth model described by Singer (1998) was applied to group-wise data across measures. Each measure was analyzed, individually, including its data for all six cases. Graphical representation of data for all participants, per measure, are presented in Appendix E (Figures E46 through E57) for those measures which, when analyzed as described above, were found to be significant at a 95% confidence level.

Group growth model data. Results of the group analyses are summarized in Appendix E (Tables E7 through E9), organized by self-report, physiological, and observational measures. They present the estimated, average, weekly rate of increase in the measure (Estimate), the standard error of that estimate (*SE*), degrees of freedom (*df*), the *t* value (*t*), and the *p* value (*p*). For measures for which we can reject the null hypothesis that the slope is 0, at a 95% confidence level, *p* will be less than or equal to .05. Thus, these measures can be said to be increasing (or, if negative, decreasing) over

time for all participants. In the summary tables, measures with p of $< .05$ are indicated by asterisk.

Discussion

Does EMDR therapy relieve symptoms of the negative sequelae of trauma for people with ID? Although research has established the efficacy of EMDR in treating PTSD, there have been no quantitative studies to date for this population on this topic. Research on the use of established psychotherapies with people with ID is accumulating support for the proposition that therapies effective for the general population can be effective for people with ID, often with minimal adaptation. The principal hypothesis of the current study was that EMDR can be effective for treating PTSD in people with ID. This was investigated within the context of six individual case studies for which various psychological and physiological data were collected, some on a pre- (Baseline), post- (Maintenance), and Follow-up basis (PCB data), and some on a continuous (weekly) basis over the entire course of the research protocol (PRB data). It was postulated as secondary to the principal hypothesis that behavior change and symptom reduction brought about by the EMDR intervention would not reverse to pre-intervention conditions. Individual case analyses of the data provided support for both of these hypotheses.

The research produced two classes of outcome data: experimental and exploratory. Each experimental instrument/measure was associated with a hypothesis regarding the expected outcome resulting from anticipated improvement wrought by the EMDR therapy intervention. For these, the nature and direction of values representing improvement are clear, and they have established histories of use in psychological

research. These experimental measures include the C-PTSD-I, IES-R, TSCC, BSI, ABC, and SPSS. Instruments/measures considered exploratory do not meet these requirements, yet the research data they provide have potentially important value in understanding aspects of the interaction between existing PTSD symptoms and improved functioning, over time, and in providing context for understanding the effects of EMDR. These include the PAI-A, WASI, and physiological measures of blood pressure, heart rate, sleep disturbance, and activity levels.

Individual Case Analyses

Data reported in the Results section and presented in Appendix E form the basis of individual case analyses, supplemented by relevant participant histories, observations of research staff, and my clinical impressions as the therapist delivering the EMDR intervention. Analyses of time-line series data rely on visual interpretation of graphic data displays (Figures E1 – E45), as well as on tests of statistical significance (Tables E9 – E13).

Discussion of the six cases reflects one of the early discoveries in the research process, that it was not possible, within a reasonable timeframe, to locate cases of single-trauma PTSD among the pool of over 3000 clients of The Arc Baltimore. The participants used in the current study are representative of complex PTSD cases in that they have experienced a multitude of traumatic events – typically starting in childhood or earlier. They express psychopathology across a broader range of symptomatology than would be associated with single incident PTSD, and their prognoses would anticipate the need for extended psychotherapy without particularly hopeful outcomes. Contrast this with research using EMDR with single-incident PTSD cases in which very few (three to

five) sessions are shown to resolve PTSD symptoms. As a result, it was not possible to maintain aspects of the originally proposed and standardized protocol. Adaptations were expressed in longer Intervention stages, but other accommodations were necessary, as well, as was discussed in the Method section.

Participant 050 case analysis. Participant 050's protocol was precipitously disrupted during week 51. The announcement of her impending surgery (to occur in just over three weeks' time) meant that the Maintenance PCB data had to be acquired during the next two site visits. Intervention sessions were necessary during these two visits, both for closing down of trauma processing and for preparation for surgery. This interruption occurred midstream in processing a participant-identified, childhood trauma target, with a number of such targets yet to be processed, along with targets that had emerged during the course of Intervention. Although she did return after 12 weeks for the Follow-up PCB, the intervening Hiatus had been particularly stressful for her, having anticipated surgery that did not happen due to insurance problems. Thus, even though her Intervention included approximately six months of trauma processing, the precipitous manner in which it was ended and the ensuing 12-week Hiatus awaiting surgery disqualify this case from meeting the research protocol requirements. Yet, data for this case reveal trends reflecting its course of events.

Measures for which data were collected at Baseline, Maintenance, and Follow-up provide an outline of the story. For the three IES-R areas of experiencing, Participant 050's Avoidance subscale is rated highest (*extremely* distressing) at Baseline. It then steps down to a *little bit* distressing at Follow-up. Hyperarousal and Intrusion were both lower than Avoidance at Baseline, rated at *moderately* distressing and a *little bit*

distressing, respectively; both stepped down at Maintenance but back up at Follow-Up, although not to Baseline levels.

The PAI at Baseline presents a valid profile with clinically high scores of Somatic Complaints and Anxiety Related Disorders (which includes the Traumatic Stress subscale), as well as a Nonsupport scale score indicating that social relationships offer her "little support – family relationships may be either distant or competitive, whereas friends are generally seen as unavailable or not helpful when needed" (Morey, 2007, p. 34). The validity scales, being high for Infrequency at Maintenance and high for Negative Impression at Follow-Up, dictate that scores for these administrations be interpreted with caution. Yet, the overall clinical profile is smoother and lower at Maintenance and on average higher at Follow-up. Somatic Complaints dropped at Maintenance but scored even higher at Follow-up than at Baseline, and Depression and Mania reached levels of clinical concern only at Follow-up. Consistent at all three administrations were the elevated scores for Anxiety Related Disorders and Nonsupport. The Follow-up profile is the only one to include a low score on the Treatment Rejection scale, suggesting "a person who acknowledges major difficulties in his or her functioning and perceives an acute need for help in dealing with these problems" (Morey, 2007, p. 35). This, when considered along with the elevated Negative Impression validity scale at Follow-up, are congruent with her expressed concerns regarding the end of the research protocol, having gone at that time for more than three months without therapy. She was reassured that, like all research participants, she would be able to return to therapy as soon as the Follow-up phase was completed.

Participant 050 is the only one for whom the structured PTSD inventory (C-PTSD-I) did not produce a positive result. Although she endorsed all 16 items corresponding to the *DSM-IV-TR* Avoidance and Numbing criteria, she responded affirmatively to no more than six items in each of the other criteria. Her examiner suggested that although Participant 050 did not report experiencing significant distress (other than her frequent efforts to avoid thinking or talking about the events or her feelings so that she does not become upset), she may not have understood what "significant distress or impairment" meant and was therefore unable to express if she met that criterion. The examiner also reported that it was hard to grasp Participant 050's "level of distress" because she seemed to have defended herself against the emotional consequences of the traumatic events she reported. The result of this structured interview also conflicts with the diagnosis of PTSD acquired at pre-research assessment performed by Dr. Karyn Harvey, who had the advantage of personal knowledge of the participant. The Maintenance and Follow-up administrations of the C-PTSD-I (both negative) were notable for fewer Avoidance and Numbing item endorsements (eight items at Maintenance and ten at Follow-up). At Follow-up, the number of items determining Significant Distress (four out of five) were at the highest of all three administrations, having been zero at baseline.

A picture emerges – from the results of these Baseline, Maintenance, and Follow-up measures of characteristics – of a woman who had suffered multiple traumas, starting very early in life and continuing until her teenage years when they became sporadic; who entered the research with no previous psychotherapy; who progressed through therapy over the course of almost a year, making improvements consistent with losing a PTSD

diagnosis (e.g., greatly diminished avoidance symptoms); and, who then faced a stressful episode. In the early weeks of the research protocol, she put observable effort into avoiding/numbing the sequelae of trauma. As trauma processing proceeded, she appeared to relinquish the need for some of these defenses, which allowed for an increasing awareness of other aspects of the complex PTSD experience, as well as of other negative factors in her life. The preemptive interruption of her research protocol, mid-trauma-processing, followed by the stress of anticipating an imminent surgery which was repeatedly postponed, and the inevitable intensification of pain during this period, are all in concert with increased depression and other negative clinical symptoms she reported at Follow-up. Her repeated, elevated endorsement of Nonsupport is consistent with ongoing irregularities in staff support, her reports of difficulty in peer and intimate relationships, and the administrative support failure leaving her uninsured. Her markedly low Treatment Rejection score at Follow-up reflects both the realities of her recent life experience and her growing self-awareness: that she needs and wants ongoing clinical treatment.

This picture is supported by my experience as her Intervention therapist. At the beginning of therapy, she habitually appeared distant or removed. The facial expression to which I became most accustomed was, I learned, a mask of dissociation. She was able to disassociate to varying degrees, which led to a delayed realization that what had seemed "normal" to me was an habitual state of appearing to be normal, or just slightly disengaged, while apparently retreating from current experience. In the course of therapy, she not only processed specific traumatic material, she also began to connect her history with the most disturbing of her current symptoms, especially her inability to control

angry, explosive, aggressive episodes. She improved in her ability to "stay with me" and to express and tolerate feelings. The "new normal" face – more expressive and responsive – was observed most of the time for most sessions during the final weeks of Intervention.

Turning to the time-series data collected every week except during Hiatus, we see results that support and add dimension to the story. Participant 050's TSCC scale scores are at clinically significant levels only for the Underresponse validity scale. Although her Underresponse scores show variation over time (Figure E1), regression analysis could identify no linear trend over the entire course of the research, but a slightly decreasing (b = -0.19) trend when Baseline data are excluded (note also the sporadic spiking of the Hyper-responsive validity scale during Baseline). Underresponse scores this high (M = 79.52; Table E1) signify that the respondent is "likely to be especially defensive or avoidant" (Briere, 1996, p. 11), and the TSCC (thus-suppressed) clinical scores are considered to be invalid. So although we cannot say that these scales represent clinically elevated ($t \geq 65$) scores in Anxiety, Depression, Anger, Posttraumatic Stress, and Dissociation (both Overt and Fantasy), the data do show the presence of symptoms for each of these such that they can be tracked over time, and characterized as: the Anxiety t-score stays between 32 and 37 until week 51 when it goes to 39, returning to the low 30s during follow-up (Figure E3); Depression t-scores range from low 30s to mid-40s before Hiatus, and cluster in the low 30s through Follow-up (Figure E4); Anger t-scores show high levels of variability between 34 and 50, presenting no evident trend (Figure E5), but with Baseline data excluded, regression analysis reveals a slight positive (b = 0.08) progression; and Posttraumatic Stress (t-scores ranging from mid-30s to mid-40s; Figure E6), Dissociation (t-scores ranging from mid-30s to low 50s; Figure E7), Overt

Dissociation (*t*-scores ranging from mid-40s to mid-50s; Figure E8); and Fantasy (*t*-scores ranging from upper 30s to upper 50s; Figure E9); display no evident trends. For the TSCC Sexual Concerns and Sexual Distress subscales scores are considered to be clinically elevated at $t \geq 70$. Participant 050's *t*-scores ranged from 38 to 62 for the former (Figure E10), and from 43 to 78 for the latter (Figure E11). For both of these subscales, regression analyses revealed slight negative trends over the complete course of the research (b = -0.10 and -0.15, respectively; Table E9) and more pronounced negative trends when the Baseline data are excluded (b = -0. 29 and -0.48, respectively). Elevated *t*-scores for Sexual Concerns and Distress, relative to *t*-scores for Sexual Preoccupation, along with the clinical profile expressed in 050's overall TSCC scores, signal "not only posttraumatic stress, but also major sexual symptomatology. Individuals with such a profile and history typically require intensive clinical intervention" (Briere, 1996, p. 15). The decrease over time of the two relatively elevated scales relating to sexual symptomatology reflects my clinically-observed progress in Participant 050's processing of traumatic experiences of sexual abuse. Increased anger is consistent with the increase in 050's apparent awareness of her history, per se, and of its relationship to her current experience.

Participant 050's scores reflect symptomatology in all of the nine BSI dimensions (Figures E13 – E25). For Somatization, Obsessive-Compulsive, and Hostility her scores are at or above the normed level of clinical significance of t = 65 at some point over the course of the research, and at or above t = 55 at some point for the remaining six dimensions. Given her high level of under-responding as measured by the TSCC, we can understand these scores to mean she experiences problems in all dimensions. The trends

associated with these data show a positive response to treatment, visually and statistically, for all dimensions except Depression. For Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Anxiety, Hostility, and Phobias, regression analysis found decreasing (negative *b*) average values across the entire research protocol (Table E10). For Interpersonal Sensitivity, the rate of decrease (*b* = -0.22) was greater when baseline data were excluded. For Paranoid Ideation and Psychotic Thinking, the negative trends were significant only when baseline data were excluded (*b* = -0. 23 and -0.16, respectively). Visual inspection reveals distinct spiking at week 51 for Depression (Figure E16), Anxiety (Figure E17), Hostility (Figure E18), and Paranoid Ideation (Figure E20). This example of instrument sensitivity to Participant 050's response to a significant negative event supports the use of timeline BSI data to track relative change (within participant) over time, even when *t* scores are less than 65.

In addition to the interplay of trends among the nine symptom dimensions, the three summary indices reflect global trends in levels of psychopathology. For participant 050, the Global Severity Index (GSI, the sum of item values endorsed divided by 53; Figure E23), The Positive Symptom Total (PST, the number endorsed out of the 53 items; Figure E24), and the Positive Symptom Distress Index (PSDI, the sum of item values endorsed divided by the PST; Figure E25) all decrease over the course of the entire protocol (Table E10). Additionally, both the GSI and PSDI decrease at an increased rate when the baseline data are excluded (*b* = -0.01 and -0.02, respectively). The graphs of each of these three indices show peaks at week 51, and although number of symptoms endorsed (PST) cluster around the week 51 peak value of 15 at Follow-up, the intensity of these symptoms (PSDI) at Follow-up drop to a low of 1.14. These data

support the picture of a more nuanced self-awareness growing over time, allowing Participant 050 to be aware of the broad array of symptoms she was experiencing, even as the intensity of these symptoms was diminishing.

Activity levels, measured as a 24-hr average (i.e., recorded for both waking and sleeping) and as a waking daily average (i.e., while awake, only) showed no linear trend over the course of the entire protocol (Table E11), but both trended negatively over time when Baseline data were excluded (b = -33.49 for the 24-hr average; b = -59. 29 for the waking daily average). No linear trends were identified for total sleep time or for sleep efficiency. Sleep latency and sleep fragmentation both increased, on average, over the entire course of the protocol (Table E11). Both sleep fragmentation and sleep wake after onset show positive trends when baseline data are excluded (b = 0.02 for sleep fragmentation; b = 0.09 for sleep latency). Thus, even as participant 050's activity levels are going down, indication of sleep disturbance is increasing although total sleep and sleep efficiency are not changing, on average, over time. Diastolic blood pressure increased on average across the entire research protocol (Table E11), and both systolic and diastolic blood pressure show positive trends over time when Baseline data are excluded (b = 0.15 for systolic and 0.13 for diastolic). Translating these values into changes in average estimated blood pressure over time (fitted lines), the linear representation for the two values go from intercepts of 120.8 over 85.9 at the end of Baseline, to 130.0 over 93.8 at the end of Follow-up. No trend was found for heart rate.

Observational data for Participant 050 were provided by seven staff members over the course of the protocol. The advantage of these measures is that they reflect how others see the participant, and are thus potentially more objective than self-report.

However, alternating responses among seven different observers diminishes this putative value for Participant 050. For the most part, these observers were members of Participant 050's group home staff who had between 10 and 40 hr per week of potential observation time. For one two-week period, however, the reports were made by a management-level staff member who had less exposure to Participant 050. The data for these two weeks (weeks 31 and 32) can be readily spotted on the charts for all SPSS and ABC subscales (Figures E37 – E45) by finding the peak value; that peak appears at one of these two weeks. The only exception is for the Sociopathic Behavior subscale of the SPSS, which displays two other roughly equivalent peaks, one in the Baseline phase and one at week 34 (data which were provided by a substitute staff member). That the peaks at weeks 31 and/or 32 are evident for all observation subscales, regardless of whether the subscale measures negative (e.g., Inappropriate Assertion) or positive (e.g., Appropriate Social Skills) behaviors, suggests that the increase in values for these weeks reflects the observer's reporting style rather than changes in the participant's behavior. Given this evident effect of observer, and the number of observers contributing data for participant 050, any data trend over time cannot be directly interpreted as change in behavior.

Participant 051 case analysis. Participant 051 is the most consistently under-responsive of all participants, as is duly reflected in both the PAI Positive Impression and the TSCC Underresponse validity subscales. Despite the resulting suppression apparent across all self-report measures, positive trends are evident.

The two PAI clinical scales that were elevated at baseline (Somatic Complaints and Schizophrenia) are no longer of concern at Maintenance and Follow-up. Although the IES-R measures of Intrusion and Avoidance do not quite rise to the *moderate* level at

Baseline**,** both drop to below *a little bit* at Maintenance and to nearly *not at all* by Follow-up. These indications of progress are supported to a 95% confidence level by the self-report time-series data: all seven of the TSCC clinical scales decrease over the course of the entire research protocol (all *p*s $\leq$ .005; Table E9); and, eight of the nine BSI clinical subscales (all except Psychotic Thinking) plus the four summary indices decrease over the course of the entire research protocol (all *p*s $\leq$ .020; Table E10). When Baseline data are excluded, decreases over time remain significant for TSCC Anxiety, Dissociation, and Overt Dissociation (all *p*s $\leq$ .014), and for BSI Somatization, Obsessive-Compulsive, Anxiety, and the four summary indices (all *p*s $\leq$. 010).

Research staff's observations of Participant 051 support the picture suggested by these results: a reticent, pleasant, elderly gentleman with an evident limp, who communicated little verbally, and whose avocation to create art consumed all his free time. His limited conversation was hesitant and perseverative, frequently expressing loneliness and physical pain, yet he displayed an inherent charm with a ready smile and sparkling eyes. Over the course of the research protocol, he became more at ease and more able to speak with some fluidity. In therapy, I observed the same qualities, and although he reported only a single traumatic memory and appeared to process this memory rapidly, his overall progress was steady. Given that he reported his history by drawing his life story and this was his only means of expressing much of the detail of his life, the sad facts of his childhood were reported (drawn) without overt expression of trauma or distress. It may be possible that the single experience reported as traumatic by Participant 051, which did not occur until adulthood, should be taken at face value and Participant 051 could be considered a single-incident PTSD case. Supporting this are his

loss of the PTSD diagnosis by the end of Intervention (as determined by the C-PTSD-I, which remained negative at Follow-up); his improvement in all of the above listed TSCC and BSI subscales, covering a wide range of emotional distress, and for all practical purposes disappearing by the end of Intervention; and his maintaining gains in many measures (e.g., BSI and TSCC subscales where he continued to score at the minimum; Figures E1 – E25) and continuing to improve in others (e.g., IES-R scores) from Maintenance to Follow-up.

Arguing against this being a case of single-incident PTSD that resolved during Intervention are two indicators: an elevated PAI Schizophrenia score at Baseline and a suggested history of sexual abuse as posited by a previous staff member upon reviewing some of his drawings. The elevated Schizophrenia score is composed of contributions from two endorsed PAI items: "I don't feel close to anyone" scored as *very true*, and "thoughts in my head suddenly disappear" scored as *mainly true*. The first endorsement can be seen as a direct result of the reality of his life – living alone, having difficulty making friends due to verbal and physical limitations, having been abandoned by family, and experiencing frequent changes in support staff – as opposed to being a schizophrenic experience. The second endorsement, given that Participant 051 is the oldest of the group, may well express the current reality of the functioning of his memory, as opposed to a psychotic experience.

The question of childhood sexual abuse is one that can never be proven false; however, no positive indication resulted from this research protocol. The TSCC subscales of Sexual Concerns, Sexual Distress, and Sexual Preoccupation are all flat-lined (zero items endorsed) across the entire protocol, and no sign or other information regarding

sexual abuse emerged throughout Intervention, including from drawings, verbalizations, gesticulations, and emotional expressions. It is possible that he is amnestic regarding memories of sexual abuse and so highly defended that no sign or symptom is evident, but it seems more likely that there are no symptoms because there was no sexual abuse. Although his drawings include symbols and representations (hearts, people kissing, cartoon-like bodies with exaggeration of various parts) that can be considered sexual in nature, this alone is not indicative of a history of sexual abuse, and they seem to capture his personal outlook, including both the loneliness and the joviality.

Physiological data collected for Participant 051 do not present conclusive evidence of improving physical health, although certain positive signs can be seen. Both systolic and diastolic blood pressures show no trend over the entire course of the protocol (Table E11). Both show slightly positive trends over time when Baseline data are excluded (b = 0.12 for systolic and 0.07 for diastolic). Translating these values into changes in average estimated blood pressure over time (fitted lines), the linear representation for the two values go from intercepts of 108.3 over 61.37 at the end of Baseline, to 115.0 over 63.15 at the end of Follow-up. Despite having been diagnosed with hypertension and prescribed Tenoretic (atenolol and chlorthalidone; antihypertensive and diuretic agents), this increase in blood pressure can be understood as trending to better health after a perhaps unhealthy dip early in Baseline. Consistent with an interpretation of decreased activation accompanying PTSD resolution, activity levels (both 24-hr and daily awake) decrease over the entire course of the protocol (b = -60.88 for the 24-hr average; b = -35.99 for the waking daily average; Table E11), and decrease at a faster rate when Baseline data are excluded (b = -85.45 for the 24-hr average; b = -

47.16 for the waking daily average). Sleep data, across the span of the protocol, are mixed. Total sleep remains unchanged although sleep efficiency decreases and sleep fragmentation and wake after sleep onset increase. Note, however, that the three indices of sleep quality all remained within generally considered healthy ranges, even though Participant 051 sleeps sitting in a chair due to back pain that is exacerbated upon fully reclining.

Unfortunately, observational data cannot provide support for any hypothesis despite the apparent (and statistically corroborated) increase over time in all four (two positive and two negative behavior types) subscales of the SPSS and in the ABC Inappropriate Speech subscale (Table E11). For Participant 051, the support staff person who had been trained in observational reporting quit four weeks into the research protocol. The first replacement provided observational data through week 25 and the second replacement through week 44. For the remainder of Intervention and all of Maintenance and Follow-up, different staff members came with Participant 051 every week, providing no observational data, with the exception of one two-week period which produced data for week 53. Armed with this information, the SPSS and ABC measures can be seen to fall into two distinct regions where the data collected for weeks 26 through 44 are higher than for previous weeks, shifting precisely at the transition from replacement staff one to replacement two, accounting for the apparent increase in these measures (Figures E37 – E45). Note also, how a drop in the single data point at week 53 is also quite apparent. Again, these changes would seem to be more dependent on style of observer than on behavior of participant.

Participant 052 case analysis. Participant 052 revealed memories of the highest number of distinct, identifiable traumatic experiences, starting in adolescence and continuing until just months before the start of the research protocol. They clustered around parental abuse, deaths of loved ones, environmental disasters (fires, storms), and a variety of sexual issues (rape, false accusations, work-place concerns). A small subset of these trauma targets was identified prior to therapy, and an additional set was identified during the history taking and preparation phases of therapy, but most targets were revealed once the desensitization phase (processing of the traumatic material) began. Although some mid-stream modifications to Participant 052's treatment plan were necessary to keep therapy on track, the uncovering of such a complex network of traumatic material, simply by allowing Participant 052 to follow the directive used routinely in EMDR therapy, to "go with that," led to apparent therapeutic progress. Although not all identified targets were able to be processed during Intervention, the nature of and degree to which progress was achieved can be seen in Participant 052's data.

Characterization data from Baseline, Maintenance, and Follow-up are clear to the extent that the C-PSTD-I diagnosis of chronic PTSD she received at baseline was lost at Maintenance (and remained negative at Follow-up), yet many of the personality dimensions of concern were present across administrations. Although the impact of event as measured for Avoidance, Intrusion, and Hyperarousal were all lessened as of Maintenance, both Intrusion and Hyperarousal were higher at Follow-up, but not up to Baseline levels. Some of the disturbance remaining at Follow-up can be explained by the design of the IES-R, which asks questions with respect to a single identified traumatic

event. At each administration, Participant 052 identified two or more events, and the events were different for each administration. Some of the remaining disturbance, however, may well reflect the yet to be processed traumatic material still present at the close of the research protocol. The time-series data help chart the course of her progress.

The TSCC indicates that Participant 052 was under-responsive ($M = 64.32$), yet her charts present some of the most visually-evident decreases over time in the areas of Anxiety, Depression, Anger, Sexual Concerns, Sexual Distress, and Sexual Preoccupation (Figures E3 –E12) all statistically verified (Table E9). The BSI data are even more uniform across the board with all subscales and summary indices trending negatively (i.e., becoming less symptomatic; Table E10). These present a picture of persistent emotional and psychological improvement across the span of the research protocol.

Physiological measures reflect some of her complex health issues (including previously diagnosed hypothyroidism, and a diagnosis of diabetes occurring early in Intervention), but sleep data, in particular, show patterns more readily explainable by events occurring roughly during weeks 20 through 40. During this period, past and present were particularly conflated due to an experience that she found disturbing and difficult to relate. She was accused of making false charges of improper sexual contact against a supervisor. This event resulted in an uncertain job situation over a number of weeks and was resolved, practically, by a decision that she should find a different work placement. She had routinely refused to go to work most days while the issue was investigated and was then without work for the rest of the research protocol. It was resolved, psychologically, during therapy, although her typically lethargic presentation,

combined with the lack of stimulation of being unemployed, can be seen as deepening in the charts of decreasing activity levels and increasing total sleep, while indices of sleep quality (latency, wake after onset, and fragmentation) show no trends.

Toward the end of the turbulent work event, a series of staff changes at her group home brought additional instability to Participant 052's environment. Observational data for her was a group effort throughout the span of the profile, with different members of the home staff completing the weekly SPSS and ABC reports. It is thus not possible to determine whether the variability especially evident during the time of high staff turnover reflects her behavior or variability in staff members' response styles.

Participant 053 case analysis. The nature of Participant 053's psychopathology led to necessary changes in protocol. Her early presentation of signs consistent with a profound attachment disorder affected all phases of the protocol. The Baseline was brought to an early conclusion (week 11 rather than week 16) at the recommendation of her research team examiner who observed Participant 053's increasingly disturbed behavior, assigning it to the triggering effect of repeated questioning on traumatic material. The establishment of attachment within the therapeutic relationship dictated the clinical and ethical requirement that therapy (Intervention) not be ended within the established research protocol timeframe. As a result, time-series data were collected over the longest continuous period for this case (96 weeks). Maintenance data were collected during weeks 60 through 66 (in addition to the continuing Intervention and routine PRB data collection). Follow-up data were collected during August 2013, nearly one year after the end of time-series data acquisition, one and a half years after the collection of Maintenance data, and six weeks after transitioning therapy from the PI to another

therapist. The continuing progress evident in the Baseline, Maintenance, and Follow-up instances of the PAI and IES-R are supported, and foreshadowed, by the time-series data.

Visual inspection, supported by statistical analysis (Tables E9 – E10), reveals a negative trend over the entire course of the protocol for all TSCC and BSI subscales and summary indices, with the exception of the TSCC Underresponse validity scale, which to the contrary displayed a positive trend (Figures E1 – E25). In other words, although Participant 053 tended to zero-endorse more of those items least likely to receive a zero in the normative sample, over that same period of time she reported diminishing experience of Anxiety, Depression, Anger, Posttraumatic Stress, Dissociation, Overt Dissociation, Fantasy, Sexual Concerns, Sexual Distress, and Sexual Preoccupation as measured by the TSCC. She also reported decreasing symptomatology in the dimensions of Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobias, Paranoid Ideation, and Psychotic Thinking as measured by the BSI. The BSI summary indices show concomitant decrease in the global severity of symptoms (GSI), the breadth of symptoms endorsed (PST), and the intensity of the symptoms endorsed (PSDI). All of these trends are also evident (visually and statistically) when Baseline data are excluded.

Thus, the apparently universal improvement reflected in all self-report measures could potentially be explained by Participant 053's increasing reticence to endorse any negative symptom. Physiological data do not provide evidence to support or refute this interpretation, given no observable trends (visual; Figures E26 – E36, or statistical; Table E-11) for any measure, other than a slightly increasing heart rate, registered at both arm and finger. The linear representations for the two values go from an average intercept of

62.58 BPM (60.96 arm, 64.19 finger) at week 0, to 64.05 BPM (63.91 arm, 64.91 finger) at week 96. Although this increase over time is statistically significant (p = .027 arm, p = .038 finger), an average increase of 1.47 BPM over almost two years does not represent an important health effect, especially when starting at the lower end of the normal range. Participant 053 had a well-established sleep routine coming into the research protocol – going to bed at the same time each night and getting up early to go to work – which she maintained throughout the protocol, and the resulting sleep data show minor variation, with no observable trend over the course of the entire protocol. When Baseline data are excluded, however, an improving trend can be observed (b = - 0.11, p = .043) in wake after sleep onset equivalent to 10.55 min (on average a night's sleep was interrupted by waking 10.55 min more at the start of the research protocol than at the end). This measure supports Participant 053's reports over the course of therapy of diminishing enuresis.

Observational data were provided by the person who had served as Participant 053's support staff for over 17 years. She accompanied Participant 053 to the research site weekly, through week 62 (less two weeks for vacation), at which time health problems caused her to quit. The data she provided corroborate the improvement expressed by Participant 053 through self-report. The SPSS subscales all trend toward improvement (Table E13), with Appropriate Social Skills and Communication Skills subscale scores increasing over the 62-week reporting period, and Inappropriate Assertion and Sociopathic Behavior scores decreasing. The ABC scores show similar improvement (Table E12) with decreases over time in Irritability (Figure E37), Hyperactivity (Figure E40), and Inappropriate Speech (Figure E41). Note that Lethargy (Figure E38) and Stereotypy (Figure E39) scores remain low and sporadic. Lethargy

items endorsed from time to time include “Is difficult to reach, contact, or get through to”, “Seeks isolation from others”, and “Prefers to be alone” – all of which reflect the social withdrawal component of the lethargy scale. The only item ever endorsed for stereotypic behavior was “repetitive hand, body, or head movements.” When Baseline data are excluded, the SPSS and ABC subscales show similar trends with Appropriate Social Skills ($b = 0.11$, $p < .001$) and Communication Skills ($b = 0.15$, $p < .001$) increasing over time, and Inappropriate Assertion ($b = -0.15$, $p < .001$), Sociopathic Behavior ($b = -0.18$, $p < .001$), Irritability ($b = -0.24$, $p < .001$), Hyperactivity ($b = -0.05$, $p < .001$), and Inappropriate Speech ($b = -0.03$, $p < .001$) decreasing over time.

Participant 066 case analysis. Participant 066 came the closest to completing the research protocol in accordance with timing calculations specified in the original protocol. He went through 10 weeks of Baseline, 56 weeks of Intervention, 6 weeks each of Maintenance and Hiatus, and then, upon arriving for week 3 of Follow-up, informed us that the person who had been his long-standing, single support staff person, who had accompanied him to the research site every week up to that point, had been fired. For Participant 066, this was profoundly disturbing. As he was no longer in therapy, I was concerned for him and also for how this incident would affect his Follow-up data. Participant 066 had a very isolated existence – living alone in the house where he grew up, having no friends, no job, and no family in the area. His number one complaint was loneliness, and his number one wish was to be able to establish an intimate relationship. He had come to depend on his single staff person as his sole source of regular human interaction, as well as the single provider of transportation for errands, medical appointments, and entertainment. I asked Participant 066 to extend Follow-up for an

additional week, and his staff person agreed to stay with him through the end of the research protocol. Although the PCB data taken at Baseline, Maintenance, and Follow-Up do not show any negative effect – e.g., PAI and IES-R show improvement through Follow-up, and the Baseline C-PTSD-I diagnosis of chronic PTSD remains negative at Maintenance and Follow-up – the time-series data do reflect his response to this event.

Time-series data also reveal consistent improvement across the complete protocol. For the TSCC clinical subscales of Anxiety, Depression, Posttraumatic Stress, Dissociation, Overt Dissociation, and Fantasy (i.e., all except Anger and the three subscales reflecting sexual issues) the linear regression analysis (Table E9) reveals that each measure declines across the entire protocol (ps < .001). This is also true for all of the BSI clinical subscales (Table E10), with ps < .001 except for Somatization (p = .001) and Hostility (p = .001); and, for the BSI total, GSI and PST. The PSDI did not show a trend. The graphs of many of these subscales (Figures E1 – E25) display an apparent Baseline effect (decreasing symptomatology prior to intervention). When Baseline data are excluded, the trends observed for Intervention through Follow-up hold for TSCC Anxiety (b = -0.03, p = .008), Depression (b = -0.11, p < .001), Posttraumatic Stress (b = -0.01, p = .004), Dissociation (b = -0.08, p <.001), Overt Dissociation (b = -0.06, p < .001), and Fantasy (b = -0.08, p < .001); and, for BSI clinical scales of Somatization (b = -0.05, p = .044), Obsessive-Compulsive (b = -0.17, p < .001), Interpersonal Sensitivity (b = -0.26, p < .001), Depression (b = -0.23, p < .001), Hostility (b = -0.06, p = .044), Paranoid Ideation (b = -0.15, p = .002), and Psychotic Thinking (b = -0.13, p < .001), and summary indices of Total (b = -0.38, p < .001), GSI (b = -0.01, p < .001), and PST (b = -0.17, p < .001).

Noteworthy in Participant 066's TSCC scores are the three subscales assessing sexual problems and the Underresponse validity scale. For the subscales of Sexual Concerns, Sexual Distress, and Sexual Preoccupation, Participant 066 did not endorse a single item for the entire course of the protocol. In the course of therapy, Participant 066 revealed a variety of problems relating to sex such that I would have anticipated his endorsing almost every item in these categories, were it not for his evident difficulty in discussing anything related to sex. That the member of the research team who administered all self-report instruments was female could have contributed to his difficulty in responding to these questions.

The TSCC Underresponse validity scale (Figure E1) increases during Baseline and the early weeks of Intervention, and then evens out at a high level for the remainder of the protocol, with the exception of the precipitous decline mid-Follow-up. This is a reflection of his personal style – unassuming, shy, and reticent, especially with regard to verbalizations. In therapy, when Participant 066 expressed negative self-statements with respect to skills deficits, it was his inability to speak fluently that he most often addressed, and with the most regret. Specifically, he blamed his verbal deficits for his inability to initiate and establish relationships (especially with women). This under-responding also prompts the question: do the declining trends in clinical scales result more from increased under-responding than decreased symptomatology?

The physiological measures, analyzed across the entire protocol, indicate significant trends in decreasing levels of activity (both 24-hr and daily awake means) and in wake after sleep onset (Table E11). When Baseline data are excluded, regression analyses indicate decreasing 24-hr total activity (b = -69.57, $p < .001$), average daily

awake activity (b = -107.45, p < .001), sleep fragmentation index (b = -0.28, p = .039), increasing sleep efficiency (b = 0.07, p = .035), and diastolic blood pressure (b = -0.06, p = .040). All of these are indicators of improving health.

The observational data, provided by Participant 066's staff person, provide clearer support for the interpretation of self-report measures as showing improvement over time. Across the span of the entire protocol, SPSS subscales of Inappropriate Assertion and Sociopathic Behavior display decreasing trends, and Appropriate Social Skills shows an increasing tendency (Table E13). Similarly, the ABC displays decreasing trends for Irritability, Lethargy, Hyperactivity, and Inappropriate Speech (Table E14). When baseline data are excluded, Appropriate Social Skills (b = 0.04, p <.001) and Communication Skills (b = 0.06, p <.001) increase over time, and Sociopathic Behavior (b = -0.01, p < .001), Irritability (b = -0.10, p < .001), and Hyperactivity (b = -0.02, p = .022) decrease over time.

Investigation of the micro patterns of Participant 066's response to a disturbing experience, known to have occurred at week 3 of Follow-up, provide further understanding of the relationship between change in the Underresponse validity scale versus change in self-report clinical scales. Charts of these data show spiking at and/or immediately after week 3 of Follow-up for the TSCC clinical scales of Anxiety, Depression, and Anger, but not for Posttraumatic Stress, Dissociation, Overt Dissociation, and Fantasy (Figures E3 – E9); and for the BSI clinical scales of Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, and Phobias, but not Somatization, or Psychotic Thinking (Figures E13 – E21). This is congruent with an emotional and relatively short-lived reaction to a challenging event that does not affect

typically more enduring characteristics. In other words, Participant 066 reacted with anxiety, depression, and anger, but did not regress to states reflecting symptomatology in areas such as posttraumatic stress and dissociation.

Participant 068 case analysis. Participant 068 presented with the most complex clinical case, and the data resulting from his participation in the research protocol are similarly complex. Although data from the Baseline, Maintenance, and Follow-up administrations of the PCB reflect therapeutic progress, it is more difficult to identify overall trends in the time-series data. The Follow-up PAI profile shows improvements in most of the areas of concern at Baseline, most notably Paranoia and Suicidal Ideation. It also shows an increase in the Negative Impression scale, which suggests "a response style that leads respondents to present self-reported data that reflect a greater level of psychopathology than is objectively present" (Morey, 2007, p.17), conferring validity on the interpretation of improvement. The markedly low Treatment Rejection scale of the Follow-up PAI can be seen as a reflection of Participant 068's grasp of the reality that he had major difficulties in his functioning, his recognition of need for help in dealing with these problems, and his acceptance of therapy as a vehicle of this help. The IES-R shows improvement, registering levels of distress at *quite a bit* in all areas at Baseline. Scores all decreased at Maintenance, registering levels of *moderately* for Intrusion and *a little bit* for Avoidance and Hyperarousal. At Follow-up, Intrusion continued to decrease to *a little bit* while Avoidance increased to *moderately* and Hyperarousal increased but remained in the *a little bit* range. The C-PTSD-I was positive for a diagnosis of chronic PTSD at Baseline, and negative at Maintenance and Follow-up. These data support the picture of a person who has made demonstrable progress in the therapeutic processing of traumatic

material, but who has some yet-unresolved psychopathology. Although this comports with the general outline of Participant 068's clinical progress, the time-line data reflect more of the complexity in his therapeutic experience.

In his interactions with the research staff in general, Participant 068's cardinal characteristic was a presentation style combining bravado and humor as he related vignettes of recent and past experiences – stories which seemed to weave fantasy and reality together in a manner that defied the observer's ability to distinguish one from the other. The documented history of the events of his life often corroborated the more dramatic of the experiences he related, while those that appeared most likely to be fantasy were also the most mundane, often describing events of normal family life. He appeared to draw solace from these fantasy-family experiences, and tended to incorporate most acquaintances into an extended family ideal, addressing most everyone with a familial epithet (e.g., Sissy, Mommy, Daddy). He also had habitual practices that could be perceived as psychotic, but were performed with a suggestion of a knowing, fanciful attitude. For example, he would frequently have brief conversations or exchanges with dead heroes, often lifting his eyes as if asking a question or opinion of the ceiling.

The self-report time-line data show variability over time, and in a few cases, regression analyses identified linear trends in data spanning the entire protocol. For the TSCC, the Anxiety and Fantasy subscales both decrease, even while validity subscales show Hyper-responsive scores increasing (Table E9). For the BSI, Psychotic Thinking increases while the PSDI decreases, indicating that the average intensity level of the symptoms he endorsed was decreasing (Table E10).

When Baseline data are excluded, the TSCC Fantasy subscale decreases at an accelerated rate (for full data range, b = -0.14, p < .001; when Baseline data are excluded, b = -0.21, p < .001), Overt Dissociation increases (b = 0.15, p = .010), and Underresponse validity scores increase (b = 0. 66, p = .014). The BSI Obsessive-Compulsive subscale increases (b = 0.13, p = .001), as do the summary indices of Total score (b = 0.38, p = .006) and PSDI (b = 0.20, p <.001).

The perception of complexity in this case is perhaps the characteristic most definitively supported by the data. The interplay between Fantasy decreasing and Overt Dissociation and Psychotic Thinking increasing; between Anxiety decreasing and Obsessive-Compulsive increasing; and, between Hyperresponse and Underresponse both increasing, all point to a need to look at Participant 068's time-series data, anew, for additional information.

In reviewing the charts of the self-report clinical scales (Figures E1 – E21), a pattern is recognizable, especially for those subscales listed above. Data generally decrease through Baseline and into the early weeks of Intervention, then transition into an upward trend in the neighborhood of week 35, and continue the general upward trend until the scores start coming down once again around week 60. This roughly sine-wave shaped data pattern has different amplitudes for different measures, and different degrees of variation around a representative well-smoothed curve, but its period appears to remain constant across all clinical measures. The most significant events near the dates of the inflection points are the first time active trauma processing (EMDR Phase 4, Desensitization) occurred – week 35 – and the last time active trauma processing occurred – week 57.

For the physiological measures, regression analysis identified linear trends across the span of the complete protocol for activity measures only: both 24-hr and daily awake activity means (Table E11). When Baseline data are excluded, both activity measures increase over time, as does the sleep fragmentation index, while sleep (24-hr mean) decreases. Visual inspection of the graphs of these data suggests the presence of elevations during the period of active trauma processing – weeks 35 through 57 – for measures of blood pressure and heart rate (Figures E28– 31). The identification of this pattern has implications for understanding the therapeutic processes of EMDR, with the phase of active processing producing symptom activation prior to symptom reduction.

The observation data for Participant 068 were juried to be invalid based on the early departure (week 12) of the staff person who had been trained in data collection, the subsequent turnover of staff personnel providing the data, and the amount of missing data.

Participant case analyses conclusions. All six cases showed improvement. All lost diagnoses of PTSD, and all improved along a number of dimensions of psychopathology, although each had a different overall trajectory and a different pattern of relative improvements among the dimensions measured. This suggests the importance of assessing and monitoring symptomatology beyond those typically associated with PTSD when treating complex cases with extensive traumatic histories. It also demonstrates the value of multidimensional outcome measures in trauma-treatment research.

Under-responding, phenomenon or confound. The improvement observed in all participants suggests that the Intervention was successful. An argument with potential for

negating this observation can be found in the TSCC Underresponse scale data. All six participants produced high scores, on average, for this scale, with mean scale scores of 79.52, 88.69, 64.32, 77.89, 87.19, and 63.65 for Participants 050, 051, 052, 053, 066, and 068, respectively (for a group mean scale score of 77.08; where $t \geq 65$ = under-responsive). The phenomenon of under-responding in the ID population, in general, is an area for future research to elucidate. In the current study, however, it is a possible confound. Had the Underresponse scale scores in the current study remained essentially stable or shown a decrease in trend across time, it could be argued that the under-responding had no effect on clinical scale score trends, or the decrease in under-responding and resulting decrease in clinical score-suppression had the effect of increasing clinical scale scores relative to experienced symptomology, conferring support on the proposition that a decrease in clinical scale scores reflects at least a concomitant decrease in the experience of symptomology. For three Participants (050, 052, and 068) no linear trend was identified. The remaining three Participants (051, 053, and 066), whose average mean Underresponse scores were the highest, showed statistically-supported trends toward higher under-responding over time (ps < .0001). Should these increasing Underresponse scores affect our understanding of clinical scale scores? The immediate implication would be that clinical scores were increasingly depressed relative to experienced symptomology, such that the lowered clinical scores cannot necessarily be understood to mean a lowering of symptoms. A review of the development of the Underresponse scale and of participant responses to individual scale items is necessary for a better understanding.

The TSCC Professional Manual explains "it is not uncommon for some children to indiscriminately mark 0s on symptom checklist measures rather than refuse to complete the test" (Briere,1996, p. 11). The Underresponse scale was developed specifically to test for this response style. It includes the 10 items, from among all TSCC items, least likely to receive a 0 rating in a normative sample. It is scored by totaling the number of items with a response of 0. The resulting range of raw scores of 0 to 10 translates to a range of *t* scores from 41 to 91. The 10 items are:

1. Bad dreams or nightmares
2. Feeling afraid something bad might happen
6. Arguing too much
9. Feeling sad or unhappy
10. Remembering things that happened that I didn't like
19. Wanting to yell at people
28. Feeling like I did something wrong
41. Worrying about things
49. Feeling mad
53. Daydreaming.

The first departure in the current research protocol from the described TSCC standard was in administration. Questions were read to the participant, who responded verbally. This might be expected to reduce random 0-responding, resulting in lower scores. This also provided an opportunity for the test administrator to gain insight into the participant's understanding of and responses to these 10 item questions. These

observations clarify the significance of an increasing number of 0s for each of the three participants.

Participant 051 recorded values greater than 0 for Items 10, 28, 41, and 49 over the course of the Baseline and early Intervention, with the number of 0s increasing until reaching a level of 10 item 0s at week 20. All 10 items then remained at 0 through the remainder of the research protocol. He offered explanations for his nonzero responses. He thought of Item 10 (*Remembering things that happened that I didn't like)*, in terms of intrusive memories of the fall, which was the incident identified for trauma processing in Intervention. He reported relating Items 28 (*Feeling like I did something wrong*), 41 (*Worrying about things*), and 49 (*Feeling mad*) to his current living situation, which he "hated". He referred to the *something wrong* in terms of getting in trouble for playing loud music. He was often *feeling mad* at building management's routinely raising rent, complaining about his behavior, and not properly repairing damage or caring for the grounds. He was *worrying about* never getting out of there, saying he had been trying to move for over nine years. As Participant 051 progressed through Intervention, his intrusive memories of the trauma decreased to the point that his response to Item 10 reached 0. Also during this period he became more capable of advocating for himself, speaking up to building management and involving responsible Arc administrators, such that he was able to move to a new place; and he began scoring Items 28, 41, and 49 as 0s.

Participant 053 recorded values greater than 0 for Items 2, 6, 9, 19, 28, 41, and 49 over the course of the Baseline and early Intervention, with the number of 0s then slowly increasing until approaching a level of 10 Item 0s at week 80. Her test administrator reports that for all seven of these Items (*Feeling afraid something bad might happen,*

Arguing too much, Feeling sad or unhappy, Remembering things that happened that I didn't like, Wanting to yell at people, Feeling like I did something wrong, Worrying about things, and Feeling mad), the referent topic was always her job where seldom a day passed without a confrontation with her boss, other supervisors, and/or coworkers, resulting in tears, anger, and/or self-harm.

Participant 066 recorded values greater than 0 for Items 1, 2, 10, 28, and 53 over the course of the Baseline and early Intervention, with the number of 0s increasing until reaching a level of 10 Item 0s at week 30. All 10 items then remained at 0 through the remainder of the research protocol until the fourth week of Follow-up. Prior to follow-up, non-zero values on these Items were all expressed in relationship to the death of his mother. Items 1 (*Bad dreams or nightmares*), 10 (*Remembering things that happened that I didn't like*), and 53 (*Daydreaming*) centered primarily on memories of her funeral. Item 2 (*Feeling afraid something bad might happen*) was often expressed in terms of his fears of not being able to cope without his mother. Item 28 (*Feeling like I did something wrong*) had more than one theme, including his belief that had he stayed by her side she might not have died, and his belief that her illness was caused (or at least exacerbated) by all the problems he had caused her by not being "normal". As the traumatic material associated with the death of his mother was processed in Intervention, he came to be able to respond to these Items with 0s. He continued to score all of these Items as zeros until the week of Follow-up during which he learned of the firing of his Key Support Staff person, who had been his sole aide for many years. He then gave non-zero responses to Items 6 (*Arguing too much*), 9 (*Feeling sad or unhappy*), 19 (*Wanting to yell at people*),

41 (*Worrying about things),* and 49 (*Feeling mad*), all in response to the news of this upsetting change. Two weeks later, he was once again scoring 0s on all 10 items.

In all three of these cases of participants whose Underresponse scores showed increasing trends across the research protocol, it can be clearly seen that the increase reflected diminishing symptomatology (clinical improvement) as opposed to increasing under-response. This supports, rather than counters, the suggestion that the Intervention was successful, and that the data are evidence of clinical and functional improvement.

Non-linear, phase-dependent data trends: Baseline effect*.* Which components of the Intervention contribute to that improvement and to what degree can be difficult to distinguish using linear regression. Visual inspection suggests two alternatives to linear data, across the entire protocol, for a number of measures. First, there is evidence of a "baseline effect" wherein improvement can be observed before the start of the Intervention. This improvement could be due to the positive experiences afforded participants in coming to a new and pleasant location (the research site) where they were greeted with positive regard, treated with respect, and paid extended personal attention. At the research site, they also had snacks and enjoyed fun pastime experiences. Upon completion of each visit they received money. All participants, from the beginning, expressed pride and self-worth at being able to help others, as the scripts and documents of the Consent process assured them they were doing. It was a personal comment of one of the participants that made me realize that the baseline effect could also represent a lessening of an initially negative experience of fear and anxiety. At the end of the research protocol, Participant 068 reported how scared he had been to come to a strange new place and have to interact, on his own, with a group of unknown people. He admitted

to me that at first he thought I was a witch – a factor I would have never conjectured. For measures that visually suggested a Baseline Effect, comparisons were made between linear data for the entire protocol and those same data, excluding Baseline. In most cases, data showed either accelerated improvement or no significant differences, as was discussed in the individual case analyses, above.

Non-linear, phase-dependent data trends; active trauma processing effect. Suggestions of a second non-linear effect can be discerned in the data, with emergent cyclic variability (see Participant 068, above) or process-related variation such that improvement can be seen early in Intervention, followed by an indication of temporary increases in symptomology during the active processing (EMDR Phase 4, Desensitization), before returning to an improving trend. If such patterns are present, neither visual inspection nor linear analyses are sufficient to establish their characteristics.

EMDR Fidelity. It can be concluded that all six participants demonstrated clinical improvement during the course of the research protocol, and that the improvement likely occurred as a result of the EMDR intervention. A final question that must be asked is, was the intervention actually EMDR? Fidelity to the EMDR protocol (the eight phases of EMDR therapy) was rated for 28 60-min sessions, representing 25% of all sessions during which active trauma processing occurred. The summed, average fidelity rating, across all categories was 2.18 (*acceptable*), and for the Critical Items of Overall Fidelity, Assessment, and Desensitization, fidelity was scored at100%. The fidelity rater observed that the rating across all categories would have been higher if the representative session videos he reviewed had contained more examples of EMDR Phases 3 through 6

occurring within single sessions. For many sessions, EMDR Phase 3. Assessment and Phase 4. Desensitization were not followed by Phase 5. Positive Installation and Phase 6. Body Scan. This happens when Desensitization of a given target continues across a number of sessions. The rater suggested that 90-min sessions might have improved the result. The scores do establish that EMDR was being performed.

The unique characteristics of each of the six cases, and the differential expression of their processes of change, demonstrate the flexibility of the EMDR therapy. The observable improvement in all cases demonstrates its effectiveness. That all participants accepted the offer to continue in therapy suggests that their experience was positive.

Instrument Performance

An important aspect of the current study was the opportunity to investigate the relative performance of various measures in providing information on the processes of change when treating cases of complex PTSD. In order to statistically test this for the measures used in the current study, the individual growth model described by Singer (1998) was applied to group-wise, time-series data across measures. Each measure was analyzed, individually, including its data for all six cases. Results of these analyses are listed in Tables E14 through E16. Graphical representations of data for those measures that were found to be significant at a 95% confidence level are given in Figures E46 through E57. Each figure presents data for all six participants (with each participant's data identifiable by a unique line symbol) for a given measure. The measures for which we can say outcome values are decreasing over time for participants as a group are the Anxiety, Depression, Posttraumatic Stress, Dissociation, Fantasy, and Sexual Distress

scales of the TSCC; all the scales, both clinical and summary, of the BSI; and the Irritability scale of the ABC.

Self-report measures. Self-report instruments included experimental (C-PTSD-I and IES-R) and exploratory (PAI-A and WASI) components of the PCB, and the experimental (TSCC and BSI) components of the PRB.

Participant Characterization Battery (PCB). Both of the experimental measures of the PCB assess PTSD-specific characteristics. The C-PTSD-I, being a structured interview, is intended for clinical use, recognizing that "mental health personnel may fail to recognize that the outward manifestations of PTSD are part of a larger symptom cluster" (Saigh, 2004, p. 18). It thus takes into account both internal experience and behaviors associated with aspects of the trauma exposure, situational reactivity, re-experiencing, avoidance and numbing, increased arousal, and significant distress. However, this instrument is designed to determine the presence or absence of a PTSD diagnosis, rather than as a measure of change. I hypothesized that the C-PTSD-I would confirm the diagnosis of PTSD in participants entering the study, and confirm the loss of the diagnosis at the conclusion of successful treatment. This was supported in five of the six cases. In one case (Participant 050), the C-PTSD-I failed to confirm the initial diagnosis. For this case, it may be that the measure was not sufficiently discriminating of the effect of extreme cases of denial, defense, and/or dissociation from memories of traumatic experience, resulting in suppressed responding in all areas other than avoidance and numbing.

The IES-R was designed to evaluate the degree of distress a patient feels in response to trauma, assessing symptoms of intrusion, avoidance, and hyperarousal. It has

been successfully used as an outcome measure in PTSD research in the general population. I hypothesized that the IES-R would quantitatively reflect diminishing symptoms in all three areas of experiencing. This was supported in all six cases. The IES-R was easy to administer and score. Because it asks questions regarding the level of distress "during the past seven days," the IES-R could prove suitable as a time-series measure in future research.

Although the PAI-A is an "objective test of personality designed to provide information on critical client variables in professional settings" (Morey, 2007, p. 1), it also "was designed to be sensitive to changes associated with treatment" (Morey,2007, p. 72). It was included in this study as an exploratory measure, so there was no specific hypothesis to test. As a pre-and post-intervention measure, it was able to provide useful information regarding changes in intensity of experience for an extensive list of scales and subscales. The length of the inventory (264 items) would make a weekly administration unrealistic for inclusion in most time-series research studies, but its configurable interpretation (significance of profile shape) could provide a unique basis for observing change over time if a research protocol could be designed to include repeated administrations.

The WASI was included in order to establish an important characteristic of ID: that is, IQ levels of approximately 70 and below. Since EMDR has been shown to bring about change in characteristics considered trait versus state, the second administration of the WASI was included to explore the question of whether IQ could be such a trait; however, insufficient evidence of change was found.

Participant Response Battery (PRB). The TSCC and BSI provide the bulk of the time-series data for the current study. I hypothesized that, for subscale scores that were elevated at the start of the research protocol, changes in scores over the course of the research protocol would reflect change in the direction of therapeutic improvement. Not only was this hypothesis supported, but even for scales which were not at elevations considered clinically significant, change over time can be seen to reflect improvement. A number of the subscales and indices of these instruments were significant for positive change as measured across the entire span of the research protocol.

The TSCC subscales address symptomatic areas of PTSD. Group-based analyses showed that, on average, all clinical subscales decreased over time (Table E14). For six of the 10 subscales, this decrease was significant: Anxiety (b = -0.07, $p < .001$), Depression (b = -0.09, p = .001), Posttraumatic Stress (b = -0.04, $p < .001$), Dissociation (b = -0.05, p = .035), Fantasy (b = -0.06, p = .009), and Sexual Distress (b = -0.06, p = .016). The TSCC includes two validity scales reflecting response style. As these are not clinical measures, I did not construct specific hypotheses about them; however the Underresponse validity scale was found to increase across the span of the entire research protocol (b = 0.12, p = .024). The mean for the group on this scale (M = 76.88) was higher than the t-score of 70, the level above which the TSCC manual recommends considering its results to be invalid. These very high scores, produced in all six cases, suggest the need for further understanding of under-responding in the ID population. They also argue for the inclusion of all subscales, whether initially scored at levels considered to be clinically elevated or not.

More detailed investigation of participant responses to the Underresponse scale items demonstrates that, at least in some cases, increasing Underresponse scale scores can result from improving symptomology as opposed to under-responding. This may be due to differences in response style between children (for whom the instrument was developed) and adults with ID. It may also be influenced by the manner of test administration. For the current research protocol, items were read to participants and their responses recorded by the test administrator. The TSCC manual instructs that the child should read and respond to item questions on his or her own. It notes that previous research has been done using the verbal presentation method, and that no research was known to suggest that this approach is invalid, but that results should be interpreted with caution (Briere, 1996).

The BSI was designed to assess symptomatology across the range of clinical psychopathology. All of its nine clinical scales and four summary indices decrease across the entire span of the research protocol (Table E14) at rates ranging from Total Score (b = -0.39, $p < .001$) to PSDI (b = -0.01, p = .005). In the current study, it demonstrated sensitivity to change, not only when occurring within short periods of time (weeks), but also when initial scale scores were below the level of clinical significance. Its use with the ID population was supported in a study with 200 people with mild ID, which showed it to be reliable (Kellett, Beail, Newman, & Frankish, 2003).

Physiological measures. PTSD is known to produce a variety of physiological effects, most of which are best understood for cases of single incident PTSD. When traumatic events begin at an early age, developmental forces interact with the defensive style of psychological reaction, and many other variables, resulting in complex patterns

of physiological responses. Information from physiological measures recorded over time for the current study were useful in understanding aspects of individual case analyses: changes in sleep patterns, activity levels, blood pressure, and heart rate were helpful in elucidating the nature of the change experienced by a number of participants. However, the linear analyses of the physiological measures showed no group-wise trends (Table E15).

Observational measures. The usefulness of observational measures is dependent on qualities of the observer. The effect of observer was demonstrated in the data for Participants 050 and 051. It is thus critical that, for time-series observations, either a single observer, or perhaps a team of observers trained in uniform response style, be employed with these measures. In the current study, only two cases meet that standard: Participants 053 and 066.

I hypothesized that for the SPSS and ABC subscale scores which were elevated at the start of the research protocol, changes in their scores over the course of the research protocol would reflect change in the direction of therapeutic improvement. The two cases with single-observer data support that hypothesis. The ABC showed decreases across the span of the research protocol for both Participant 053 and 066 in Irritability, Hyperactivity, and Inappropriate Speech. It also showed decrease across the span of the research protocol in Lethargy for Participant 066 but not for Participant 053. The SPSS showed decreases for both cases, across the span of the research protocol, in the two scales assessing negative behaviors: Inappropriate Assertion and Sociopathic Behavior. Of the two scales assessing positive behaviors, Appropriate Social Skills increased across

the span of the research protocol for both cases, although the increase in Communication Skills was demonstrated only for Participant 053.

Instrument performance summary. Self-report measures provided the most conclusive evidence of change in this study. Of the PCB measures, the IES-R captured changes in pre- (Baseline), post- (Maintenance) and Follow-up experiencing in the PTSD-specific areas of Intrusion, Avoidance, and Hyperarousal. It performed well in this role, and may be suitable for use as a time-series data measure, being quick and easy to administer, and probing for the levels of experiencing within the past week. The C-PTSD-I agreed with the initial diagnosis of PTSD, made by Dr. Karyn Harvey who had the advantage of personal acquaintance with the participants, in five of six cases. It also established the loss of the diagnosis by Maintenance and at Follow-up. The PAI-A provided dimensional characterization of each of the participants, and its configural profile representation made changes over time (from Baseline to Maintenance to Follow-up) pictorially-evident.

The self-report measures of the PBR covered both trauma-specific (TSCC) and a broader range of symptom dimensions (BSI). The TSCC may have suffered a loss of validity in being adapted from an instrument designed for use with children to use with adults with ID, particularly with regard to the determination of under-responding. Its clinical scales produced data allowing the tracking of relative change, over time, for individual participants and, when grouped, for all participants. The BSI, with scales covering nine primary symptom dimensions, was designed as a general psychiatric screen and research instrument, for use with the general population. As such, it is intended to recognize any psychopathology, regardless of specific diagnoses. It has been validated by

at least one random clinical trial with adults with ID, and was adapted for use in the current study without any identified problems. All of its clinical and summary scales were able to track relative change over time for individual participants, producing patterns of data that allow visual and statistical distinction in the variation among individual participants, while confirming group-wise trends in change. Employing the two instruments allows the ability to assess the degree of convergence in scales designed to measure similar constructs. For example, the correlation between the two depression scales, when including all data acquired in the current study, is high ($r = .81$, $p < .0001$), and also for the two anxiety scales ($r = .72$, $p < .0001$). Divergence can be seen, for example, in the correlations between BSI Hostility and TSCC Sexual Distress ($r = .27$, $p < .0001$) and BSI Depression and TSCC Sexual Distress ($r = 0.28$, $p < .0001$).

Although the basic physiological measures of blood pressure and heart rate, and the actigraph-acquired sleep and activity data did not produce any results in the current study that were significant when grouped across participants, this should not be interpreted as diminishing the need for inclusion of such measures, and ideally, a number of other physiology-based indicators associated with physical and psychological stress reactions. Candidates include startle response, heart rate variation, immune function indicators, and skin conductance level. These types of data will be critical to understanding the processes leading to the development of PTSD and of the processes of change as PTSD is resolved. Regarding the development and remission of symptoms associated with more complex cases of multi- and poly-traumatization, the need for research in physiological factors is even more pronounced.

Assessment of the performance of the observer-reported measures used in the current study is hampered by a lack of consistent observer reporting due to staff turnover and missing data for four of the six participants. With DBC-A test-retest reliability being different for family members (r = .85) and for paid caregivers (r = .75), and the inter-rater reliability reported for family members only (r = .72), researchers are cautioned to consider observer characteristics critically. Observers should be trained in use of the instrument, be familiar with the participant, have sufficient time of exposure to the behavior of the participant, and be encouraged to the greatest degree possible to continue in the study throughout the entire protocol.

Conclusions

People with ID are not fundamentally different from people without ID. Yet, as a population they have often been denied the benefits of psychotherapy, although they experience at least as much psychopathology as the general population. They are also subject to more trauma and abuse than the general population. Recent efforts to include people with ID in psychotherapeutic interventions have been met with skepticism based on the lack of empirically-based evidence that psychotherapy is effective for them. The results of the current research indicate that, for six people with ID and PTSD, the intervention resulted in emotional and psychological improvement. This was accomplished with EMDR, a trauma therapy that has been established as effective, particularly in the treatment of PTSD, in the general population.

A growing literature of case studies demonstrates that trauma therapies empirically established as effective for the general population can be successfully applied with people with ID. These include a number of cases using EMDR. The current research

contributes to the progression of the research process required to empirically establish a particular therapy as effective. As a multiple-baseline design with quantitative time-series data on multiple outcome measures, it meets standards for the next step beyond case studies, alone (Chambless & Ollendick, 2001). At this level, any conclusion reached from the results of the current research must be considered as subject to future research.

The participants in this research are representative of the ID population to the extent that they are members of that population, but psychophysiological characteristics distinguishing the population are not yet sufficiently delineated to support clams of representativeness. Generalization of results thus depends on the accumulation of more data characterizing the population itself. The multidimensional description of the six participants in the current study is intended to allow for inclusion of its results in future research syntheses, as well as to understand each current participant's response to treatment. It also serves to provide an introduction to how differently individuals with mild to moderate ID, but with otherwise differing characteristics, respond on various outcome measures as they progress through therapy. The complexity presented in these cases is also reflective of their all having extensive trauma histories, starting in childhood or earlier.

Although results on outcome measures serve to elucidate both the uniqueness of each participant and the degree to which they are similar in their responding, my personal experience with them, as researcher and therapist, led to some general observations. All participants were reliable in attendance, routinely expressing their desire to continue in the research over the extended length of the protocol. They tolerated being at the research site for a period of 2 to 3 hours per visit without complaint, and the 60 min of therapy

without signs of boredom, loss of focus or attention, or restiveness. Concerns over the potential for negative reactions to research demands had led to a research design that was as streamlined as possible, including establishing therapy session length at 60 min, which is less than the 90 min recommended for EMDR sessions. This experience recommends this population not only as suitable as participants in research, but also as appropriate as clients for psychotherapy.

Adaptations made to instrument administration, mainly verbal administration, adjustment of response scales to the individual's ability to discriminate (varying from binary answers to five levels on Likert scales) and some simplification of language, were readily incorporated into the research protocol and produced data that could be analyzed and aggregated. These adaptations were among those recommended historically by clinicians with experience with people with ID, and support the proposition that many existing psychotherapies would be appropriate for both clinical application and research with this population. Adaptations to the EMDR therapy protocol were minimal, with the demands for flexibility and extended pre-trauma-processing preparation stemming more from the complexity of psychopathology and trauma histories than from IQ and developmental level.

Limitations

Many limitations to interpretation of the outcomes of the current research are inherent in the preliminary nature of the study. Some specifically identified limitations are included below.

Unknowns in population characteristics and classification. For a proportion of the ID population (a subset of the roughly 30% thought to represent genetic/medical,

formerly *organic*, etiologies) who have been identified as instances of one of the many genetically-identified developmental syndromes, many physiological and psychological attributes are known. For the remainder of the population (> 70%) for which etiology is considered environmental, formerly *cultural/familial*, and which also represents the majority of those with mild to moderate ID (those for whom psychotherapy could be expected to be most readily adapted) very little research exists upon which to base study designs relative to classes or subgroups of the population. It follows that there cannot yet be a statistically rigorous approach to answering questions such as which psychotherapies are most effective for people with ID, much less for subsets of this population based on severity of ID, etiology of ID, MI diagnosis, age, etc. This is a limitation to the generalization of any findings of the current study, which should be thought of as six case studies, with some very exploratory investigations of how they responded as a group.

Two areas for which the current level of understanding affects some of the most important limitations to the current study are PTSD and Underresponding. In terms of the incidence of PTSD in the ID population, although clinically reported as high, is one of the features of this population that presented a particular limitation in the current study. The lack of instances of single-incident PTSD cases within the catchment site, an agency serving over 3000 people with developmental disabilities, was unanticipated. This resulted in all six participants being diagnosed with chronic PTSD, and all reflecting the complexity of symptomology associated with multi- and/or poly-traumatization that begins at an early age. Although there is an emerging theoretical understanding of these complexities, many relating to the interaction of early and multiple traumatization with developmental processes (physiological, psychological, neurological, immunological, and

sociological), much more research is necessary to achieve a degree of knowledge necessary to hypothesize on how these individuals would be expected to change on various indicators/measures as they respond positively to a given therapeutic intervention. This limitation had less of an impact on predicting responses on a scale of general psychopathology (the BSI) than on predictions of changes in physiological measures.

In terms of incidence of alexithymia or *underresponding*. the relatively high scoring on the Underresponse validity scale of the TSCC for all six participants presents a limitation to the interpretation of self-report data. Underresponding is understood to suppress scores on all scales, such that degrees of reported pathology are lower than are actually present. That this is an expression of alexithymia is uncertain, given comparisons to scores on the two alexithymia screens presented at Baseline, Maintenance, and Follow-up – one self-report (the TAS) and one observer report (the OAS). For example, the two participants with the highest mean Underresponse scores generated the lowest TAS scores, although their OAS scores were at or approaching the cut-off for discriminating between clinical and non-clinical populations. Investigation of the individual items included in the Underresponsive subscale (the 10 out of 54 items of the scale least likely to be scored a zero), including administrator observations of participant answers, suggest that these low scores do not represent the random recording of zeros on the answer sheet (the stated purpose of the subscale), given that the scale was administered verbally, and also given that participants' appeared to give equal consideration in responding to these items as to others.

Lack of measures normed for the ID population. None of the measures employed in the current study have been normed for this population, other than the observer rating scales. Although the self-report scales appeared to serve well as measures of relative change over time, little can be said of their clinical significance without an ability to compare the obtained scores to clinical and community subpopulation norms.

Susceptibility of observer rating scales to inter-rater variability. Examples of inter-rater differences can be identified within the data stream for four of the six participants whose original observers were replaced during the course of the research protocol. Despite extended, pre-protocol training of staff that served as observers/raters, when changes in staff were made, even among those who had been trained, changes in data resulted. In some cases, step functions can be seen across subscales measuring both positive and negative behaviors, such that all would increase, markedly and together, when a substitute observer was supplying the data, and then all decrease when the original observer returned.

Limitations to linear analyses. Although linear analyses can provide useful information in support of visual interpretation of time series data, they can only answer questions regarding whether an observed trend (steadily increasing or decreasing over time) can be said to exist. They do not help in identifying other data patterns that may be phasic or cyclical. This limited the current study in its ability to fully understand the data, and two phenomena, in particular, that were potentially explainable by higher-order modeling of the data: the baseline effect and the processes associated with trauma therapy. Although the baseline effect (apparent improvement during the Baseline phase) could be assessed to a degree by comparing linear analyses of the data with and without

Baseline data included, process-related fluctuations (e.g., increases in measures sensitive to states of activation being elevated during active trauma processing phases) were not further analyzed.

Demand bias inherent in psychotherapeutic interventions. It is the nature of the therapeutic alliance to support and encourage improvement. In a research setting, this could potentially introduce bias into self-reports intended to measure attendant change. Although safeguards were in place to protect against this (participants were never given any indication that all the questions they were answering and the physiological data they were providing via physiological readings and actigraph downloads were going to be translated into measures of their improvement), and the length of the protocol ($\geq$ 60 weeks) could be expected to temper any bias that would contribute in a linearly trending fashion across the entire course of the protocol, the potential for this type of bias cannot be ignored.

Bias associated with case-analysis interpretation. Case analyses are intended to summarize all available information, including the personal observations of the therapist, to create a multidimensional, biopsychosocial profile of the person being analyzed and reported on. Use of quantitative data provides elements of objective information that are included in the analysis of individual cases, but ultimately it is the skill and experience of the analyst that determines the validity of case conclusions. Because the PI in the current study played the dual role of therapist and experimenter, her case analyses may have been informed by personal bias.

Recommendations for Future Research

Characterizing the ID population. Although research on syndromes that feature developmental and cognitive abnormalities is flourishing, with the result that detailed characteristics have been identified for many such conditions, this information is typically syndrome-specific, and in total, applies to less than 30% of the ID population. The etiology of ID in the remainder of the population (formerly referred to as *cultural familial mental retardation*) remains to be determined. Although various environmental factors have been investigated as contributing to the development of ID in this segment of the ID population (consisting primarily of mild to moderate ID), the role of trauma in infancy and early childhood has not been addressed.

In addition to etiology of ID, characterization of psychological functioning and psychopathological expression in the ID population is necessary in order to develop appropriate research designs. This should include incidence rates of diagnosable psychological conditions, including PTSD and complex PTSD constellations. An additional recommendation is to further assess under-responding in the ID population.

Understanding of trauma-related physiology and psychopathology. Research has progressed in the last two decades on physiological markers and psychopathological profiles of PTSD in the general population, and is addressing these for complex PTSD. More research in needed in these areas, and in the question of are there differences in expression in people with ID.

The ability to use physiological data as outcome measures is particularly important for this population, for which both self-report and observer ratings are problematic. They have the potential for reducing issues of bias, lack of norms on self-report, and inter-rater variability by providing objective data on changes in physiological

markers of PTSD. Meta-analyses on performance of such measures in predicting and assessing treatment outcomes have identified a number of measures with potential to serve this purpose. Measures that are found to be better at this tend to be those that measure the variability of physiological systems (heart rate variability, blood pressure variability, galvanic skin response) and startle response. Each of these has both practical implementation concerns and can present problems associated with the incorporation of techniques that can induce participant activation and/or emotional distress for use in intervention research. Research into measures/instruments that can passively obtain data from participants is, thus, highly recommended.

Developing reliable, sensitive, and valid measures. The current study provides encouraging results in the adaptation of established psychological instruments to be used with people with ID. Given the paucity of measures designed for people with ID, and their dependence on observer-based (as opposed to self-report) ratings, research into the adaptation of existing measures is recommended. Experience in the current study predicts that adaptations in administration would be readily accomplished. The results obtained from the IES-R, PAI-A, TSCC, and BSI are examples. More critical to the ability to generalize results, but more demanding of research resources, is the need to norm the adapted measures for the ID population.

Until new measures and/or norms are established, the TSCC and BSI are recommended for use in acquiring time-series data in research where relative change over time is the effect of interest. The IES-R, used in the current research as pre- and post-intervention measures, shows promise for use in acquiring time-series data, as well. For this application, however, research is needed into how to best employ the IES-R with

people with histories of multi-, and especially poly-traumatization. The scale, as currently designed, addresses the impact of a single event, whereas the trauma therapy process would typically address a series of single traumas, or clusters of similar traumas, over the course of treatment.

Observer-based measures involve practical problems for repeated measures research. When the observer is well-acquainted with the participant, has routine, on-going exposure to the participant over the course of the research protocol, and can be relied on to consistently and responsibly make and report observations over the entire course of the protocol, the SPSS and ABC can be recommended. The experience of the current study, however, recommends that: 1) the measures be modified to improve inter-rater reliability, and/or 2) training in appropriate observer rating of behaviors be standardized (there can be a wide range of rates of behavior that can be judged to be, for example, *a problem, but slight in degree* or *very much*), and/or 3) that research protocols be designed to promote, to the greatest degree possible, the continued participation of a single observer across the span of the entire research protocol.

Adapting psychotherapies established as effective for the general population. The current study adds to the growing case-based literature demonstrating that established psychotherapies can be successfully adapted for the ID population. More research is needed, from quantitative case-based designs to randomized controlled trials, for each therapy investigated. The objective of this line of research should be aimed at achieving a *What Works for Whom* within the ID population consensus sufficient to guide clinicians in the selection of most appropriate therapeutic approach for a given client.

Advancing research design and data analysis techniques. The use of linear analyses of data, as in the current study, is useful in supporting visual analyses of trends in time-series data. In order to study process-related effects, which implies a number of variables and segmentation of the data stream, higher-order analyses would be required. Research on the application of such analyses to the processes of psychotherapy with people with ID is recommended. It is particularly critical for therapies used with complex cases that typically require extended periods of treatment and for whom the biopsychosocial profile typically reflects the interaction of pathologies within a number of neurobiological systems and the symptoms associated with a number of psychological diagnoses, each of which could be expected to resolve at different rates, over time.

Effectiveness of the EMDR therapy with people with ID. Given the successful outcomes demonstrated for EMDR with people with ID in the current research, supported by a growing case-based literature, continued research is recommended. All recommendations for continued research, listed above, apply here. Specific recommendations for EMDR include allowing for 90 min sessions and accumulating information on best practices in adapting the EMDR protocol for people with ID. Closely coordinating research in EMDR therapy for complex PTSD and for people with ID is recommended.

Appendix A

Procedural Steps Outline for EMDR Research Protocol

This appendix presents material taken from the *EMDR Treatment Manual Research Protocol*, (Korn & Spinazzola, 2001). Included is an outline of each step of the protocol along with scripts for each of the eight EMDR Phases, and for additional supporting exercises.

Procedural Steps Outline for EMDR Research Protocol

Phase 1: History-taking and Treatment Planning

1. PI welcomes participant to the intervention area of the research site, pointing out location of video camera, briefly locating the various furnishings and equipment to be used, noting that the BLS items will be explained more when it is time to use them. Turns camera on.
2. PI elicits participant's report of experience in research program, to date.
3. PI goes through an overview of the participant's history, PCB/PRB results, and research staff observations, verifying critical information and asking for any additional information participant thinks is important.
4. PI provides an overview explanation of EMDR commensurate with participant's cognitive abilities.
5. Identify traumas that are potential processing targets and organize treatment plan.
    a. If the participant is only reporting an acute or recent trauma (no report of earlier or childhood trauma) related to current symptoms and difficulties, PI should plan to focus on the recent trauma as a target.
    b. If the participant is reporting only a history of childhood trauma (no report of significant adult trauma or recent trauma) related to current symptoms and difficulties, PI should identify representative childhood memories as targets.
    c. If the participant is reporting both a history of childhood trauma and adult or recent trauma, explore for childhood memories schematically linked to adult trauma and begin with childhood memories as targets. Only those childhood memories which appear to be "activated" in terms of current disturbance or

symptoms should be included in the target list. A childhood memory would be considered "activated" if 1) participant is experiencing intrusions in the here and now that do not appear to be linked to a current or more recent traumatic event, 2) participant indicates that this earlier event is still bothering them, and 3) symptoms cannot be attributed to a current or more recent traumatic event. When traumatic childhood memories on the target list are resolved, PI would plan to move on to targets designated adult traumatic memories.

d. If there is a clinical reason to refrain from starting with a childhood trauma (limited affect tolerance, participant's reluctance to target a childhood memory, strong connection between current PTSD symptoms and adult or recent trauma), consider targeting the more recent adult trauma first. If, in fact, a more recent memory appears more "charged" or "activated", it is reasonable to target this memory prior to targeting earlier memories. Among "activated" memories, PI ideally targets material in a chronological sequence.

e. In collaboration with participant, PI specifically identifies and reviews the incidents or memories that will be targeted with EMDR over the course of the intervention. The list of targets should serve as a "road map", guiding the treatment plan. As targets are resolved, PI returns to list of targets to determine the next focus of treatment.

f. PI reviews a treatment plan which will address past (memories), present (triggers), and future (desired plan for action/future templates) targets and goals.

g. PI explains that the proposed treatment plan might be revised over the course of the Intervention (i.e. if relevant "feeder" memories arise during processing).

6. Work with participant to agree to final plan.

7. Obtain participant's consent to proceed with intervention.

Phase 2: Preparation

SET UP

PI places a chair to the side of the participant ("ships passing in the night" position). Demonstrates the various BLS options, e.g. tests for proper distance for holding hand in front of participants face and demonstrates manually-induced Eye Movements (EMs). PI moves hand toward and away from the participant's face and tests the direction/speed of eye movements: "*Where does it feel most comfortable to have my hand? What speed feels most comfortable for you? Does this direction feel comfortable for you?"*(start with horizontal hand movements). Check if there is any discomfort in moving eyes. If no, ask if the participant is comfortable with this method or would prefer other (eye bar, tappers, audio music or sounds). Determine best method for participant.

SAFE PLACE STEPS AND SCRIPT

1. PI explains the Safe Place exercise.

"A Safe Place is a place where you can go when the feelings in your body become too overwhelming. It can be a place where you have been or where you want to be but never

had a chance. It can be a place that you imagined or that you found in a movie or a book. It is important that you can imagine yourself feeling safe, calm, protected, and nurtured in this safe place. It is also helpful to imagine the company of protective figures that offer you comfort and support, such as family members, a pet, God, a book or movie character, friends, a teacher, etc. We may return to this safe place during a session or at the end of a session to help you feel calmer"

2. PI asks the participant to identify an image of a "safe place" that he/she can easily evoke and that creates a personal feeling of calm, comfort, or safety.

"Now I am going to ask that you think of a place where you can feel safe, protected, where nothing bad can happen."

3. PI asks the participant to describe the image, label the associated emotions, and identify the location of any positive physical sensations. The PI uses a calm and paced tone of voice to enhance the sense of calmness and safety the image.

"I would like you to now focus on your safe place. Tell me about your safe place. Where is this place you feel safe? Can you describe it? What does it look like? How do you feel there? What sounds do you hear? Can you notice any smells or aromas? What positive feelings do you have? Where in your body are those positive feelings? Do you feel safe now in this place?"

4. The positive response is further expanded by including a series of eye movements. At the end of the EM set the PI evaluates the participant's feelings.

"Think of this place that feels safe and calm. Concentrate on the positive emotions and where you feel the pleasant sensations in your body; allow yourself to enjoy them. Now

concentrate on those sensations and follow my fingers with your eyes. How do you feel now?"

a. If the participant feels better, the PI does several more sets of EM.

b. If the participant's positive emotions do not intensify, the PI can try alternative directions of eye movements until the participant reports improvement.

5. The participant is then asked to come up with a word or short phrase that identifies the safe place image (e.g., "country," "beach," "garden," "my safe place") and to repeat it mentally while at the same time bringing up the pleasant sensations and feelings of safety. This procedure is repeated several times, along with additional eye movements.

"How would you like to name your safe place? Think of a word or two that we can use whenever you feel the need to go to your safe place. Now, think of that name and imagine your safe place. Think of how good and safe it feels be there."

6. PI instructs the participant to repeat the process on his/her own, bringing up the image and the word and experiencing the positive feelings without EMs. When the participant has successfully repeated the exercise independently, the PI points out how the participant can use it to relax during times of stress.

"Now I want you to on your own think of your safe place and the name you gave it. Experience the feelings of calm and safety that your safe place brings you. If at any point during our session your feelings are so strong you cannot handle them, let me know and I

will guide you to your safe place. You can also use the image of your safe place not only during sessions but at any other time that you may feel too much stress"

7. The PI asks the participant to bring up an unpleasant feeling or emotion and then guides the participant through the safe place exercise until the upsetting feelings subside.

"Now I'd like you to think of a mildly annoying incident and bring up the safe place by yourself. Again, especially noticing any changes in your body when you have gone to your safe place."

8. The PI asks the participant to bring up a disturbing thought once again and to practice the safe place exercise on his/her own until the unpleasant sensation subside.

"Let's do this again. This time bring up an upsetting thought or feeling and then do the safe place exercise to feel calm and safe."

RESOURCE DEVELOPMENT AND INSTALLATION (RDI)

1. PI, having reviewed the list of targets, selects a challenging event, situation, or belief identified from the participant's History and Treatment Planning. As another option, the participant may be asked to consider a symbolic representation of a desired resource that may or may not be obviously linked to a specific memory.
2. PI follows the **Resource Development and Installation (RDI) Protocol,** working to develop an associated inner resource. An example of an RDI exercise follows:

"One issue that you wanted to work on is [issue, feeling, experience].

What is a recent example of this?

How would you have wished to deal with this situation?

What qualities or strengths do you think you need to better deal with this situation? Do you remember a time when you had that quality?"

3. If such an experience cannot be recalled, the participant is asked to remember someone else dealing effectively with this type of situation or someone who embodies the desired quality. Just like in the Safe Place exercise, the participant can be asked to identify a person who is seen as a good coach, mentor, or support figure from their present or past. It can also be a symbolic representation.

"Can you think of someone who has that quality or who would deal with that situation in the way you want to? Someone in your life, now or in the past, who represents an example of that quality. It t can be someone you know personally or a character from TV or a book."

4. The participant is then asked to describe the chosen image or memory in more detail.

"When you think of that person or image, how do you feel? What do you see, hear, feel, and/or smell? Notice any positive feelings when you think of this image or quality."

5. The PI enhances the participant's resource experience by repeating verbatim descriptions of the memory or image including the sensory and affective qualities and the location of feelings associated with the resource. The PI verifies that the positive emotions or sensations of this resource are increased before bilateral stimulation is considered.

"Think about... (description of image).

Notice... (description of feelings, sensations, sounds, etc.)

Can you describe how you feel now?"

6. Next the participant is asked to focus on the identified image, sounds, smells, feelings, and sensations (and a cue word or phrase if selected) while the PI provides a brief set (6 to 14 back and forth movements) of EM.

"Now, focus on _____(participant's verbatim description of the image and associated emotions and sensations) and follow my fingers (or tones, lights, taps, etc.)". (The PI then provides several short sets of bilateral stimulation. After each set of bilateral stimulation, the PI makes a general inquiry.)

7. The participant is then asked to report any changes in the experience of the resource.

"What are you feeling or noticing now?"

8. If the participant reports that the resource experience is enhanced, the PI continues with EMs as long as positive feelings and associations get stronger. The sets of alternating stimulation are discontinued when the resource is optimally strengthened.

9. PI repeats process for each of the qualities the participant wants to strengthen.

ADDITIONAL TECHNIQUES IN PREPARATION FOR CLOSING UNFINISHED PROCESSING SESSIONS, DAMPING EXTREME EMOTIONAL RESPONSES AND RETURNING PARTICIPANTS TO A STATE OF CALM: CONTAINER, STOPPING, AND SAFETY DEVICE

Container

Used to help the participant feel as if the memory is put away again.

"What kind of container can think of that could hold this memory until you need to get to it again.

What would it be made of ? How big would it be? How would you close it (to keep it secure)? Where would you keep it?

What I want you to do is imagine packing this memory away in [the container]. When it's all put away, let me know. (EM)

How did that go? Does it feel all put away or not really."

Stopping

"We are going to be talking about something that might be hard for you. So you might need a break... So if you want a break, what can you do?"

[Participant answers]

"I'm going to show you another way to take a break, that you can do without even saying anything. Remember that safe place we were practicing? We're going to practice you going to that safe place, okay? Because when you are talking about the hard memory, I want you to be good at taking a break, going to that safe place if you decide you want to. What did you have for breakfast?"

[Participant answers]

"I'm going to ask you to concentrate on the [answer] while I move my hand back and forth and you are doing the eye movements. When I call out "switch" you go to your safe place as fast as you can, and let me know when you are there. Okay, think about the [answer], ready? [EM for a couple of seconds] Switch!" [Count seconds with your fingers until the participant indicates that he or she is in the safe place.]

[Participant goes to safe place and indicates when there]

"Good. What did you have for dinner last night?"

[Participant answers]

"Okay, think about the [answer]. [EM for a couple of seconds] Switch!" [Count seconds with your fingers until the participant indicates that he or she is in the safe place.]

[Participant goes to safe place and indicates when there]

"Do you feel like you are pretty good at that, or you want more practice?"

[Participant answers]

"*Okay, so any time you want to go there, you know what to do, you can just go to your safe place. You don't have to ask first. Just let me know when you've gone there."*

Safety Device

"*I'm going to ask you to do something a little different now. Just for a minute, imagine that this whole event was a dream. If you had to go back into this dream, what would you need to be safe, or to be okay?"*

[Participant answers -- possible answers might include a figure, image, or symbol.]

"I want you to imagine your [answer] now. Notice if it's male or female, or neither... Notice how big it is... What it's wearing ... the facial expression, body posture... where it is... how you feel with your [answer] there... Got it?"

[Participant answers]

"*Concentrate on the [answer], ready? (Participant nods.) (EM) How did that go?"*

[Participant answers -- possible answers might include a feeling of protection and safety.]

"*Okay, concentrate on the [answer] again, ready? (Participant nods.) (EM) How did that go this time?"*

EXPLANATION OF EMDR PROCESSING

Use for initial trauma processing session only: explanation of the EMDR method is dependent upon age, background, experience and cognitive level of participant. This explanation is only offered to the participant prior to the first EMDR trauma processing session.

"When a disturbing event (something very bad) happens, it can get locked in your nervous system, in your brain and your body, with the picture, sounds, thoughts, and feelings of what happened. Even though it happened in the past, it sometimes seems like it is happening now. EMDR seems to unlock the nervous system and let your brain process the disturbing experience (the bad thing that happened). It is important to remember that it is your own brain that will be doing the healing and that you are the one in control".

SPECIFIC INSTRUCTIONS

Use for initial trauma processing session and then, as needed, to reorient participant.

"What we will be doing often is a simple check on what is going on with you. I need to know from you exactly what is going on, as clear as possible. You can look at these pictures of faces and their numbers to help tell me. Sometimes things will change and sometimes they won't. I'll ask you how you feel from 0 to 10--sometimes it will change and sometimes it won't. I may ask if something else comes up--sometimes it will and sometimes it won't. There are no "supposed to's" in this process. So just give as accurate feedback as you can to what is happening, without thinking it should be happening or not. Let whatever happens, happen. We'll do the eye movement for a while, and then we'll talk about it."

STOP SIGNAL

"If at any time you feel you want to stop, raise your hand, like this."

METAPHOR TO USE

Use for initial trauma processing session and then reorient participant as needed.

"It often helps to create a sense of distance between you and the painful experience. For example, imagine riding on a train or in a car and just watching the scenery go by. Or pretend you are watching it like a movie. Which way would you like to pretend during the

eye movements if we need to take some distance from the bad memory we're working on?" (PI does not use EM to install the metaphor.)

REVIEW AND CHECK SAFE PLACE AND RESOURCE IMAGES

Briefly review the "Safe Place" and "Resource" images established in earlier sessions.

"*I'd like you to think about the "Safe Place" that we established earlier (PI names the Safe Place and offers descriptive cues). We may call upon this "Safe Place" during our processing or at the end of the session. I'd also like to remind you of the Resource images that we identified earlier (PI names the Resource images and associated feelings, qualities, or capacities). Do any of these Resources feel particularly important to have on hand, on the sidelines, as we begin our trauma processing work?"*

REVIEW AND CHECK APPROPRIATE DISTANCE AND DIRECTION/SPEED OF EYE MOVEMENT (OR ALTERNATE BLS SET-UP)

If manual EMs, PI moves hand toward and away from the participant's face and tests the direction/speed of eye movements.

"Where does it feel most comfortable to have my hand? What speed feels most comfortable for you? Does this direction feel comfortable for you?" (start with horizontal hand movements)

If other BLS method, set up as when first established and ask: *"Is this the way that is most comfortable for you? Would you like to change* [the music, loudness, speed of the lights, etc.]"?

<u>Phase 3. Assessment</u>

TARGET IDENTIFICATION

PI decides, in collaboration with the participant, what to target based on the list of traumatic experiences/targets established during History-taking and Treatment Planning. When identified past targets have been adequately resolved, present triggers can be addressed as targets. When identified triggers have been adequately resolved, anticipatory fears and "positive templates" can be targeted.

The PI uses the **EMDR Worksheets/Progress Notes** form to record the specific data associated with EMDR Phases 3 - 7, employing a new form for each new target. The form contains space to record the responses to the following steps. It is included here as Figure A-1. When, as the assessment proceeded, the PI asks the participant to rate the VoC and SUDS associated with the target, she presents the **SUDS – VoC Faces Scale** as a visual aid. This scale is pictured in Figure A-2.

PICTURE: *"What picture represents the worst part of the incident?"*

IF NO PICTURE: "*When you think of the incident, what do you get?"*

NEGATIVE COGNITION (NC): *"What words go best with that picture that express your negative belief about yourself **now**?"*

The NC is a presently held, negative, irrational, self-referencing belief which comes to mind when focusing on the traumatic memory (typically an "I statement"). The NC accurately focuses or connects with the participant's presenting issues. The NC is generalizable to other, related areas of concern; it should not be too specific to the target incident. The NC should have affective resonance; it should activate or intensify negative emotion. The NC is not: 1) necessarily what was thought at the time of the original incident, 2) a possibly true description, 3) necessarily believed or acted on ALL the time.

POSITIVE COGNITION (PC): *" When you bring up that picture (or incident), what would you like to believe about yourself **now**?"*

The PC must be a present desired, positive, self-referencing belief (typically an "I statement"). It accurately focuses the participant's desired direction of change. It is generalizable to other, possibly related areas of concern. It should have positive affective resonance; it should activate or intensify positive emotion. The PC should not reflect unrealistic, wishful thinking.

If the participant is having difficulty in identifying a NC and PC, the PI may give further explanation. In particular, reinforcing/re-experiencing the difference between **then** and **now** can be very helpful in teasing this out. Additionally, the PI can give examples of NCs and PCs (see reverse side of the **SUDS – VoC Faces Scale**) and can use her knowledge of this participant's previously uttered self-statements to guide the participant in selection of appropriate cognitions.

VoC (Validity of Cognition): *"When you think of that picture (or incident), how true do those words (repeat the positive cognition) **feel** to you **now** on a scale of 1-7, where 1 **feels** completely false and 7 **feels** totally true?"*

EMOTIONS/FEELINGS:

*"When you bring up that picture (or incident) and those words (negative cognition), what emotion(s) do you feel **now**?"* Explore the emotion(s) that the participant feels in the present.

SUDS: *"On a scale of 0-10, where 0 is no disturbance or neutral and 10 is the highest disturbance that you can imagine, how disturbing does it feel to you **now**?"*

LOCATION OF BODY SENSATION: *"Where do you feel it in your body?"*

<u>Phase 4: Desensitization</u>

DESENSITIZE: *"I'd like you to bring up that picture (label and describe using participant' verbatim words), those negative words* (repeat the negative cognition), *and notice where you are feeling it in your body-and follow my fingers."*

1. Begin the eye movements slowly. Increase the speed until it is as fast as the participant can comfortably tolerate the movement.
2. At least once or twice during each set of eye movements, or when there is an apparent change, comment to participant: *"That's it. Good. That's it."*
3. It is helpful to comment to the participant, (especially if the participant is experiencing strong emotion or sensations): *"That's it. It's old stuff. Just notice it."* (use train or videotape metaphors as needed).
4. After a set of EM, instruct participant to: *"Blank it out."* and/or *"Let it go and take a deep breath."*
5. Ask: *"What do you get **now**?"* or *"What are you noticing **now**?"*
6. After the participant reports, say: *"Go with that."* or *"Stay with that."* (Do not repeat the participant's words/statements.)
7. When you believe the participant is at the end of a channel (participant appears significantly calmer, no new material is emerging), ask: *"When you go back to the original experience (or incident), what do you get now?"*
8. After the participant reports, add a set of EMs.
9. If new material opens up, continue down that channel with further sets of EMs.
10. If no new material opens up, ask: "*When you bring up the experience, on a scale of 0-10, where 0 is no disturbance and 10 is the highest disturbance you can imagine, how disturbing does it feel to you **now**?"*

11. If the SUDS is 0 or 1, proceed to Installation of Positive Cognition. If the SUDS is greater than 0 or 1, do more EMs, time permitting.

12. The flow of desensitization processing is determined by the participant's progression through processing, but there are a number of opportunities when therapist suggestion or gentle intervention may be called for.

Phase 5: Positive Installation

INSTALLATION OF POSITIVE COGNITION: Linking the desired positive cognition with the original memory/incident or picture

1 *"Do the words (repeat the positive cognition) still fit, or is there another positive statement you feel would be more suitable?*

2 *"Think about the original incident and those words* (repeat the selected positive cognition). *From 1 (completely false) to 7 (completely true), how true to they feel?"*

3 *"Hold them together."* Do EM. *"On a scale of 1-7, how true does that (repeat the positive cognition) feel to you* ***now*** *when you think of the original incident?"*

4 Continue Installation as long as the material is becoming more adaptive. The goal for the Installation Phase is a VoC of 6 or 7. If participant reports a 6 or 7, do EM again to strengthen and continue until it no longer strengthens. Go on to the Body Scan.

5 If participant reports a 5 or less, check appropriateness and address blocking belief (if necessary) with additional reprocessing.

Phase 6: Body Scan

*"Close your eyes; concentrate on the incident and the PC (repeat the final positive cognition) and mentally scan your **ENTIRE** body. Tell me where you feel anything."* If any sensation is reported, do a set of EM. If a positive/comfortable sensation is reported, do EM to strengthen the positive feeling. If a sensation of discomfort is reported--reprocess until discomfort subsides.

Phase 7: Closure

DEBRIEF THE EXPERIENCE *"The processing we have done today may continue after the session. You may or may not notice new insights, thoughts, memories, or dreams. If you do, just notice what you are experiencing--take a snapshot of it (what you are seeing, feeling, thinking, and the trigger). We can work on this new material next time. If you feel it is necessary, call me."*

PROCEDURE FOR CLOSING INCOMPLETE SESSIONS

An incomplete session is one in which a participant's material is still unresolved, i.e., they are still obviously upset or the SUDS is above 1 and the VoC is less than 6. The following is a suggested procedure for closing down an incomplete session. The purpose is to acknowledge participants for what they have accomplished and to leave them well-grounded before they leave the office.

STEPS

1. Ask the participant's permission to stop and explain the reason.

"We are almost out of time and we will need to stop soon. How comfortable are you about stopping now?"

2. Give encouragement and support for the effort made.

"You have done some very good work and I appreciate the effort you have made. How are you feeling?"

3. Eliminate the Installation of Positive Cognition and the Body Scan (it is evident that there is still material to be processed).

4. Do a containment exercise.

"I would like to suggest we do a relaxation exercise before we stop. We could do_____(PI suggests a form of relaxation, e.g., Imagery, Safe Place, etc.) *What would you like to do?"*

5. Read the above Closure/Debriefing the Experience section to the participant.

Phase 8: Reevaluation

At the start of every session after EMDR has been introduced, explore the following reevaluation questions with participant (use only questions that apply for a given session):

What new material has emerged since the last session (i.e. dreams/nightmares, insights, observations, etc.)?

What changes have occurred since the last session (i.e. changes in symptoms, cognitive shifts, new behavioral action steps, etc.)?

Has the previous target been resolved (SUDS =0 or 1, VoC=6 or 7)? (PI reevaluates SUDS as participant focuses on the target from the previous session). If not, what remains disturbing as participant holds the target in his/her awareness (image, cognition, emotion, sensation?)?

Have all the necessary targets been reprocessed to allow the participant to feel at peace with the past, empowered in the present, and able to make choices for the future?

What targets (past events, present triggers, intrusive images) still need to be addressed?

Supporting Materials. Two aids commonly used in conjunction with the EMDR therapy, and used in the current study, are provided in Figures A1 through A4. The EMDR worksheets/progress notes form, front and back views, are given in Figures A1 and A2. The *faces* scale, used to help clients rate their levels of SUDS and VoC is pictured in Figure A3 and its opposite side, offering examples of commonly endorsed negative and positive cognitions, is shown in Figure A4.

EMDR WORKSHEETS/PROGRESS NOTES

Client Name_____ **Date**_____

In clinical practice, proceed only after Preparation Phase.

REMINDER: Clinician and client will have agreed to work on an issue as part of the overall treatment plan.

The incident represents the issue and the image represents the selected incident.

Specific Instructions:
"Often we will be doing a simple check on what you are experiencing. I need to know from you exactly what is going on with as clear feedback as possible. Sometimes things will change and sometimes they won't. There are no "supposed to's" in this process. So just give as accurate feedback as you can as to what is happening without judging whether it should be happening or not. Just let whatever happens, happen." [Remember to tell the client about the STOP hand signal.]

Presenting Issue or Memory:

Image:
Most disturbing: *"What picture represents the worst part of the incident?"*
If no picture: *"When you think of the incident, what do you get?"*

Negative Cognition:
"What words go best with that picture/incident that express your negative belief about yourself now?"

Positive Cognition:
"When you bring up that picture/incident, what would you like to believe about yourself now?"

Validity of Cognition (VoC):
"When you think of that picture/incident how true do those words (repeat the positive cognition above) feel to you now on a scale of 1 to 7, where 1 feels completely false and 7 feels completely true?"

1 2 3 4 5 6 7
completely false **completely true**

Emotions:
"When you bring up that picture/incident and those words (negative cognition above), what emotion(s) do you feel now?"

SUDs:
"On a scale of 0 to 10, where 0 is no disturbance or neutral and 10 is the highest disturbance you can imagine, how disturbing does the incident feel to you now?"

0 1 2 3 4 5 6 7 8 9 10
(no disturbance/neutral) (highest disturbance)

Location of Body Sensation:
"Where do you feel it in your body?"

Desensitize:
"I'd like you to bring up that picture, those negative words (repeat the negative cognition), and notice where you are feeling it in your body—and follow my fingers." After set: *"Blank it out. Take a deep breath. What do you get now?"*

Figure A1. EMDR worksheets/progress notes, front view.

Processing and checking for new channels:
Continue processing with several sets of eye movements (tactile or tones) until there is no new disturbing material coming up. Ask *"When you go back to the original experience, what do you get now?"* If there is no new, disturbing material, check the SUDs. (SUDs should be 0 before moving to Installation.)

Check SUDs:
"When you bring up the experience, on a scale of 0 to 10, where 0 is no disturbance and 10 is the highest disturbance you can imagine, how disturbing does it feel to you now?" (If SUDs is 1 or greater, continue processing. If SUDs is 0, do one more set and move on to Installation.)

Installation:
Linking the desired positive cognition with the original memory/incident or picture:

1. *"Do the words (repeat the PC) still fit, or is there another positive statement you feel would be more suitable?"*
2. *"Think about the original incident and those words (repeat the selected PC). From 1 (completely false) to 7 (completely true), how true do they feel?"*
3. *"Hold them together."* Do EM.
4. *"On a scale of 1 to 7, how true do those words (PC) feel to you now when you think of the original incident?"*
5. Continue installation as long as the material is becoming more adaptive. If client reports a 6 or 7, do EM again to strengthen and continue until it no longer strengthens. Go on to the Body Scan.
6. If client reports a 6 or less, check appropriateness and address blocking belief (if necessary) with additional reprocessing.

Body Scan:
"Close your eyes and keep in mind the original memory and the (repeat the selected positive cognition). Then bring your attention to the different parts of your body, starting with your head and working downward. Any place you find any tension, tightness or unusual sensation, tell me." If any sensation is reported, do EM. If a positive/comfortable sensation, do EM to strengthen the positive feeling. If a sensation of discomfort is reported—reprocess until discomfort subsides.

Procedure for closing incomplete sessions:
An incomplete session is one in which a client's material is still unresolved. i.e., s/he is still obviously upset or the SUDs is above 1 and the VoC is less than 6. The following is a procedure for closing down an incomplete session. The purpose is to acknowledge clients for what they have accomplished and to leave them well grounded before they leave the office.

Steps:

1. Ask the client's permission to stop and explain the reason. *"We are almost out of time and we will need to stop soon. How comfortable are you about stopping now?"* Give encouragement and support for the effort made. *"You have done some very good work and I appreciate the effort you have made. How are you feeling?"*
2. Eliminate the Installation of Positive Cognition and the Body Scan (it is evident that there is still material to be processed).
3. Do a containment exercise. *"I would like to suggest we do a relaxation exercise before we stop. I suggest we do _____."*
4. Read the Closure/Debriefing the Experience section to the Client.

Closure: Debrief the Experience.
"The processing we have done today may continue after the session. You may or many not notice new insights, thoughts, memories, or dreams. If so, just notice what you are experiencing-take a snapshot of it in a log (what you are seeing, feeling, thinking, and the trigger on the TICES grid). Use the Safe Place exercise to rid yourself of any disturbance. Remember to use a relaxation technique daily. We can work on this new material next time. If you feel it is necessary, call me."

Notes: Issues for future sessions, observations, etc.

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Figure A2. EMDR worksheets/progress notes, back view.

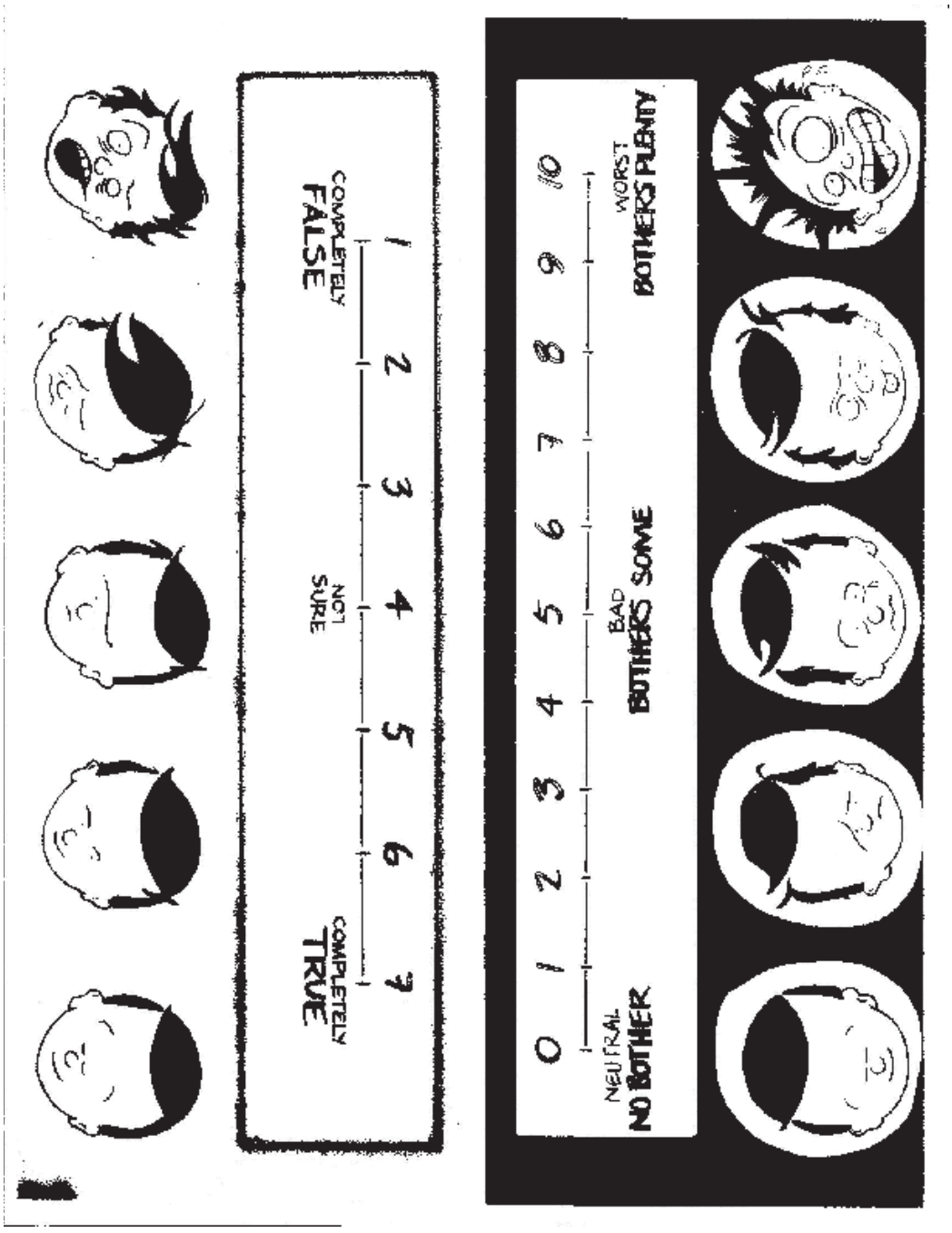


Figure A3. SUDS – VoC Faces Scale. Shown in black and white; original is in bright red, green, and yellow.

EXAMPLES OF COGNITIONS

NEGATIVE COGNITIONS

RESPONSIBILITY (I am defective)
I don't deserve love
I am a bad person
I am terrible
I am worthless (inadequate)
I am shameful
I am not lovable
I am not good enough
I deserve only bad things
I am permanently damaged
I am ugly (my body is hateful)
I do not deserve.....
I am stupid (not smart enough)
I am insignificant (unimportant)
I am a disappointment
I deserve to die
I deserve to be miserable
I am different (don't belong)

RESPONSIBILITY (I did something wrong)
I should have done something*
I did something wrong*
I should have known better*
*What does this say about you? (e.g., does it make you feel: I am shameful/I am stupid/I am a bad person).

SAFETY/VULNERABILITY
I cannot be trusted
I cannot trust myself
I cannot trust my judgment
I cannot trust anyone
I cannot protect myself
I am in danger
It's not OK to feel (show) my emotions
I cannot stand up for myself
I cannot let it out

CONTROL/CHOICES
I am not in control
I am powerless (helpless)
I am weak
I cannot get what I want
I am a failure (will fail)
I cannot succeed
I have to be perfect (please everyone)I cannot stand it/I am inadequate/I cannot trust anyone

POSITIVE COGNITIONS

RESPONSIBILITY
I deserve love; I can have love
I am a good (loving) person
I am fine as I am
I am worthy; I am worthwhile
I am honorable
I am lovable
I am deserving (fine/OK)
deserve good things
I am (can be) healthy
I am fine (attractive/lovable)
I can have (deserve)
I am intelligent (able to learn)
I am significant (important)
I am OK just the way I am
I deserve to live
I deserve to be happy
I am OK as I am

RESPONSIBILITY
I did the best I could
I learned (can learn) from it
I do the best I can (I can learn)

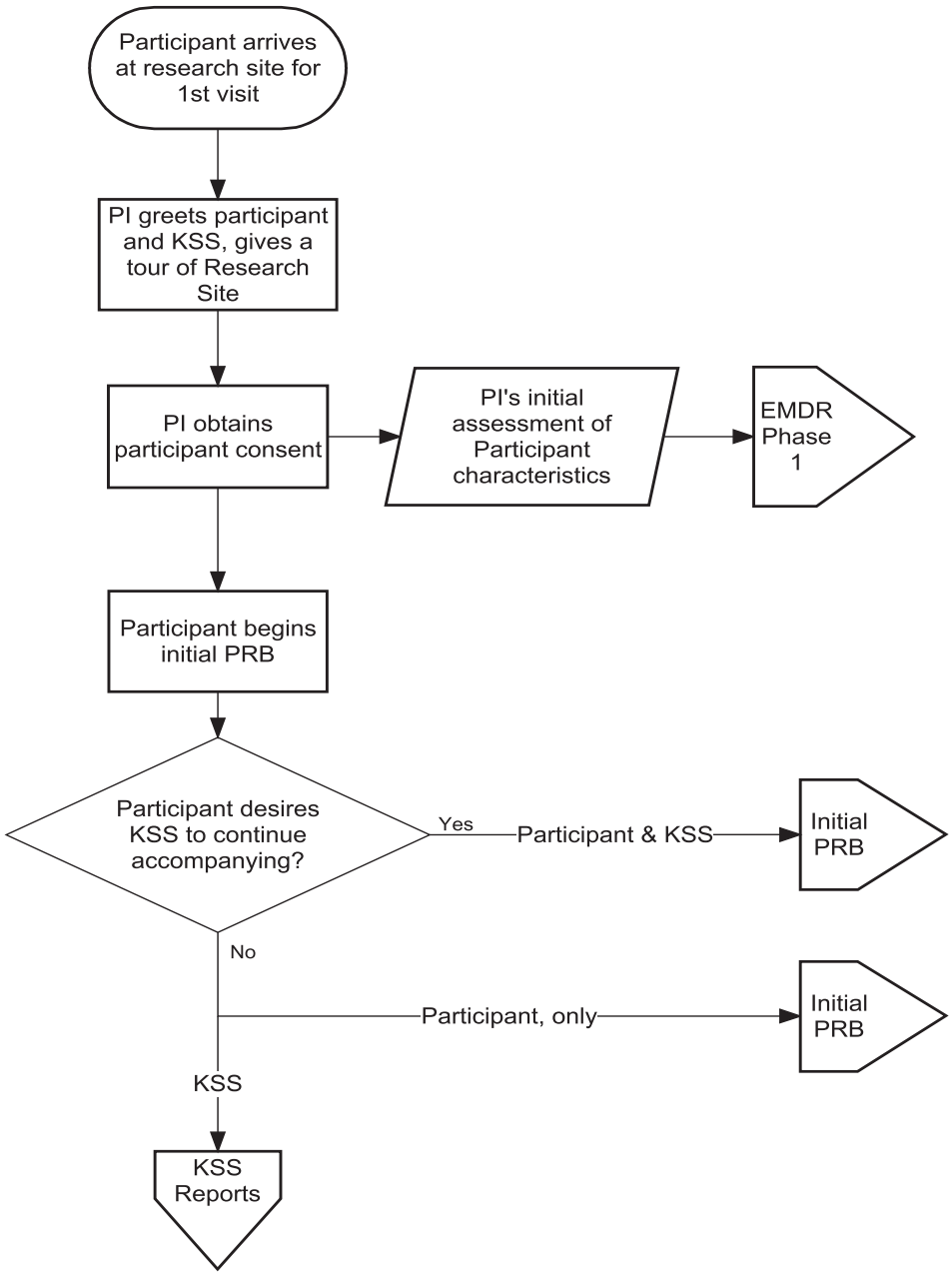
SAFETY/VULNERABILITY
I can be trusted
I can (learn to) trust myself
I can trust my judgment
I can choose whom to trust
I can (learn to) take care of myself
It's over; I am safe now
I can safely feel (show) my emotions
I can make my needs known
I can choose to let it out

CONTROL/CHOICES
I am now in control
I now have choices
I am strong
I can get what I want
I can succeed
I can be myself (make mistakes)
I can handle it
I am capable I can choose whom to trust

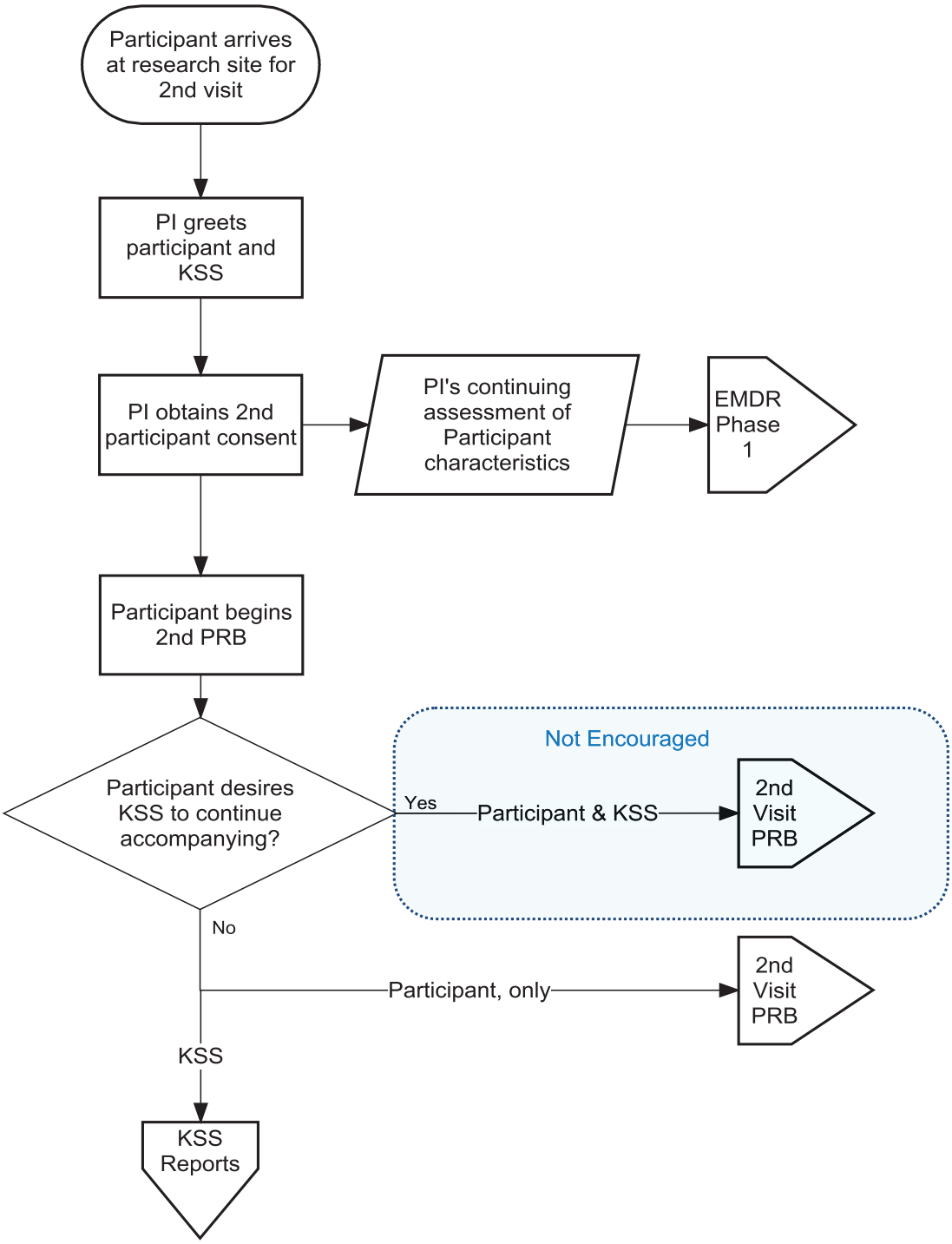
Figure A4. SUDS – VoC Faces Scale reverse side, examples of negative and positive cognitions.

Appendix B
Flowchart of the Research Protocol

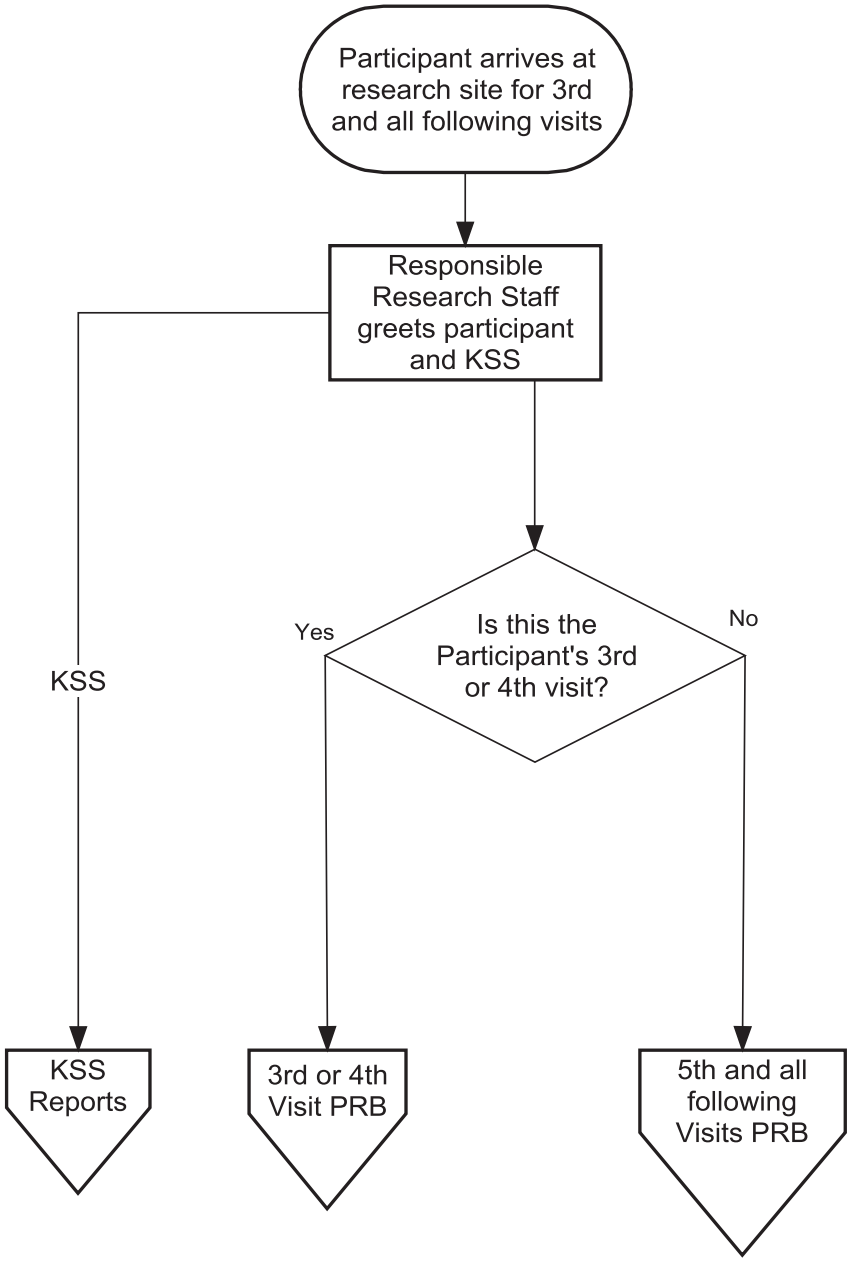
Baseline Phase Visit 1

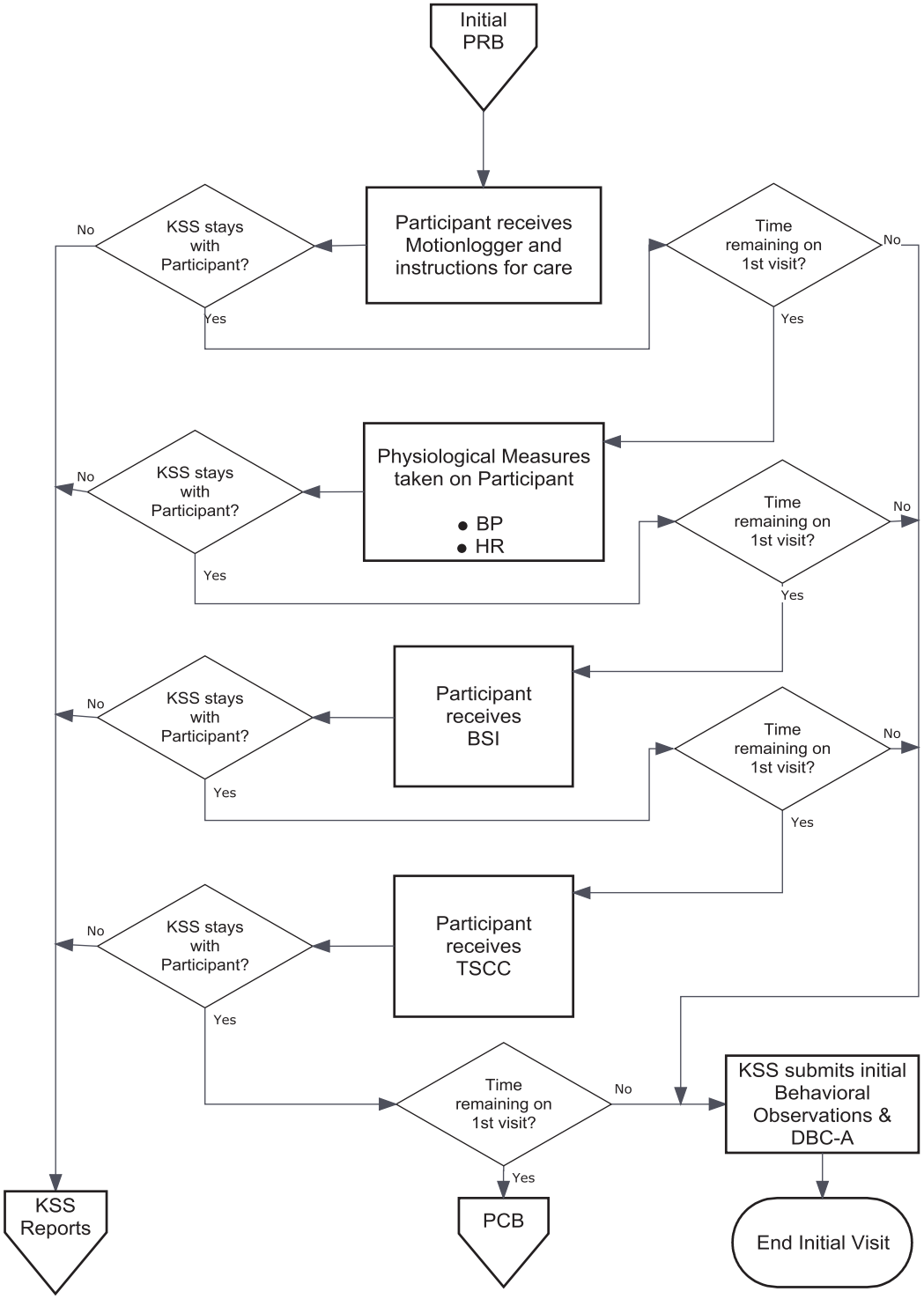


Baseline Phase Visit 2

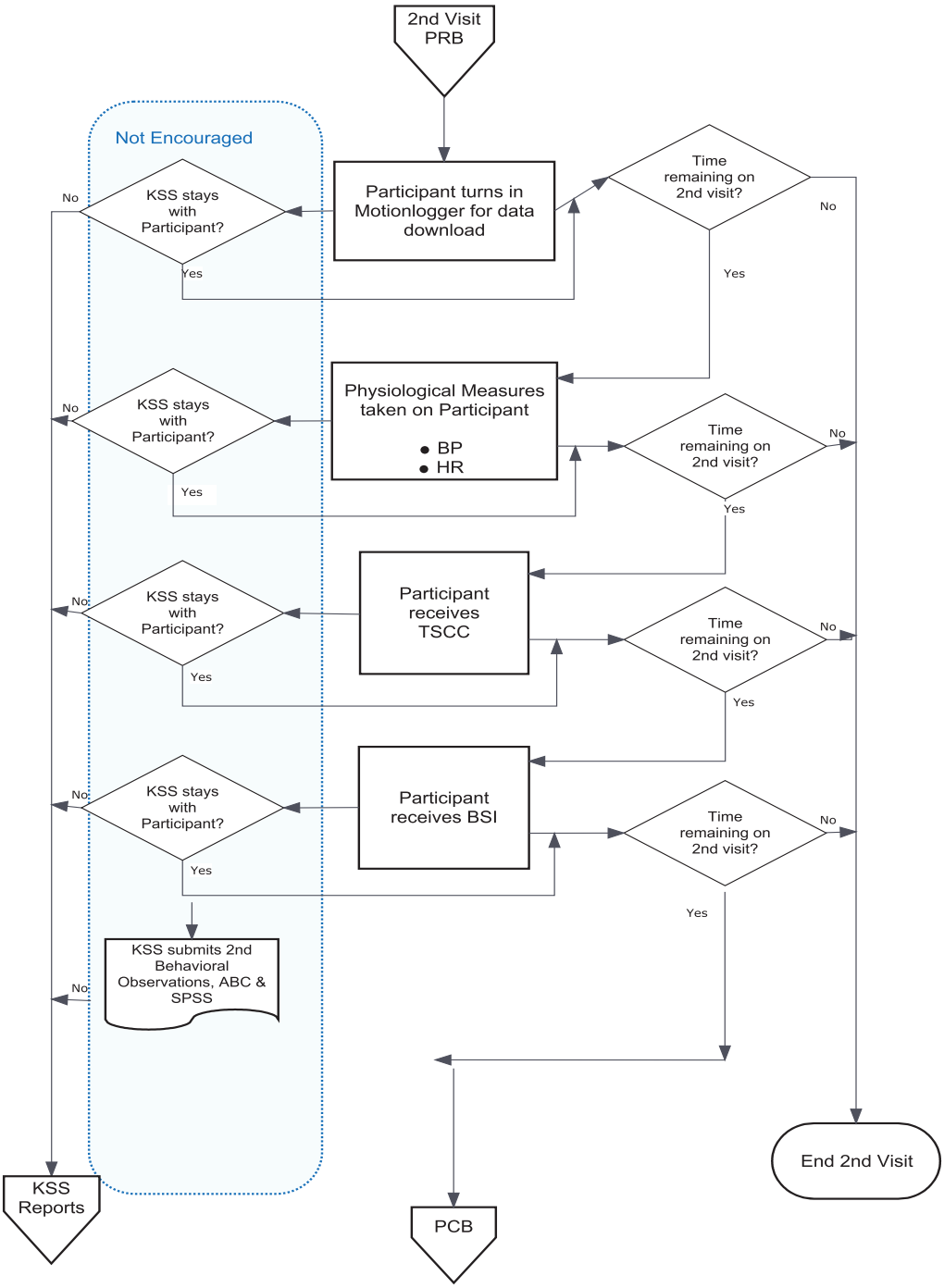


Baseline Phase 3rd and All Following Visits

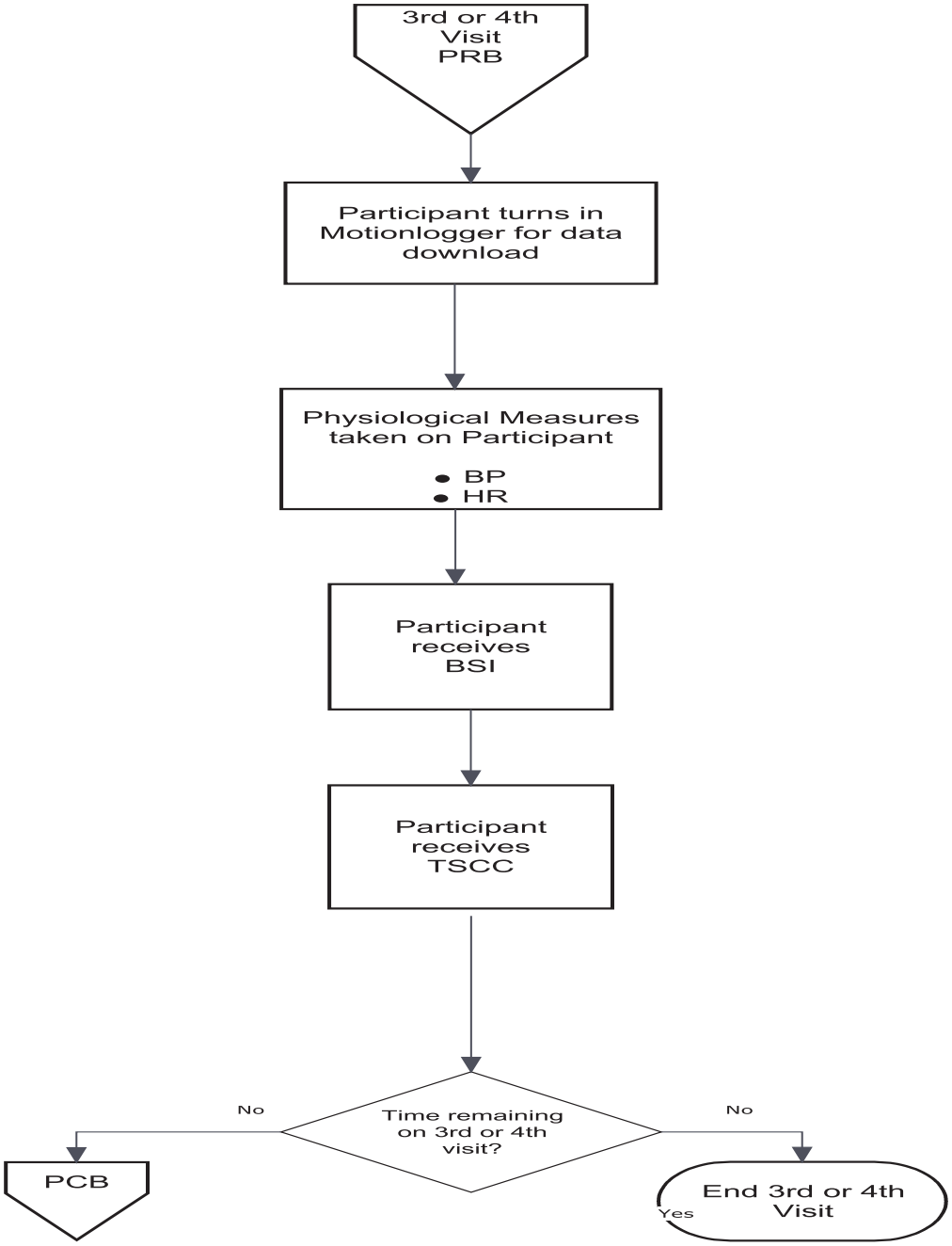



Initial PRB
Participant receives Motionlogger and instructions for care
KSS stays with Participant?
No
Yes
Time remaining on 1st visit?
No
Yes
Physiological Measures taken on Participant
BP
HR
KSS stays with Participant?
No
Yes
Time remaining on 1st visit?
No
Yes
Participant receives BSI
KSS stays with Participant?
No
Yes
Time remaining on 1st visit?
No
Yes
Participant receives TSCC
KSS stays with Participant?
No
Yes
Time remaining on 1st visit?
No
Yes
KSS submits initial Behavioral Observations & DBC-A
End Initial Visit
PCB
KSS Reports

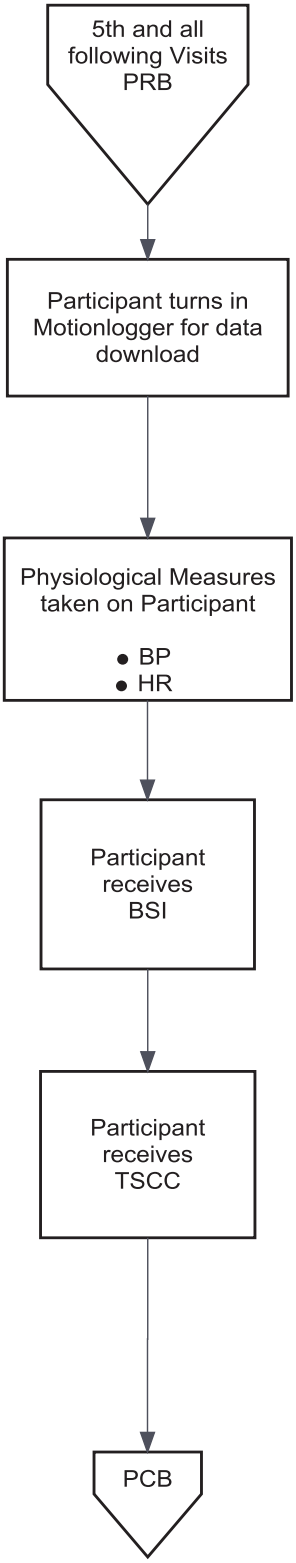
2nd Visit - PRB



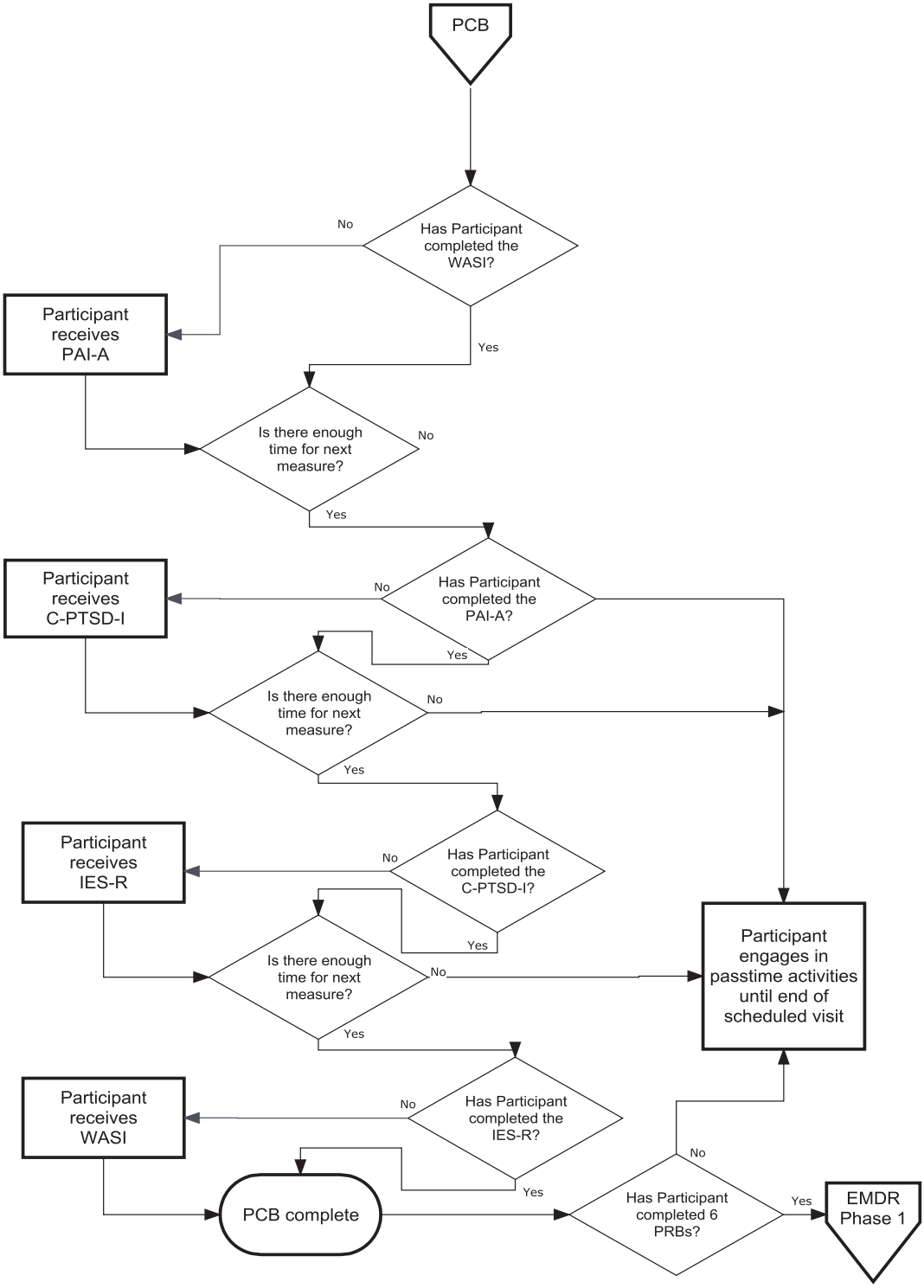
3rd or 4th Visit - PRB

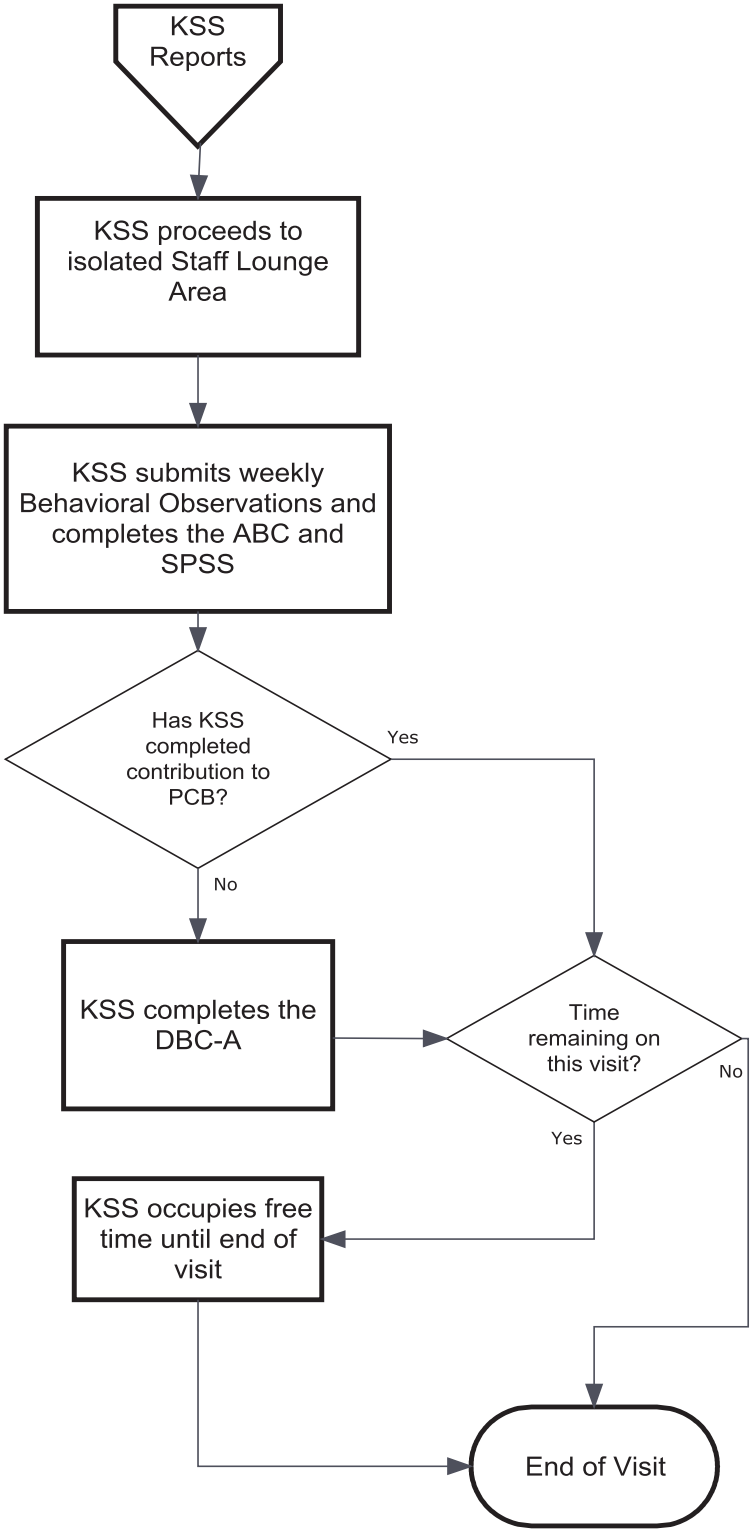


5th and All Following Visits - PRB

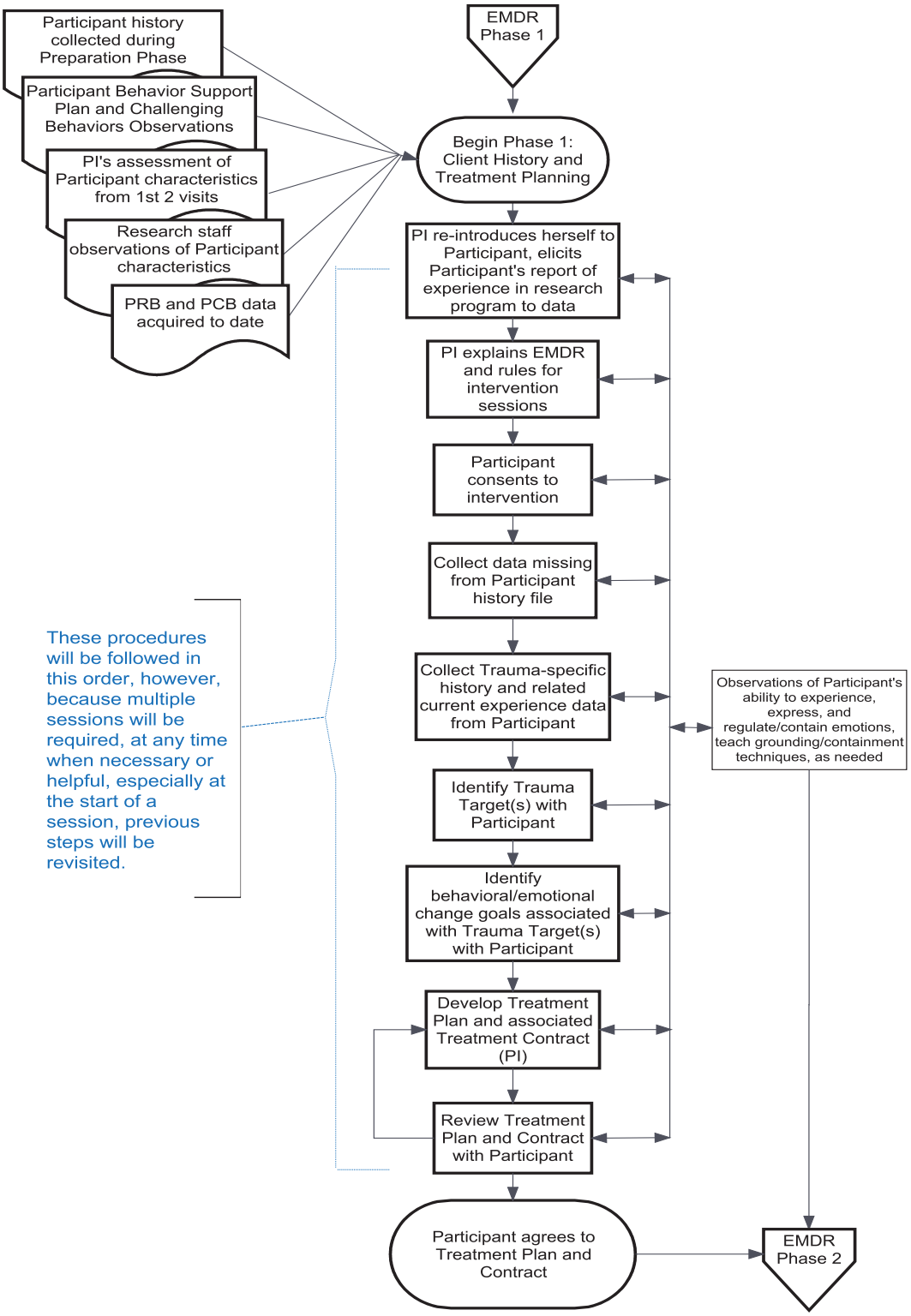


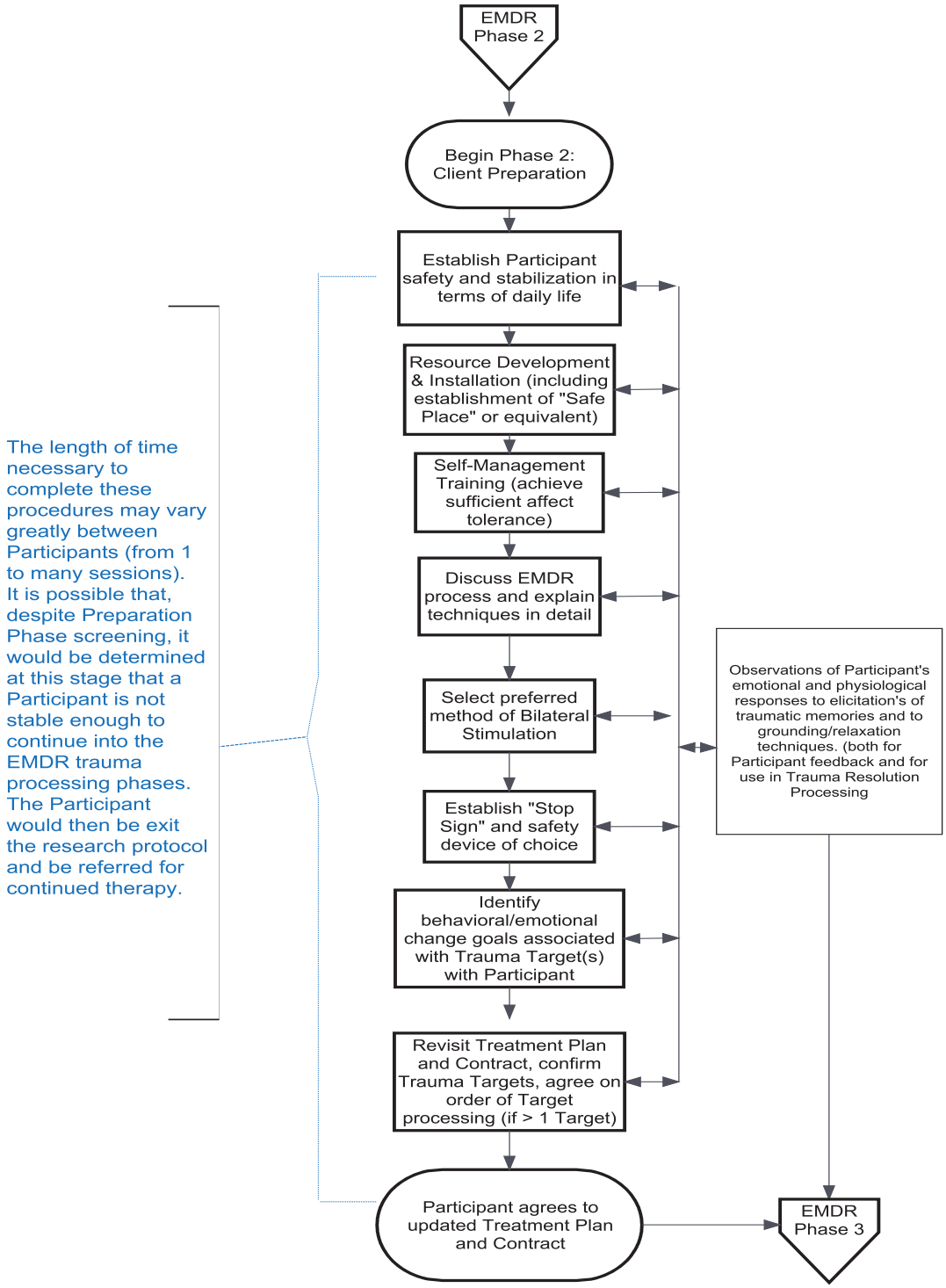
PCB

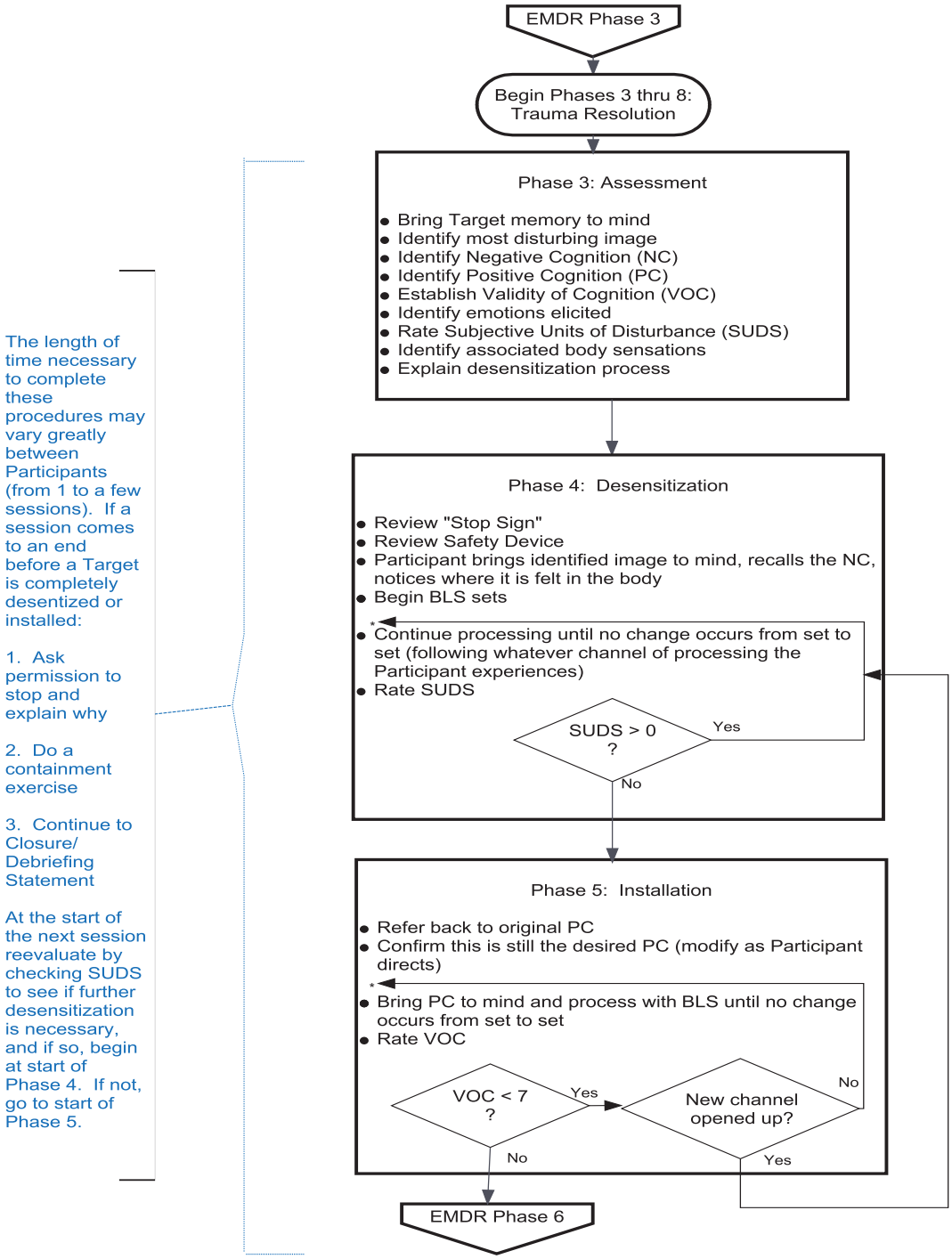

PCB
Has Participant completed the WASI?
No
Participant receives PAI-A
Yes
Is there enough time for next measure?
No
Yes
Has Participant completed the PAI-A?
No
Participant receives C-PTSD-I
Yes
Is there enough time for next measure?
No
Yes
Has Participant completed the C-PTSD-I?
No
Participant receives IES-R
Yes
Is there enough time for next measure?
No
Yes
Participant engages in passtime activities until end of scheduled visit
Has Participant completed the IES-R?
No
Participant receives WASI
Yes
PCB complete
Has Participant completed 6 PRBs?
No
Yes
EMDR Phase 1


KSS Reports
KSS proceeds to isolated Staff Lounge Area
KSS submits weekly Behavioral Observations and completes the ABC and SPSS
Has KSS completed contribution to PCB?
Yes
No
KSS completes the DBC-A
Time remaining on this visit?
No
Yes
KSS occupies free time until end of visit
End of Visit

EMDR Phase 1


Participant history collected during Preparation Phase
Participant Behavior Support Plan and Challenging Behaviors Observations
PI's assessment of Participant characteristics from 1st 2 visits
Research staff observations of Participant characteristics
PRB and PCB data acquired to date
EMDR Phase 1
Begin Phase 1: Client History and Treatment Planning
PI re-introduces herself to Participant, elicits Participant's report of experience in research program to data
PI explains EMDR and rules for intervention sessions
Participant consents to intervention
Collect data missing from Participant history file
Collect Trauma-specific history and related current experience data from Participant
Identify Trauma Target(s) with Participant
Identify behavioral/emotional change goals associated with Trauma Target(s) with Participant
Develop Treatment Plan and associated Treatment Contract (PI)
Review Treatment Plan and Contract with Participant
Participant agrees to Treatment Plan and Contract
EMDR Phase 2
Observations of Participant's ability to experience, express, and regulate/contain emotions, teach grounding/containment techniques, as needed
These procedures will be followed in this order, however, because multiple sessions will be required, at any time when necessary or helpful, especially at the start of a session, previous steps will be revisited.


EMDR Phase 2
Begin Phase 2: Client Preparation
Establish Participant safety and stabilization in terms of daily life
Resource Development & Installation (including establishment of "Safe Place" or equivalent)
Self-Management Training (achieve sufficient affect tolerance)
Discuss EMDR process and explain techniques in detail
Select preferred method of Bilateral Stimulation
Establish "Stop Sign" and safety device of choice
Identify behavioral/emotional change goals associated with Trauma Target(s) with Participant
Revisit Treatment Plan and Contract, confirm Trauma Targets, agree on order of Target processing (if > 1 Target)
Participant agrees to updated Treatment Plan and Contract
EMDR Phase 3
Observations of Participant's emotional and physiological responses to elicitation's of traumatic memories and to grounding/relaxation techniques. (both for Participant feedback and for use in Trauma Resolution Processing
The length of time necessary to complete these procedures may vary greatly between Participants (from 1 to many sessions). It is possible that, despite Preparation Phase screening, it would be determined at this stage that a Participant is not stable enough to continue into the EMDR trauma processing phases. The Participant would then be exit the research protocol and be referred for continued therapy.



The length of time necessary to complete these procedures may vary greatly between Participants (from 1 to a few sessions). If a session comes to an end before a Target is completely desentized or installed:

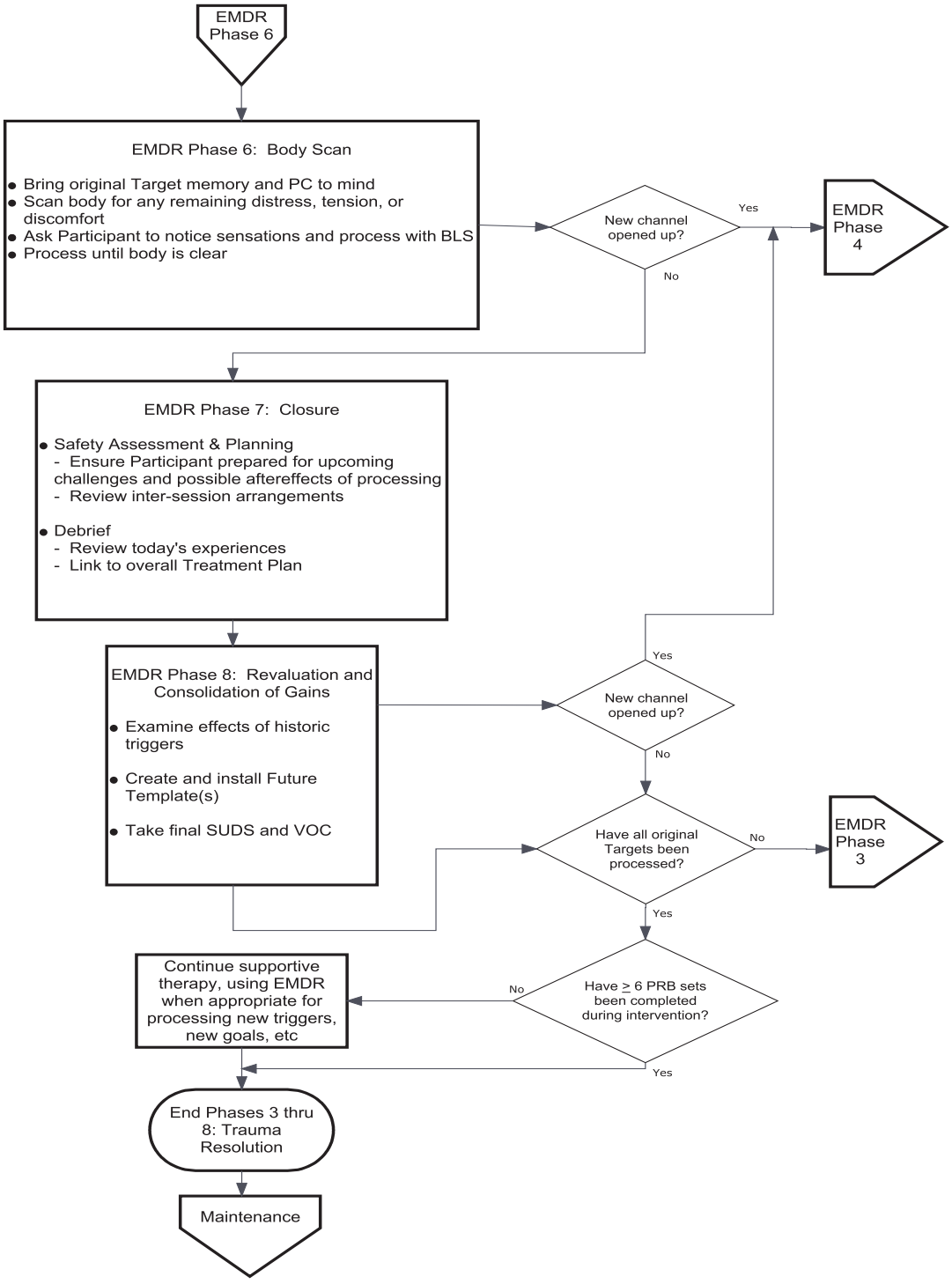
1. Ask permission to stop and explain why

2. Do a containment exercise

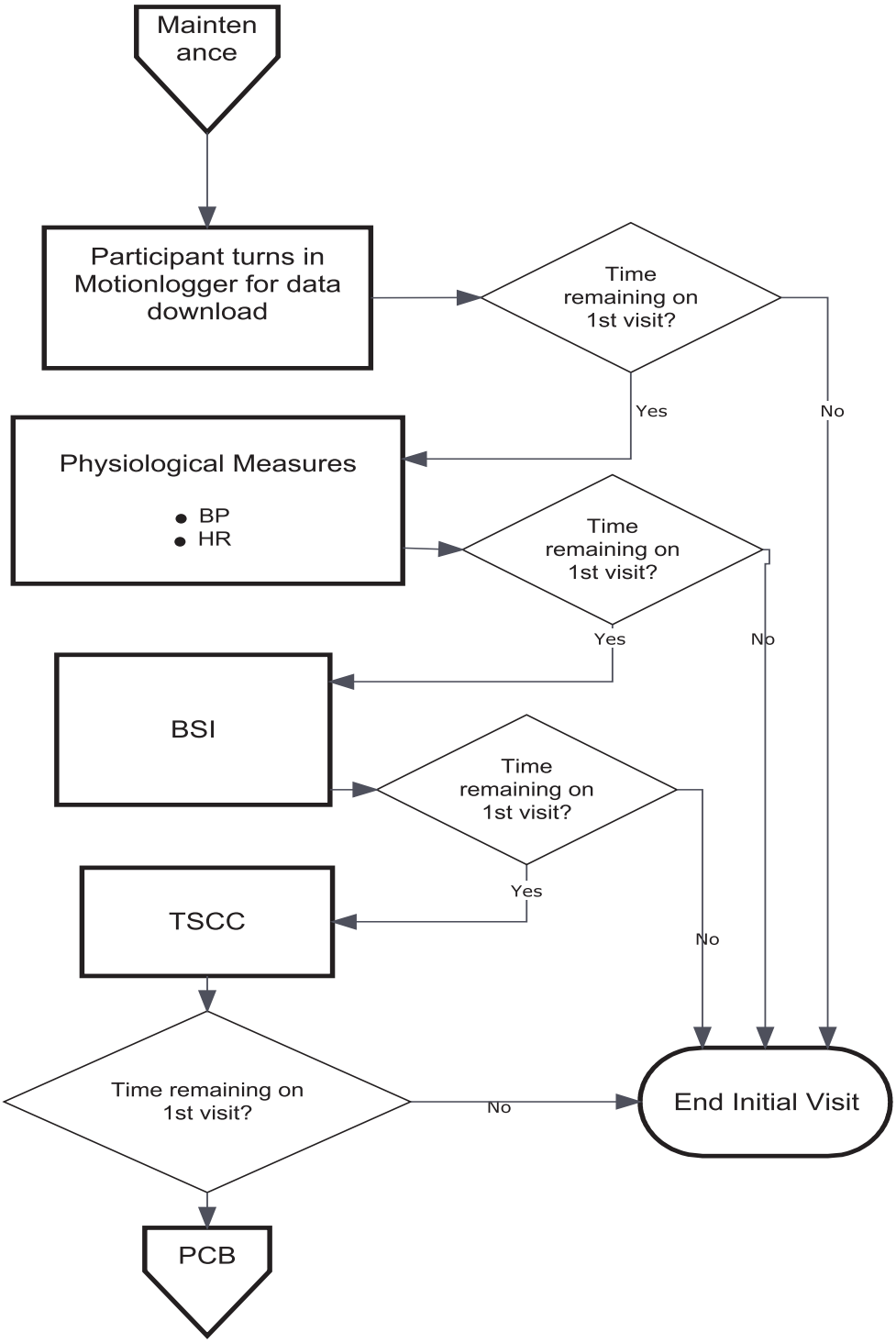
3. Continue to Closure/ Debriefing Statement

At the start of the next session reevaluate by checking SUDS to see if further desensitization is necessary, and if so, begin at start of Phase 4. If not, go to start of Phase 5.

EMDR Subsequent Phases



Maintenance Phase



Appendix C

Informed Consent Documentation

One of the first actions of the Baseline Phase was to obtain the informed consent of each participant. During the first visit to the research site, the following prepared statement regarding the purpose of the research, its procedures, risks and benefits, and confidentiality practices was read to the participant, allowing as much time as is necessary for questioning and discussion of any aspects that may require clarification, simplification, reiteration, illustration, etc. This document was worded with intention to avoid any statement that would be perceived by the participant as coercing him or her into consenting to any component of the research, and the PI presented an attitude and used intonation and gestures designed to promote and support the participant's perception that his or her consent is freely given or denied. When the PI determined that the participant understood these statements, she showed to and read with the participant the informed consent document.

Informed consent was obtained according to the procedures established in the guidelines of the Institutional Review Board (IRB) of the University of Maryland, Baltimore County UMBC). Accordingly, the PI:

a) Provided a copy of the consent form to the participant

b) Kept a copy of the consent form for the approved protocol file

c) Sought consent only if the potential participant had the mental and legal capacity to give consent

d) Provided sufficient opportunity to the potential participant to consider whether or not to participate

e) Ensured that the possibility of coercion or undue influence was absent

f) Enhanced each participant's comprehension of the information, and

g) Utilized a consent form appropriate to the developmental level.

It should be noted however, that consent was not considered a single event, but an ongoing process throughout the study. The specific informed consent process described above was repeated at the beginning of the second visit of the Baseline phase, resulting in two signed consent copies. In addition, the participant was reminded of individual aspects of the consent statements at appropriate times across the course of research progress.

Preparation for Consent - Script

"First of all, I want to thank you very much for coming here today to help me with my research. I would like to talk with you about this. I want to make sure that you understand what you will be doing here. I also want to see if you have any questions about it. Would that be okay with you?"

Participant responds in affirmative – if not ask for the problem, discuss, resolve.

"Good. Then let's talk about what research is. Research is when someone studies something to make it better. Some people might study medicines to see if they can cure you when you're sick. Some people might study rockets to see if they can travel to Mars. Have you heard of research before?"

Participant responds in affirmative – if no, *"Well, this will be a chance for you to learn about research for yourself."*

"If you agree to help me, we will be doing a different kind of research. We will study a way to make people feel better after they have something very bad happen to them. Have you ever had anything very bad happen to you?"

Participant responds in affirmative – if no, gently remind participant of the known trauma, if participant denies trauma history, explain that then it is not going to be possible for him or her to participate. Allow opportunity to indicate that there was a trauma (does not have to talk about it now). Allow opportunity to think about this and return next week to answer.

"In our research, you will tell me about the bad thing, or maybe more than one bad thing. Then we will work together in a new way to try to make you feel better. The new way is called a therapy. It's name is EMDR. Therapy usually means that someone who

has a problem talks with a therapist to make the problem better. Have you ever had therapy before?"

Participant responds in affirmative – if no, *"Well, this will be a chance for you to learn about therapy for yourself"* and omit first sentence of next statement.

"Good, then you already know a lot about what is going to happen in our research. A big part of our research will be doing therapy together. We will be talking about times when you feel bad, and try to make you feel better. And we will be talking about problems you may be having. We will try to figure out ways to fix those problems. Would that be something you can agree to do?"

Participant responds in affirmative – if no, explain that then it is not going to be possible for her or him to participate. Allow opportunity to ask questions and discuss what therapy is, and after coming to understand, say yes. Allow opportunity to think about this and return next week to answer.

"That is very good. There is another part of our research that might seem more like a job to you. You will have to come here one time every week, and you will have to stay here for a certain amount of time. You might have to stay for 3 or 4 hours. And like a job, you will be paid. Every time you come here you will be paid $20. Would you be willing to come here every week on [fill in the day of the week] at [fill in the time of day]?"

Participant responds in affirmative – if no, query for what the problem is, fix if possible. Allow opportunity to think about this and return next week to answer.

"Wonderful! I can't tell you right now how long this research might last. It might last for a few months. It might last as long as a year. Can you agree to come here for that long?"

Participant responds in affirmative – if no, query for what the problem is, fix if possible. Allow opportunity to think about this and return next week to answer.

"That's great! A different part of our research may feel like going to school. When you are here, you will have to answer many questions. But it is not really like school, because these questions are not a test. No one will tell you 'that's not the right answer.' No one will say that you did not do a good job answering the questions. That is because the questions are about you. About how you feel about things. About how your life is going. About how you think about things. As long as you DO say how you feel – or how your life is going – or how you think about something, then that IS the right answer. Can you answer questions like that?"

Participant responds in affirmative – if no, query for what the problem is, fix if possible. Allow opportunity to think about this and return next week to answer.

"That's really good! There is another little part of the research that is almost like going to the doctor's office. Do you remember seeing the big chair in the other room? The one that you can sit in and it goes back like you're almost lying down?"

Participant responds in affirmative – if not, offer to show and demonstrate the chair

"Each time you come here you will sit there and [name of the research assistant present] will use the machine you saw there to take your blood pressure. The machine does it automatically. It gets information from your body, like how fast your heart is beating.

This should not hurt, just feel like someone is squeezing your arm. Would you be willing to do that each time you come here?"

Participant responds in affirmative – if not, offer to show and demonstrate

"That's great. You will have a chance to try it for the first time before you leave here today.

"There is one more special thing about this research that you probably never heard about before. It's about the make-believe watch that you have been wearing for the past week. You know that it is not really a watch. It has something inside called a sensor. The sensor knows about how much you move around during the day, when you are awake, and it knows about how much you are not moving when you are asleep. The sensor keeps that information inside the watch for the whole week. When you come here, the very first thing you will do is give [name of the research assistant present] the watch. She will connect the watch to a computer. All the information inside the watch will go into the computer. Do you have any questions about the watch?"

[Answer any questions as clearly, simply, and correctly as possible.]

"Will you be able to wear the watch all day and all night?"

Participant responds in affirmative – if no or don't know: *"Will you try?"* – if no, query for what the problem is, fix if possible. Allow opportunity to think about this and return next week to answer.

"Will you be able to remember to take it off when you take a shower and put it back on after?"

Participant responds in affirmative – if no or don't know: *"Will you try?"* – if no, query for what the problem is, fix if possible. Allow opportunity to think about this and return next week to answer.

"Will you be able to remember to take it off when you swim and put it back on after?"

Participant responds in affirmative – if no or don't know: *"Will you try?"* – if no, query for what the problem is, fix if possible. Allow opportunity to think about this and return next week to answer.

"I guess you get the picture that there are going to be a lot of different things going on in our research. Even though there will be many things to do, there may be days when you finish everything before it's time to go. On those days we will have things for you to do that we hope are fun. Thinks like watching movies, playing cards, talking with [name of the research assistant present]. Do you think you would enjoy that?"

Participant responds in affirmative – if no or don't know: *"Well, we will have to work together to find things you will enjoy."*

"Good. Pretty soon I am going to ask you to sign a paper saying you agree to all this. But because it is very important that I know that you understand everything, I am going to ask you a few questions first. Okay?"

Participant responds in affirmative – if no or don't know: *"Will you try?"* – if no, query for what the problem is, fix if possible. Allow opportunity to think about this and return next week to answer.

For the following series of questions, help the participant with the correct answers if necessary:

Can you give me an example of research?

Participant responds in a manner that indicates an understanding of research, even if it is just repeating the examples given, above

Do you understand the things I told you today about our research?

Participant responds in affirmative

Can you tell me two things about our research?

Participant responds with any two correct facts from the above description

Are you afraid of anything in our research?

Participant gives negative response

When do you have to come here?

Any response indicating a weekly visit

How much will you be paid?

Participant responds $20

Will you have to take tests and know the right answers?

Participant gives negative response

Will you be asked a lot of questions about how you feel and think?

Participant responds in affirmative

Do you have any questions about our research?

[Answer any questions as clearly, simply, and correctly as possible.]

"There is another important thing for you to know about our research. It has to do with privacy – keeping information about you safe. All the things you tell me or [name of the research assistant present] or anybody else here will never be told to anyone else, unless you say it's okay. When our research is finished, I might write about it for magazines. If

our research makes you feel better, that would be great. We want other people to be able to use it to feel better, too. So I might write something to explain how to do it. I might teach other people how to do it. If I teach about how to do it, I would like to show how to do it. It is easier to learn something when you can look at a movie of how to do it. So I would like to make a movie of you while we are doing the EMDR therapy. Have you ever had a movie made of you? [any answer – yes, no, don't know – is acceptable] Is it okay if I make a movie of you?"

Participant responds in affirmative – if no, explain that then it is not going to be possible for her or him to participate. Allow opportunity to ask questions and discuss what the problem might be, and after coming to understand, say yes. Allow opportunity to think about this and return next week to answer.

"When I am ready to start making the movie, I will show you the camera and how everything works. We won't start making movies until a month or two from now. Would that be okay?"

Participant responds in affirmative – if no: *"Would you rather that I just make the movie without telling you?"* – if still no, ask for the problem, discuss, resolve. Repeat previous question if necessary

"There are two times when I might have to break the rule about never telling anybody what you say. Number one, if you tell me that you are going to hurt yourself, or that you are going to hurt somebody else. Number two, if you tell me that somebody is hurting you now or hurt you before. If you tell me any of these things, I might have to tell the police or do the right thing to stop it from happening. Is that okay with you."

Participant responds in affirmative – if still no, ask for the problem, discuss, resolve. Allow opportunity to ask questions and discuss what the problem might be, and after coming to understand, say yes. Allow opportunity to think about this and return next week to answer.

"Now here is the last and most important thing for you to understand. Even if you say yes to all the questions I asked you today, it will be okay if you change your mind. [if 1st presentation of consent: You can change your mind when I ask you all these same questions again next week.] You can change your mind anytime at all. You can say that you do not want to answer any question that I or [name of the research assistant present] or anyone here asks you. You can say that you do not want to do anything that I or [name of the research assistant present] or anyone here asks you to do. You can say NO at any time. You can quit at any time. Do you understand what I mean?"

Participant responds in affirmative – if still no, ask for the problem, discuss, resolve. Allow opportunity to ask questions and discuss what the problem might be, and after coming to understand, say yes. Allow opportunity to think about this and return next week to answer.

'When can you say NO?

Anytime I want (prompt if necessary)

'Who can you say NO to?'

Anyone (prompt if necessary)

'Very good'

Informed Consent Document Template

Principal Investigator: Lynn Buhler

Department: Psychology

Telephone number: (410) 539-9444 home; (443) 414-4333 cell

INFORMED CONSENT FOR PARTICIPATION IN RESEARCH ACTIVITIES

Use of Eye Movement Desensitization and Reprocessing with Adults with Intellectual Disability

I. PURPOSE OF THIS RESEARCH STUDY:

You are being asked to be in research to study a way to make people feel better after they have something very bad happen to them.

II. WHAT WILL BE DONE/PROCEDURES:

You will be asked to come here to my office (857 Park Avenue, Baltimore, Maryland 21201) one time a week. You will be here between 3 and 4 hours each time. I can't tell you right now how long this research might last. It might last for a few months. It might last as long as a year.

When you are here, you will have to answer many questions. But it is not like school, because these questions are not a test. No one will tell you "that's not the right answer." No one will say that you did not do a good job answering the questions. That is because the questions are about you. About how you

feel about things. About how your life is going. About how you think about things.

Each time you come here we will take your blood pressure. A machine does it automatically. It gets other information from your body, like how fast your heart is beating. This should not hurt, just feel like someone is squeezing your arm.

You will wear a make-believe watch. The watch has a sensor inside. The sensor knows about how much you move around during the day, when you are awake, and it knows about how much you are not moving when you are asleep. The sensor keeps that information inside the watch for the whole week. When you come here, we will connect the watch to a computer. All the information inside the watch will go into the computer.

A big part of our research will be doing therapy together. We will be talking about times when you feel bad, and try to make you feel better. And we will be talking about problems you may be having. We will try to figure out ways to fix those problems. In our research, you will tell me about a very bad thing that happened to you. Maybe more than one bad thing. Then we will work together in a new way to try to make you feel better. This therapy is called EMDR.

III. POSSIBLE BENEFITS:

Your help in this research might help other people. Maybe we will learn how to make people feel better after very bad things happen to them. We think that EMDR can do this. You can help us find out for sure.

IV. POSSIBLE RISKS AND DISCOMFORTS:

Nothing we do in our research should hurt you. You can change your mind anytime at all. You can say that you do not want to do anything that I or anyone here asks you to do. You can say NO at any time. You can quit at any time.

V. CONFIDENTIALITY OF RECORDS:

All the things you tell me or anybody else here will never be told to anyone else, unless you say it's okay. There are two times when I might have to break the rule about never telling anybody what you say. Number one, if you tell me that you are going to hurt yourself, or that you are going to hurt somebody else. Number two, if you tell me that somebody is hurting you now or hurt you before. If you tell me any of these things, I might have to tell the police or do the right thing to stop it from happening.

All the information learned from this study in which you might be identified will remain confidential and will be stored in a locked file cabinet in a locked room. Only I and the other people here on the research team will be able to open the files. If information learned from this study is published, I will not be identified by name. By signing this form, however, I allow the research study investigator to make my records available to the University of Maryland Baltimore County (UMBC) Institutional Review Board (IRB) and regulatory agencies as required by law.

When our research is finished, I might write about it for magazines. If our research makes you feel better, that would be great. We want other people to be able to use it to feel better, too. So I might write something to explain how to do it. I might teach other people how to do it. If I teach about how to do it, I would like to show how to do it. It is easier to learn something when you can look at a movie of how to do it. So I would like to make a movie of you while we are doing the EMDR therapy.

Please, check Yes of No for permission to make video movies of you:

___ Yes, I give permission to make video movies of me during therapy

___ No, I do not give permission to make video movies of me during therapy

Please, check Yes of No for permission to use the video movies for teaching:

___ Yes, I give permission to use the video movies of me to help others to learn about our research

___ No, I do not give permission to the video movies of me to help others to learn about our research

VI. PAYMENT FOR PARTICIPATION:

You will be paid $20 each week when you come here.

VI. VOLUNTARY PARTICIPATION WITH RIGHT OF REFUSAL:

You can change your mind about being in this research. You can change your mind anytime at all. You can say that you do not want to answer any question that I or anyone here asks you. You can say that you do not want to do anything that I or anyone here asks you to do. You can say NO at any time. You can quit at any time.

VIII. IRB REVIEW AND IMPARTIAL THIRD PARTY:

This study has been reviewed and approved by the UMBC Institutional Review Board (IRB). A representative of that Board, from the Human and Animal

Research Protections Office, is available to discuss your rights as a research participant. That means that if you want to talk to someone at my school who knows about our research, call the Office at (410) 455-2737. You could also send them an email at HARPO@umbc.edu. If can always call them if you have any problems or worries about our research.

If you have any questions you would like to ask me at any time, you can call me at home (410) 539-9444 or on my cell phone (443) 414-4333.

Both Dr. Karyn Harvey and Dr. Russ Hibler want you to know that you can call them if you would like to talk to someone about the research. You can ask them questions. You can tell them about any worries you may have. You can talk to them about anything that is on your mind about the research. Their cell phone numbers are:

Dr. Karyn Harvey – (443) 807-0166

Dr. Russ Hilber – (410) 353-5144

IX. SIGNATURE FOR CONSENT:

Lynn has answered my questions and I agree to be in this research.

Participant's Name: _____ Date: _____

Participant's Signature: _____ Date: _____

Investigator's Signature: _____ Date: _____

Appendix D

Acronyms

AA	African American
AMI	Ambulatory Monitoring Inc.
AAIDD	American Association on Intellectual and Developmental Disabilities
ABA	Applied Behavioral Analysis
ABC	Aberrant Behavior Checklist
ACC	Anterior Cingulate Cortex
A/D	Analog/Digital
AIP	Adaptive Information Processing
AMI	Ambulatory Monitoring Inc.
APA	American Psychological Association
ARC	Association for Retarded Citizens of the United States
BLS	Bi-lateral Stimulation
BP	Blood Pressure
BSI	Brief Symptom Inventory
C	Caucasian
C-PTSD-I	Children's PTSD Inventory
CA	Chronological Age
CAPS	Career Abilities Placement Survey
CAPS-CA	Clinician-Administered PTSD Scale for Children and Adolescents
CBT	Cognitive-behavioral Therapy
CMAI	Cohen-Mansfield Agitation Inventory
DBC	Developmental Behaviour Checklist
DBC-A	Developmental Behaviour Checklist for Adults
DBP	Diastolic Blood Pressure
DD	Dual Diagnosis
DID	Dissociative Identity Disorder

DM-ID	Diagnostic Manual-Intellectual Disability
DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorders
EBPP	Evidence-based practice in psychology
EHR	Electronic Health Records
EMDR	Eye Movement Desensitization and Reprocessing
EMDRIA	EMDR International Association
EMs	Eye Movements
FSIQ	Full Scale IQ
GSI	Global Severity Index
HD	High Density
HIPAA	Health Insurance Portability and Accountability Act
HIV	Human Immunodeficiency Virus
HR	Heart Rate
IES	Impact of Events Scale
IES-R	Impact of Events Scale - Revised
ID	Intellectual Disability
ID #	Participate number
ICC	Intraclass Correlation Coefficient
IQ	Intelligence Quotient
IRB	Institutional Review Board
KSS	Key Support Staff
LM	Life Measures Mode
MA	Mental Age
MI	Mental Illness
MMPI	Minnesota Multiphasic Personality Inventory
NADD	National Association for the Dually Diagnosed
NICHD	National Institute of Child Health and Human Development

NC	Negative Cognition
NOS	Not Otherwise Specified
OAS	Overt Aggression Scale
OMIM	Online Mendelian Inheritance in Man
OR	Orienting Response
PAI-A	Personality Assessment Inventory - Adolescent
PAS-ADD	Psychiatric Assessment Schedule for Adults with Developmental Disabilities
PASS	Planning, attention, and simultaneous and successive information processing
PC	Positive Cognition
PCB	Participant Characterization Battery
PGO	Pontine-geniculateoccipital
PI	Principal Investigator
PIM	Proportional Integrating Measure
PIQ	Performance IQ
PRB	Participant Response Battery
PSDI	Positive Symptom Distress Index
PST	Positive Symptom Total
PTSD	Posttraumatic Stress Disorder
PWI-ID	Personal Wellbeing Index - ID
qEEG	Quantitative Electroencephalography
QOL	Quality of Life
RDI	Resource Development and Installation ()
REM	Rapid Eye Movement
RSA/HRV	Respiratory Sinus Arrhythmia/Heart Rate Variability
SBP	Systolic Blood Pressure
SCL-90-R	The Symptom Checklist-90, Revised
SDQ-20	The Somatoform Dissociation Questionnaire

SIB	Self-injurious Behavior
SE	Standard Error
SES	Social Economic Status
SMA	Simulation Modeling Analysis
SPSS	Social Performance Survey Schedule
SUDS	Subject Units of Disturbance Scale
TAS-20	Toronto Alexithymia Scale
TAT	Time-Above-Threshold
TSCC	Trauma Symptom Checklist for Children
UMBC	University of Maryland, Baltimore County
VoC	Validity of *(Positive)* Cognition
VIQ	Verbal IQ
WAIS-III	Wechsler Adult Intelligence Scale – Third Edition
WASI	Wechsler Abbreviated Scale of Intelligence
WIAT	Wechsler Individual Achievement Test
WISC-III	Wechsler Intelligence Scale for Children – Third Edition
WRAT-3	Wide Range Achievement Test - 3
ZC	Zero Crossing Mode
ZPD	zone of proximal development

Appendix E

Data

The data included in this appendix are in tabular and figural formats. Tables contain descriptive statistics for each outcome measure for each participant and for each outcome measure with data grouped for all participants; the results of the linear regression analyses for each outcome measure for each participant; and, the results of the individual growth model analyses for each outcome measure. Figures present graphs of the outcome data for each measure for each participant, and graphs overlaying data for all participants for measures for which the individual growth models produced significant results.

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Table E1
Descriptive Statistics: Self-report Measure - Trauma Symptom Checklist for Children

ID #	Subscales	*N*	MIN	MAX	*M*	*SD*
050	Under-responsive	58	52	91	79.52	9.33
050	Hyper-responsive	58	47	65	48.55	5.1
050	Anxiety	58	32	39	33.34	1.95
050	Depression	58	32	43	34.74	3.32
050	Anger	58	33	50	39.53	4.9
050	Posttraumatic Stress	58	33	47	37.95	4.09
050	Dissociation	58	35	53	40.97	4.64
050	Overt Dissociation	58	37	56	42.97	4.54
050	Fantasy	58	37	57	40.55	4.86
050	Sexual Concerns	58	38	62	47.72	6.57
050	Sexual Distress	58	43	78	54.1	10.66
050	Sexual Preoccupation	58	38	50	43.03	1.14
051	Under-responsive	65	61	91	88.69	6.25
051	Hyper-responsive	65	47	47	47	0
051	Anxiety	65	34	42	34.52	1.42
051	Depression	65	32	37	32.22	0.87
051	Anger	65	33	41	33.58	1.56
051	Posttraumatic Stress	65	34	43	34.38	1.32
051	Dissociation	65	35	43	35.62	1.5
051	Overt Dissociation	65	37	45	37.54	1.34
051	Fantasy	65	38	43	38.31	1.21
051	Sexual Concerns	65	42	42	42	0
051	Sexual Distress	65	44	44	44	0
051	Sexual Preoccupation	65	43	43	43	0
052	Under-responsive	68	42	81	64.32	8.6
052	Hyper-responsive	68	47	65	47.26	2.18
052	Anxiety	68	34	66	42.13	5.92
052	Depression	68	34	72	43.01	5.92
052	Anger	68	33	53	39.49	5
052	Posttraumatic Stress	68	40	64	47.56	4.3
052	Dissociation	68	45	57	50.21	2.85
052	Overt Dissociation	68	42	59	49.26	3.5

ID #	Subscales	*N*	MIN	MAX	*M*	*SD*
052	Fantasy	68	42	62	52.66	4.31
052	Sexual Concerns	68	41	103	62.88	16.21
052	Sexual Distress	68	43	69	46.54	6.52
052	Sexual Preoccupation	68	43	127	72.68	21.92
053	Under-responsive	92	42	91	77.89	10.8
053	Hyper-responsive	92	47	65	48.76	5.38
053	Anxiety	92	32	59	36.51	5.3
053	Depression	92	32	53	37.76	5.44
053	Anger	92	34	61	38.34	5.98
053	Posttraumatic Stress	92	33	49	35.28	3.86
053	Dissociation	92	35	53	39.59	4.59
053	Overt Dissociation	92	37	62	42.43	5.37
053	Fantasy	92	37	52	38.47	3.36
053	Sexual Concerns	92	37	67	42.21	4.46
053	Sexual Distress	92	43	87	44.25	5.93
053	Sexual Preoccupation	92	41	58	43.86	3.29
066	Under-responsive	80	66	91	87.19	6.62
066	Hyper-responsive	80	47	62	47.56	2.87
066	Anxiety	80	34	50	35.29	2.73
066	Depression	80	32	53	35.49	5.77
066	Anger	80	33	43	33.23	1.31
066	Posttraumatic Stress	80	34	45	34.56	1.83
066	Dissociation	80	35	54	37.64	4.72
066	Overt Dissociation	80	37	56	39.15	4.2
066	Fantasy	80	38	52	40.35	4.61
066	Sexual Concerns	80	42	42	42	0
066	Sexual Distress	80	44	44	44	0
066	Sexual Preoccupation	80	43	43	43	0
068	Under-responsive	68	41	86	63.65	8.62
068	Hyper-responsive	68	47	78	52.34	8.63
068	Anxiety	68	39	74	51.13	8.11
068	Depression	68	37	63	50.49	5.05
068	Anger	68	33	52	42.47	4.81
068	Posttraumatic Stress	68	36	68	48.99	6.41

ID #	Subscales	*N*	MIN	MAX	*M*	*SD*
068	Dissociation	68	47	70	57.19	5.75
068	Overt Dissociation	68	39	70	56.41	7.49
068	Fantasy	68	43	76	55.29	7.31
068	Sexual Concerns	68	53	86	69.28	7.32
068	Sexual Distress	68	43	86	58.93	9.57
068	Sexual Preoccupation	68	58	102	73.13	7.89

Table E2

Descriptive Statistics: Self-report Measure - Brief Symptom Inventory.

ID #	Subscales	*N*	MIN	MAX	*M*	*SD*
050	Somatization	58	36	68	50.26	8.71
050	Obsessive-Compulsive	58	31	69	41.38	9.2
050	Interpersonal Sensitivity	58	34	64	45.5	8.16
050	Depression	58	35	60	41.84	6.88
050	Anxiety	58	33	59	40.29	8.23
050	Hostility	58	33	65	42.52	8.72
050	Phobias	58	40	63	49.12	6.96
050	Paranoid Ideation	58	30	64	50.64	8.02
050	Psychotic Thinking	58	31	55	47.12	6.33
050	Sum of Values on 53 Items	58	1	52	22.24	11.34
050	Global Severity Index	58	0.02	0.98	0.42	0.21
050	Positive Symptom Total	58	1	21	11.6	4.18
050	Positive Symptom Distress Index	58	1	3	1.86	0.59
051	Somatization	65	36	78	41.86	8.19
051	Obsessive-Compulsive	65	32	64	34.6	4.63
051	Interpersonal Sensitivity	65	35	66	35.77	4
051	Depression	65	36	57	36.74	3.05
051	Anxiety	65	34	62	36.94	5.24
051	Hostility	65	34	45	34.88	2.59
051	Phobias	65	40	52	40.91	2.85
051	Paranoid Ideation	65	32	67	33.45	5.12
051	Psychotic Thinking	65	37	46	37.14	1.12
051	Sum of Values on 53 Items	65	0	44	3.51	6.57
051	Global Severity Index	34	0.02	0.83	0.13	0.15
051	Positive Symptom Total	65	0	20	2.85	4.22
051	Positive Symptom Distress Index	65	0	2.2	0.6	0.62
052	Somatization	68	43	66	52.75	7.03
052	Obsessive-Compulsive	68	31	61	42.78	7.22
052	Interpersonal Sensitivity	68	46	76	54.82	5.94
052	Depression	68	49	69	56.12	4.06
052	Anxiety	68	33	69	40.72	8.46
052	Hostility	68	33	70	42.25	8.72

ID #	Subscales	*N*	MIN	MAX	*M*	*SD*
052	Phobias	68	40	66	53.32	5.7
052	Paranoid Ideation	67	31	67	48.7	6.7
052	Psychotic Thinking	68	46	75	51.18	5.17
052	Sum of Values on 53 Items	68	14	86	32.16	16.23
052	Global Severity Index	68	0.26	1.62	0.61	0.31
052	Positive Symptom Total	68	11	39	18.56	6.81
052	Positive Symptom Distress Index	68	1	3.09	1.7	0.44
053	Somatization	92	36	70	48.49	8.84
053	Obsessive-Compulsive	92	32	66	40.59	9.85
053	Interpersonal Sensitivity	92	35	69	41.4	7.43
053	Depression	92	36	64	45.5	8.11
053	Anxiety	92	34	69	43.16	10.12
053	Hostility	92	34	68	41.46	8.55
053	Phobias	92	40	71	49.13	8.06
053	Paranoid Ideation	92	32	70	39.18	9.52
053	Psychotic Thinking	92	37	67	44.14	8.15
053	Sum of Values on 53 Items	92	0	80	18.93	19.58
053	Global Severity Index	87	0.02	1.51	0.38	0.37
053	Positive Symptom Total	92	0	34	11.38	9.44
053	Positive Symptom Distress Index	87	1	3	1.45	0.44
066	Somatization	80	36	59	38.55	5.44
066	Obsessive-Compulsive	80	33	66	39.86	10.97
066	Interpersonal Sensitivity	80	35	67	42.56	10.89
066	Depression	80	36	66	44.96	11.17
066	Anxiety	80	35	64	40.85	8.37
066	Hostility	80	34	52	36.8	5.73
066	Phobias	80	40	66	42.51	6.04
066	Paranoid Ideation	80	32	65	47.41	8.34
066	Psychotic Thinking	80	37	55	40.83	6.13
066	Sum of Values on 53 Items	80	0	77	17.15	19.41
066	Global Severity Index	72	0.02	1.45	0.36	0.37
066	Positive Symptom Total	80	0	33	7.48	8.46
066	Positive Symptom Distress Index	72	1	4	2.41	0.69
068	Somatization	68	43	72	58.99	5.98

ID #	Subscales	*N*	MIN	MAX	*M*	*SD*
068	Obsessive-Compulsive	68	46	70	56.82	6.38
068	Interpersonal Sensitivity	68	46	74	59.84	5.59
068	Depression	68	41	69	57.09	6.09
068	Anxiety	68	44	73	57.78	7.24
068	Hostility	68	33	60	44.29	7.48
068	Phobias	68	39	71	60.93	7.49
068	Paranoid Ideation	68	48	70	57.5	5.34
068	Psychotic Thinking	68	36	68	58.4	5.88
068	Sum of Values on 53 Items	68	25	101	66.76	17.97
068	Global Severity Index	68	0.47	1.91	1.26	0.34
068	Positive Symptom Total	68	18	45	29.46	6.43
068	Positive Symptom Distress Index	68	1.24	3.12	2.25	0.27

Table E3

Descriptive Statistics: Physiological Measures

ID #	Measure	*N*	MIN	MAX	*M*	*SD*
050	Activity 24-Hour Mean	57	12334.63	22071.12	17691.30	2204.47
050	Activity, Awake Mean	57	9406.78	15446.53	13083.63	1281.73
050	Diastolic Blood Pressure	56	79	103	91.19	4.74
050	Systolic Blood Pressure	56	110.5	146	127.36	6.57
050	Heart Rate (Arm)	56	60.5	78	68.19	3.94
050	Heart Rate (Finger)	58	54.79	80.63	68.84	5.21
050	Sleep, 24-Hour Mean	57	541.71	806.57	608.89	49.53
050	Sleep Efficiency	57	81.65	93.15	87.94	2.47
050	Sleep Fragmentation Index	57	2.6	6.55	3.69	0.7
050	Sleep Latency	57	4.57	40.29	15.6	7.92
050	Wake After Sleep Onset	57	32.13	87.71	54.37	12.09
051	Activity 24-Hour Mean	62	9898.87	16986.56	13934.36	1511.48
051	Activity, Awake Mean	63	8790.39	16986.56	13604.87	1891.05
051	Diastolic Blood Pressure	65	56.5	75.5	64.83	3.42
051	Systolic Blood Pressure	65	103.5	124	113.91	4.72
051	Heart Rate (Arm)	65	53.5	69	60.57	3.52
051	Heart Rate (Finger)	63	52.19	71.9	63.42	3.48
051	Sleep, 24-Hour Mean	63	287.29	591.29	458.74	49.06
051	Sleep Efficiency	63	79.48	96.3	89.87	3.88
051	Sleep Fragmentation Index	63	1.6	5.88	3.29	0.88
051	Sleep Latency	63	5.57	36.86	15.19	6.83
051	Wake After Sleep Onset	63	14.71	73.57	37.27	14.24
052	Activity 24-Hour Mean	66	747.17	14422.06	7281.37	3394.8
052	Activity, Awake Mean	66	3305.56	9989.7	5873.76	1328.48
052	Diastolic Blood Pressure	67	57.5	82	68.16	5.64
052	Systolic Blood Pressure	67	104	162	131.81	11.78
052	Heart Rate (Arm)	67	54.5	76.5	64.75	5.17
052	Heart Rate (Finger)	65	53.03	78.98	68.05	5.44
052	Sleep, 24-Hour Mean	66	537.71	978	755.53	81.24
052	Sleep Efficiency	66	82	95.69	90.66	3.17
052	Sleep Fragmentation Index	66	1.85	5.65	3.26	0.77
052	Sleep Latency	66	4.67	39.29	14.64	7.35
052	Wake After Sleep Onset	66	23.14	99.86	52.47	16.53

ID #	Measure	*N*	MIN	MAX	*M*	*SD*
053	Activity 24-Hour Mean	90	11533.93	34164.4	28131.19	3966.39
053	Activity, Awake Mean	90	10778	24344.18	19667.67	2485.81
053	Diastolic Blood Pressure	91	64	124.5	77.68	7.64
053	Systolic Blood Pressure	91	103	161.5	121.46	9.71
053	Heart Rate (Arm)	91	50	76	62.44	3.73
053	Heart Rate (Finger)	90	49.38	77.51	65.84	4.29
053	Sleep, 24-Hour Mean	90	378.86	704.71	472.46	54.9
053	Sleep Efficiency	90	85.79	94.97	90.75	2.22
053	Sleep Fragmentation Index	90	1.83	4.72	2.97	0.58
053	Sleep Latency	90	4.86	31.67	12.3	5.3
053	Wake After Sleep Onset	90	23.14	76.57	42.63	11.95
066	Activity 24-Hour Mean	74	8439.14	27305.72	13393.41	3396.17
066	Activity, Awake Mean	74	6439.23	18967.44	9813.99	2207.37
066	Diastolic Blood Pressure	78	64	91	77.13	5.43
066	Systolic Blood Pressure	78	105	143.5	126.79	7.5
066	Heart Rate (Arm)	78	48.5	82	59.5	5.47
066	Heart Rate (Finger)	77	49.84	81.75	60.13	5.43
066	Sleep, 24-Hour Mean	74	279.43	598.71	437.37	69.02
066	Sleep Efficiency	74	74.59	98.34	89.75	4.8
066	Sleep Fragmentation Index	74	1.47	14.27	4.35	2.07
066	Sleep Latency	74	6.86	56.43	22.33	12.01
066	Wake After Sleep Onset	74	6	101.14	39.75	19.21
068	Activity 24-Hour Mean	64	11344.19	22764.51	15958.06	2483.29
068	Activity, Awake Mean	64	9331.59	18869.32	12693.65	2253.87
068	Diastolic Blood Pressure	67	54.5	99.5	77.53	8.22
068	Systolic Blood Pressure	67	108	156.5	130.28	8.6
068	Heart Rate (Arm)	67	57.5	96	77.13	7.48
068	Heart Rate (Finger)	63	54.23	87.11	75.8	6.72
068	Sleep, 24-Hour Mean	64	215.71	550	400.36	68.04
068	Sleep Efficiency	64	69.51	90.96	81.27	4.87
068	Sleep Fragmentation Index	64	2.15	10.52	4.58	1.59
068	Sleep Latency	64	4.5	35.14	14.69	6.9
068	Wake After Sleep Onset	64	29.83	112	66.28	19.14

Table E4

Descriptive Statistics: Observational Measure - Aberrant Behavior Checklist.

ID #	Subscale	*N*	MIN	MAX	*M*	*SD*
050	Irritability	56	0	10	1.05	2.32
050	Lethargy	56	0	10	1.04	1.99
050	Stereotypy	56	0	1	0.02	0.13
050	Hyperactivity	56	0	7	0.14	0.94
050	Inappropriate Speech	56	0	5	0.21	0.76
051	Irritability	39	0	4	0.77	1.16
051	Lethargy	39	0	5	1.41	1.67
051	Stereotypy	39	0	3	0.23	0.74
051	Hyperactivity	39	0	3	0.1	0.5
051	Inappropriate Speech	39	0	7	4.64	1.65
052	Irritability	66	0	24	5.05	6.39
052	Lethargy	66	0	12	3.41	3.22
052	Stereotypy	66	0	4	0.44	0.88
052	Hyperactivity	66	0	22	5.23	4.65
052	Inappropriate Speech	66	0	5	0.76	1.36
053	Irritability	56	3	26	16.45	5.04
053	Lethargy	56	0	5	0.45	0.97
053	Stereotypy	56	0	3	0.23	0.76
053	Hyperactivity	56	0	6	2.21	1.49
053	Inappropriate Speech	56	0	3	1.66	0.77
066	Irritability	72	1	17	5.33	3.04
066	Lethargy	72	2	15	5.53	2.24
066	Stereotypy	72	0	1	0.04	0.2
066	Hyperactivity	72	0	12	3.39	1.9
066	Inappropriate Speech	72	0	3	0.24	0.54
068	Irritability	67	0	4	0.18	0.63
068	Lethargy	67	0	1	0.01	0.12
068	Stereotypy	67	0	0	0	0
068	Hyperactivity	67	0	1	0.04	0.21
068	Inappropriate Speech	67	0	0	0	0

Table E5

Descriptive Statistics: Observational Measure - Social Performance Survey Schedule.

ID #	Subscale	*N*	MIN	MAX	*M*	*SD*
050	Appropriate Social Skills	56	9	27	17.63	3.38
050	Communication Skills	56	18	52	34.75	5.66
050	Inappropriate Assertion	56	0	19	6.71	3.92
050	Sociopathic Behavior	56	0	18	2.02	4.17
051	Appropriate Social Skills	38	11	36	22.92	7.46
051	Communication Skills	38	17	61	40.55	12.75
051	Inappropriate Assertion	38	9	30	18.26	6.73
051	Sociopathic Behavior	38	0	8	3.18	1.94
052	Appropriate Social Skills	66	2	24	11.98	6.31
052	Communication Skills	66	2	49	23.68	12.72
052	Inappropriate Assertion	66	0	33	12.17	9.26
052	Sociopathic Behavior	66	0	47	12.36	11.05
053	Appropriate Social Skills	55	5	18	11.62	2.75
053	Communication Skills	55	16	37	29.93	4.61
053	Inappropriate Assertion	55	6	20	11.98	3.12
053	Sociopathic Behavior	55	5	23	12.73	3.87
066	Appropriate Social Skills	72	3	12	8.76	1.57
066	Communication Skills	72	4	26	16.65	2.9
066	Inappropriate Assertion	72	5	15	9.24	2.07
066	Sociopathic Behavior	72	2	16	5.39	2.56
068	Appropriate Social Skills	67	0	37	14.91	5.27
068	Communication Skills	67	0	66	25.48	10.06
068	Inappropriate Assertion	67	0	21	7.93	3.45
068	Sociopathic Behavior	67	0	11	3.63	2.68

Table E6
Descriptive Statistics: Group Data - Self-Report Measures

Measure	*N*	MIN	MAX	*M*	*SD*
Trauma Symptom Checklist for Children					
Under-responsive	431	41	91	77.08	12.95
Hyper-responsive	431	47	78	48.57	5.15
Anxiety	431	32	74	38.75	7.73
Depression	431	32	72	38.93	7.67
Anger	431	33	61	37.67	5.46
Posttraumatic Stress	431	33	68	39.47	7.26
Dissociation	431	35	70	43.26	8.65
Overt Dissociation	431	37	70	44.44	7.93
Fantasy	431	37	76	43.97	8.27
Sexual Concerns	431	37	103	50.41	13.39
Sexual Preoccupation	431	38	127	52.62	16.65
Sexual Distress	431	43	87	48.17	8.72
Brief Symptom Inventory					
Somatization	431	36	78	48.21	10.05
Obsessive-Compulsive	431	31	70	42.56	10.75
Interpersonal Sensitivity	431	34	76	46.35	10.96
Depression	431	35	69	47.09	10.14
Anxiety	431	33	73	43.33	10.47
Hostility	431	33	70	40.32	8
Phobias	431	39	71	49.18	9.22
Paranoid Ideation	430	30	70	45.77	10.73
Psychotic Thinking	431	31	75	46.23	9.07
Sum of Values, 53 Items	431	0	101	26.35	25.25
Global Severity Index	387	0.02	1.91	0.55	0.47
Positive Symptom Total	431	0	45	13.38	10.97
Positive Symptom Distress Index	418	0	4	1.71	0.78

Table E7

Descriptive Statistics: Group Data - Physiological Measures

Measure	*N*	MIN	MAX	*M*	*SD*
Activity, 24-Hour Mean	413	747.17	34164.40	16700.10	7436
Activity, Awake Mean	414	3305.56	24344.18	12800.15	4864.03
Diastolic Blood Pressure	424	54.5	124.5	75.86	9.93
Systolic Blood Pressure	424	103	162	125.09	10.35
Heart Rate (Arm)	424	48.5	96	65.06	7.74
Heart Rate (Finger)	416	49.38	87.11	66.69	7.03
Sleep, 24-Hour Mean	414	215.71	978	516.87	135.58
Sleep Efficiency	414	69.51	98.34	88.57	4.89
Sleep Fragmentation Index	414	1.47	14.27	3.66	1.36
Sleep Latency	414	4.5	56.43	15.73	8.58
Wake After Sleep Onset	414	6	112	48.14	18.49

Table E8

Linear Growth Model: Group Data - Observational Measures

Measure	*N*	MIN	MAX	*M*	*SD*	*N*
Aberrant Behavior Checklist						
Irritability	356	0	26	4.88	6.62	356
Lethargy	356	0	15	2.14	2.85	356
Stereotypy	356	0	4	0.15	0.57	356
Hyperactivity	356	0	22	2.04	3.03	356
Inappropriate Speech	356	0	7	0.99	1.68	356
Social Performance Survey Schedule						
Appropriate Social Skills	354	0	37	13.89	6.31	354
Communication Skills	354	0	66	27.12	11.43	354
Inappropriate Assertion	354	0	33	10.53	6.22	354
Sociopathic Behavior	354	0	47	6.73	7.01	354

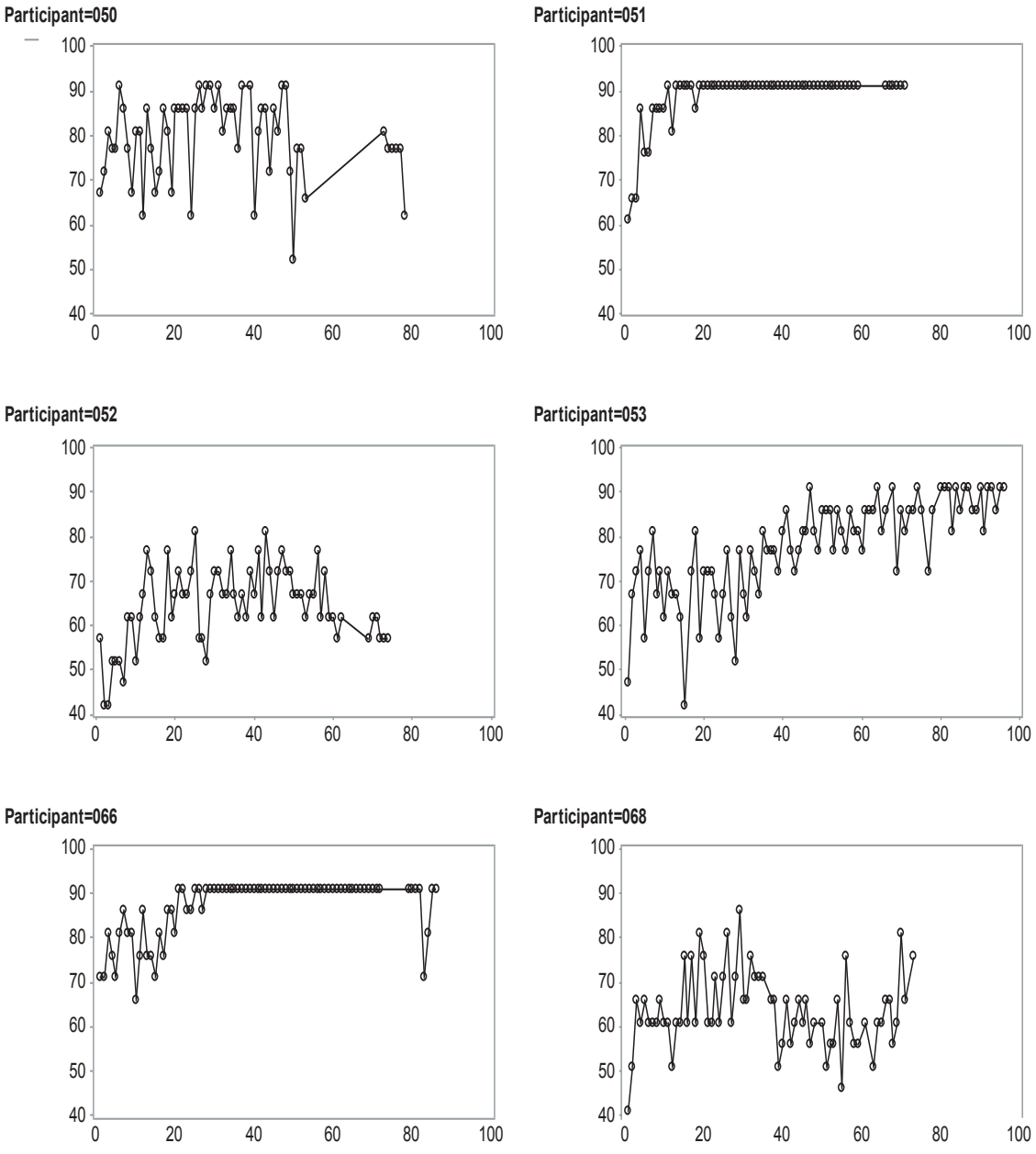

Figure E1. Trauma Symptom Checklist for Children, Underresponse validity scale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

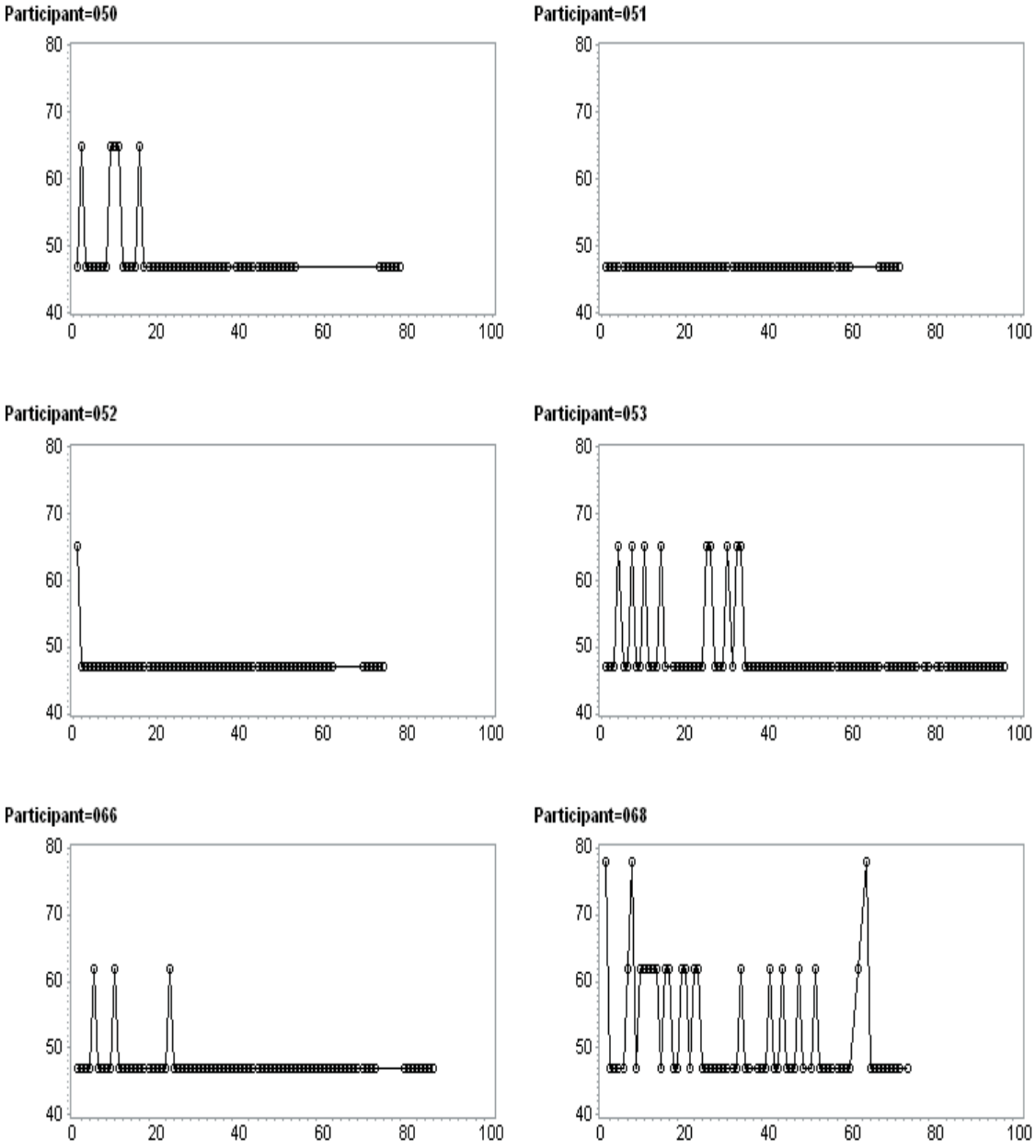

Figure E2. Trauma Symptom Checklist for Children, Hyperresponse validity scale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

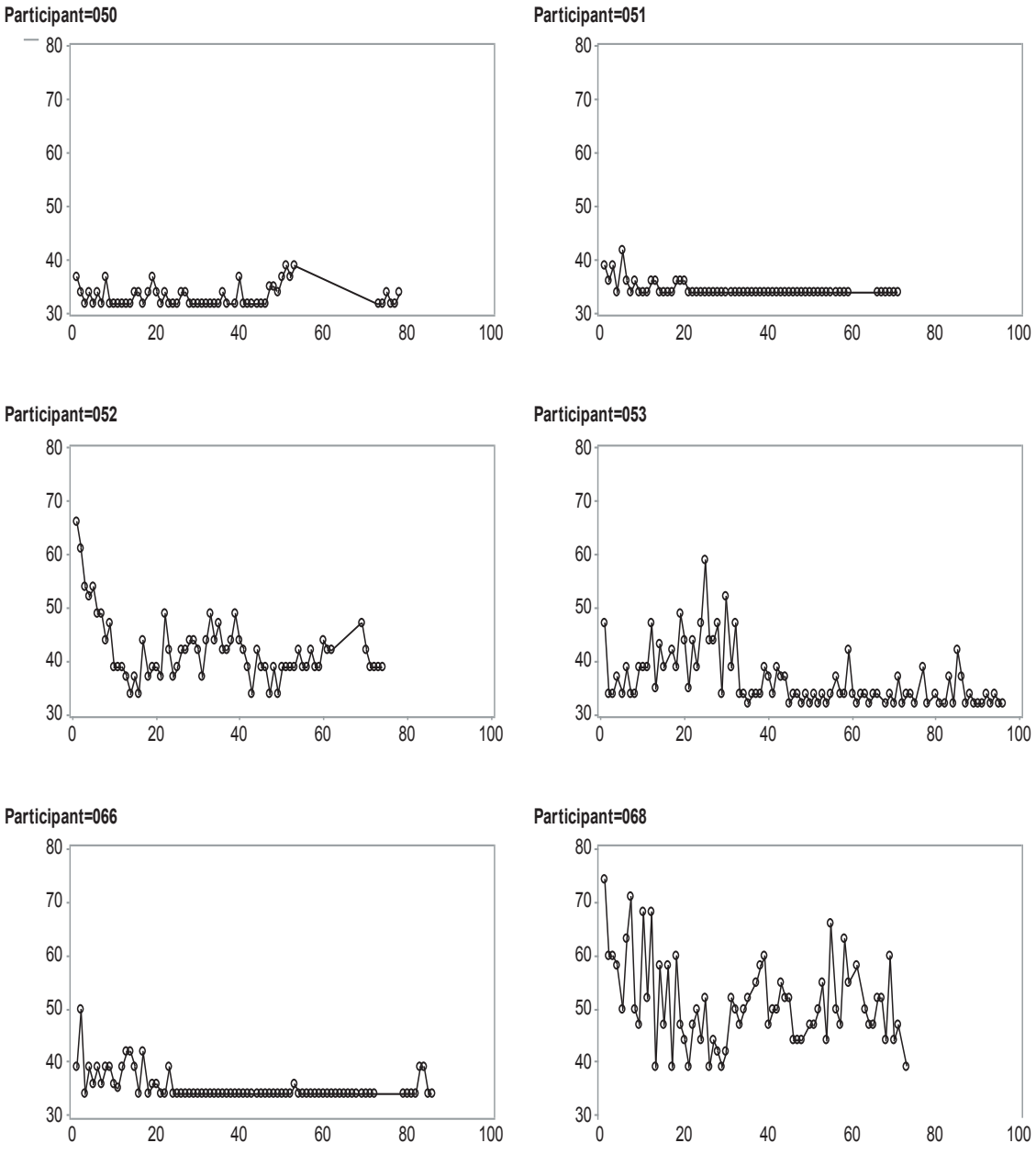

*Figure E3.*Trauma Symptom Checklist for Children, Anxiety subscale, T-score by week. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

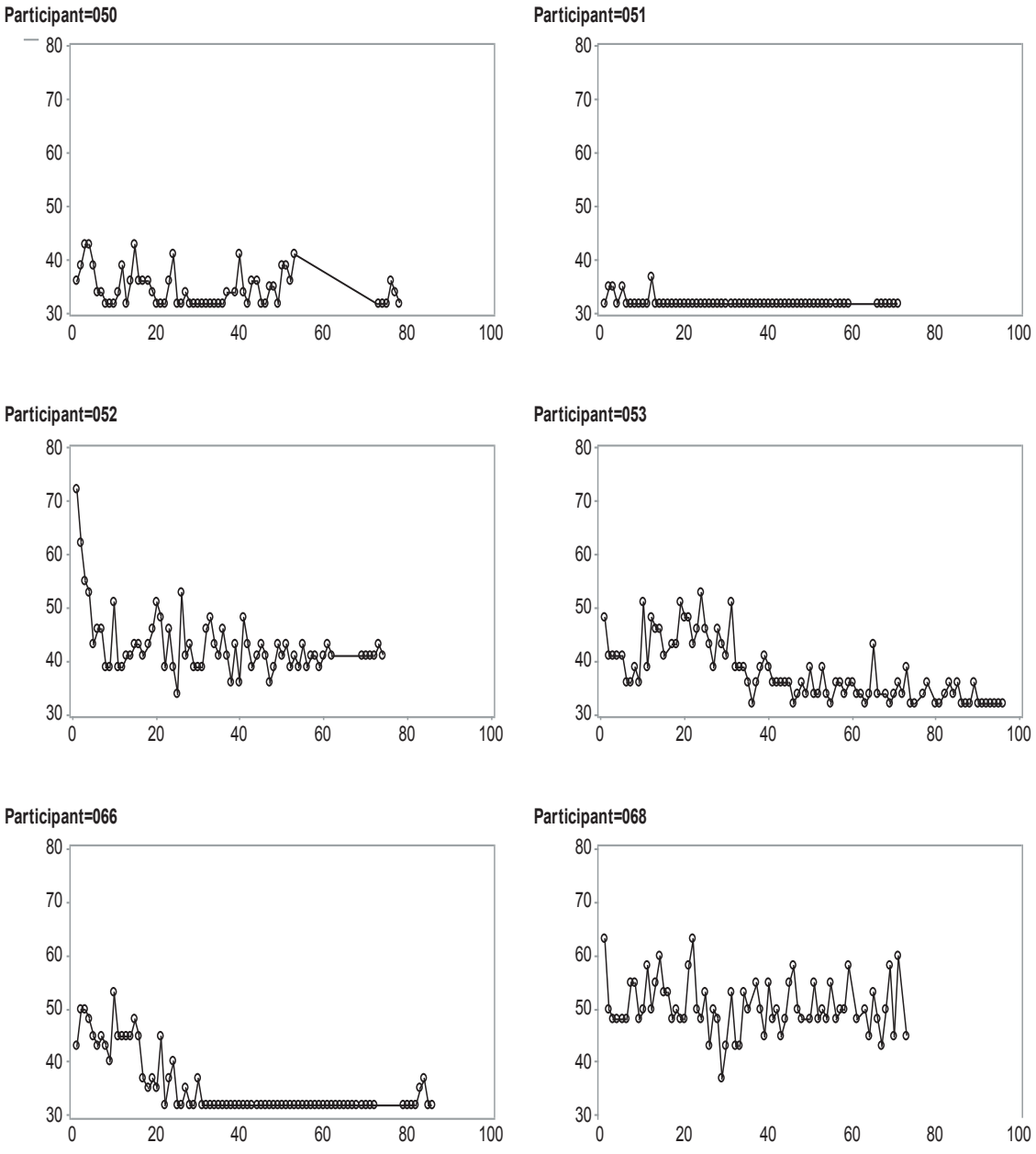

*Figure E4.*Trauma Symptom Checklist for Children, Depression subscale, T-score by week. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

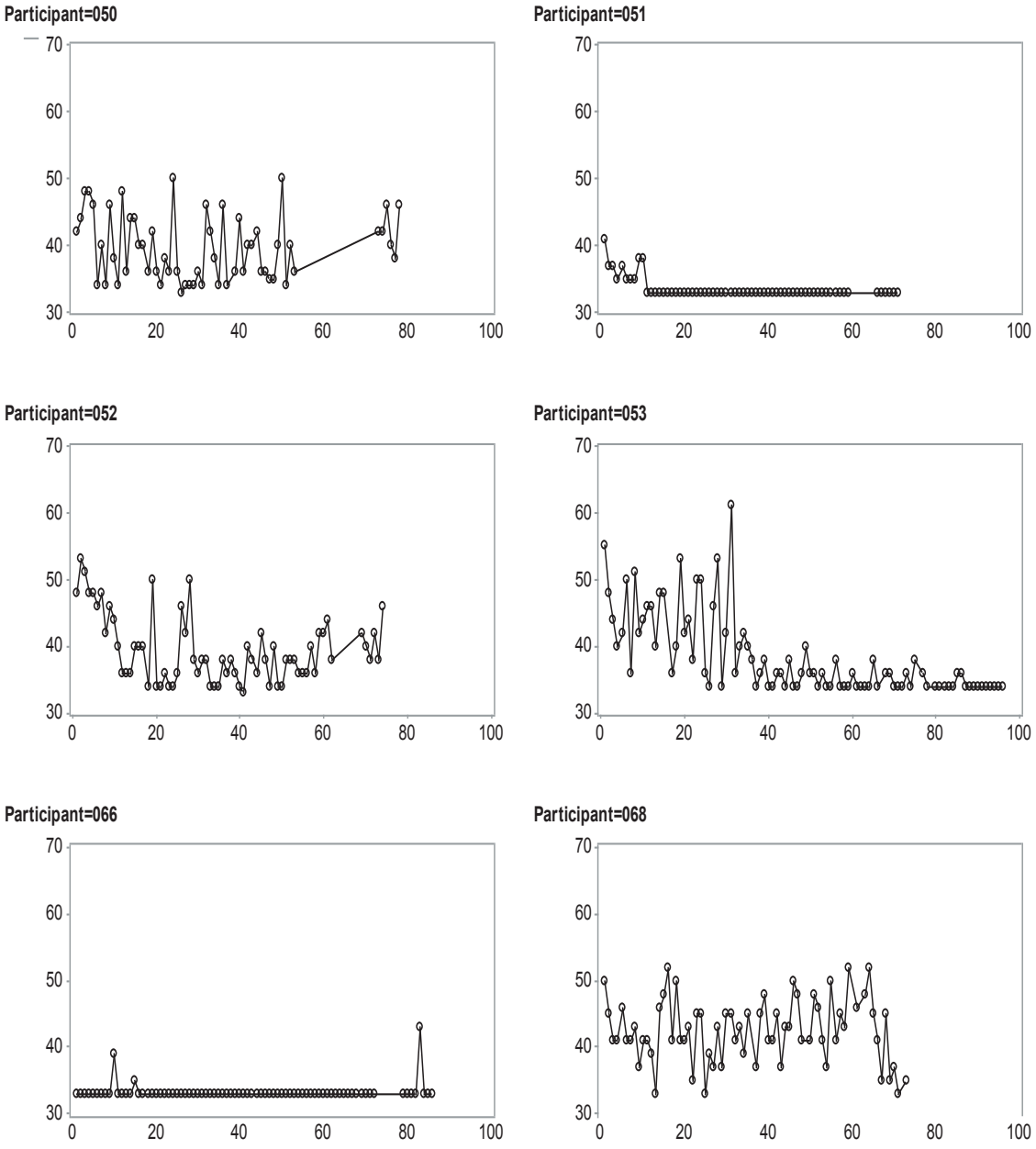

Figure E5. Trauma Symptom Checklist for Children, Anger subscale, T-score by week. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

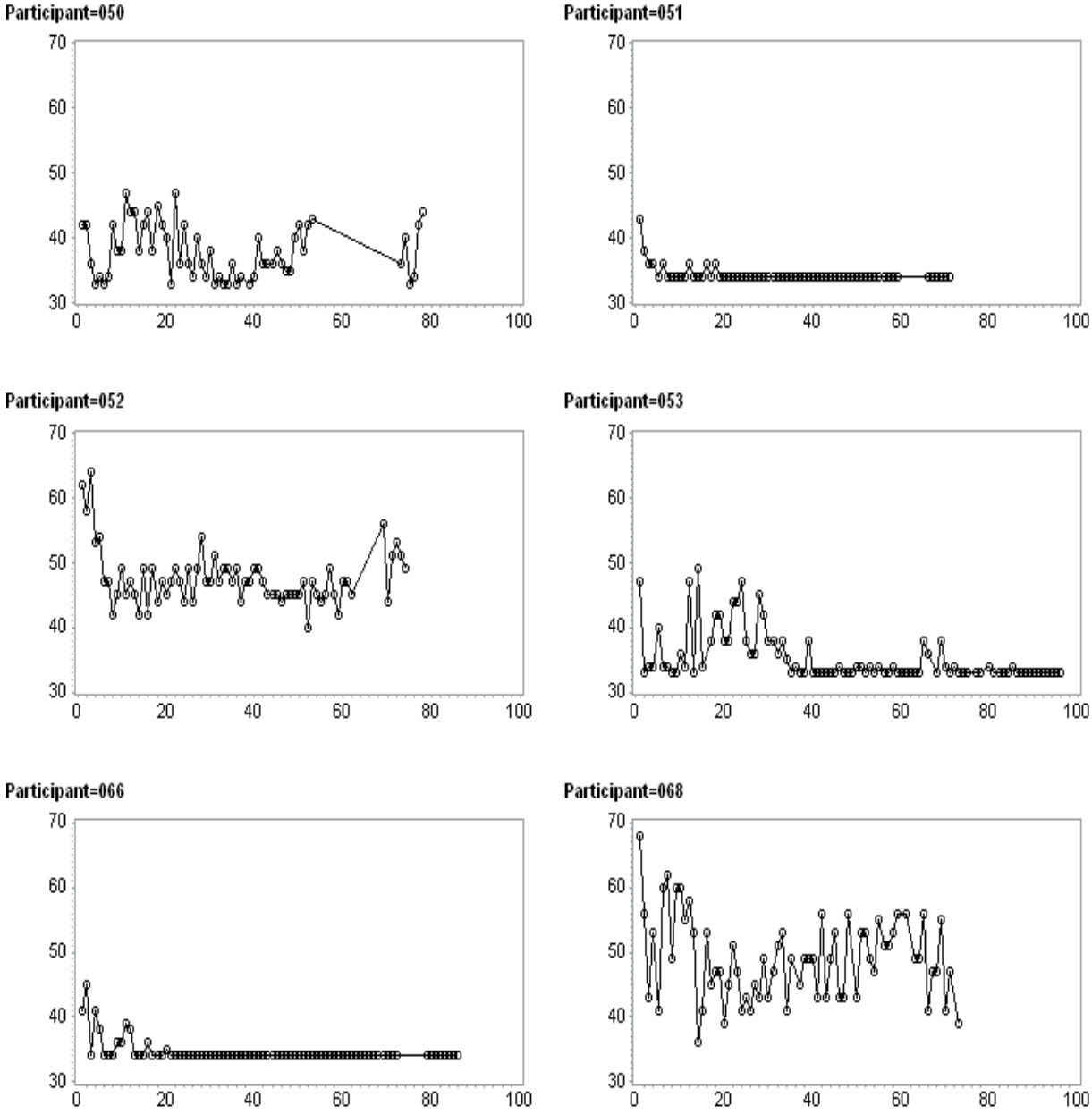

Figure E6. Trauma Symptom Checklist for Children, Posttraumatic Stress subscale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

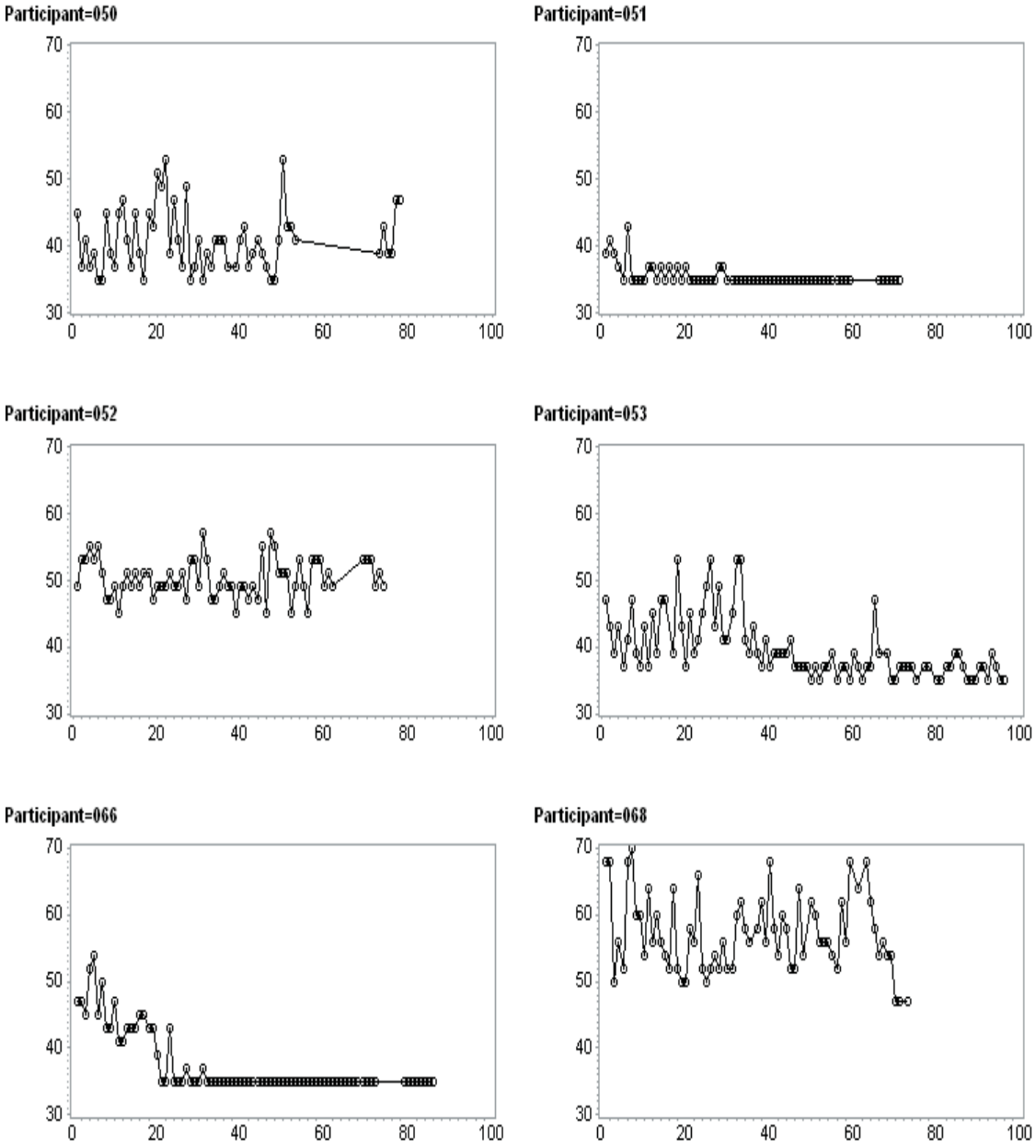

Figure E7. Trauma Symptom Checklist for Children, Dissociation subscale, T-score by week. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

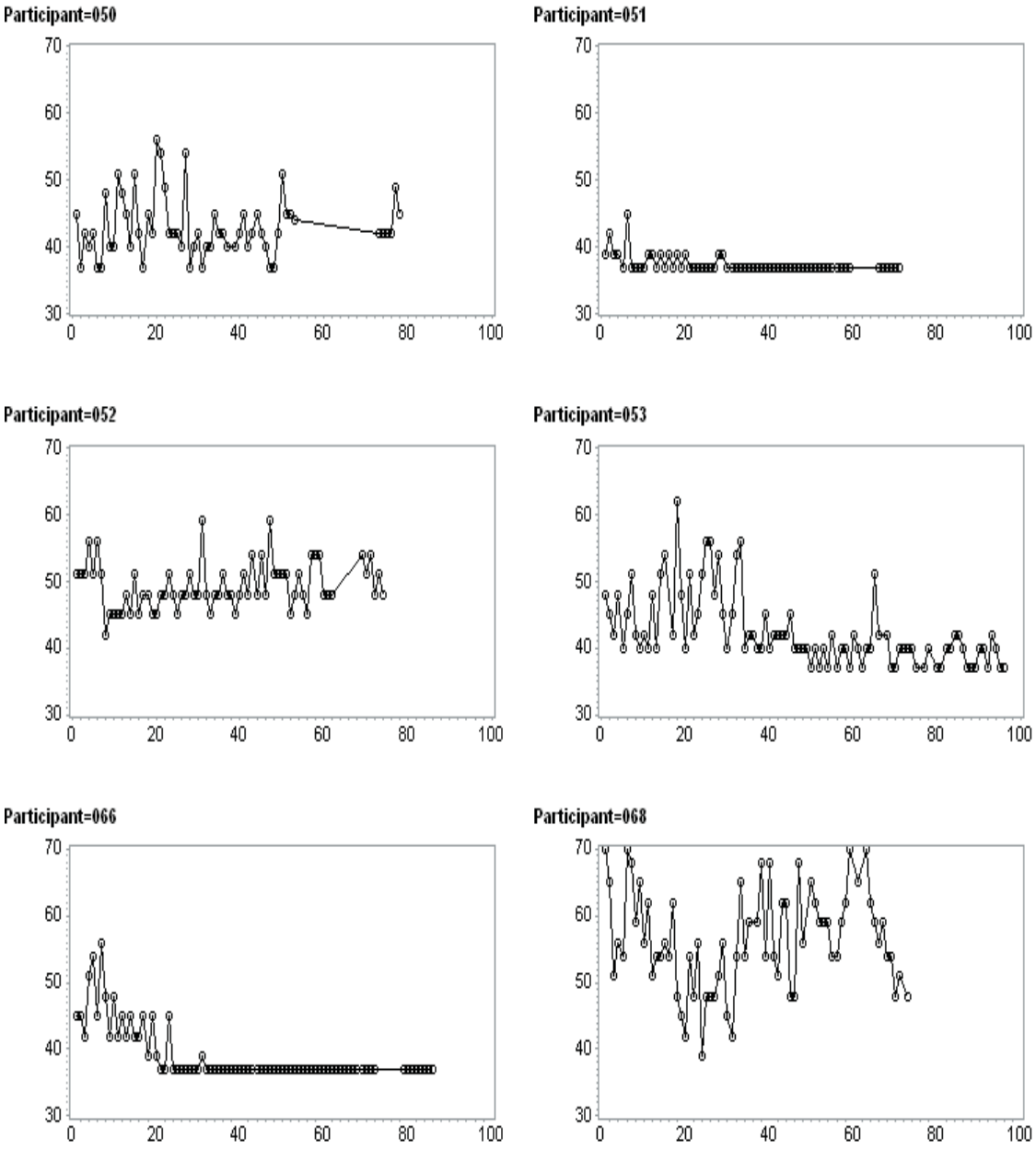

Figure E8. Trauma Symptom Checklist for Children, Overt Dissociation subscale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

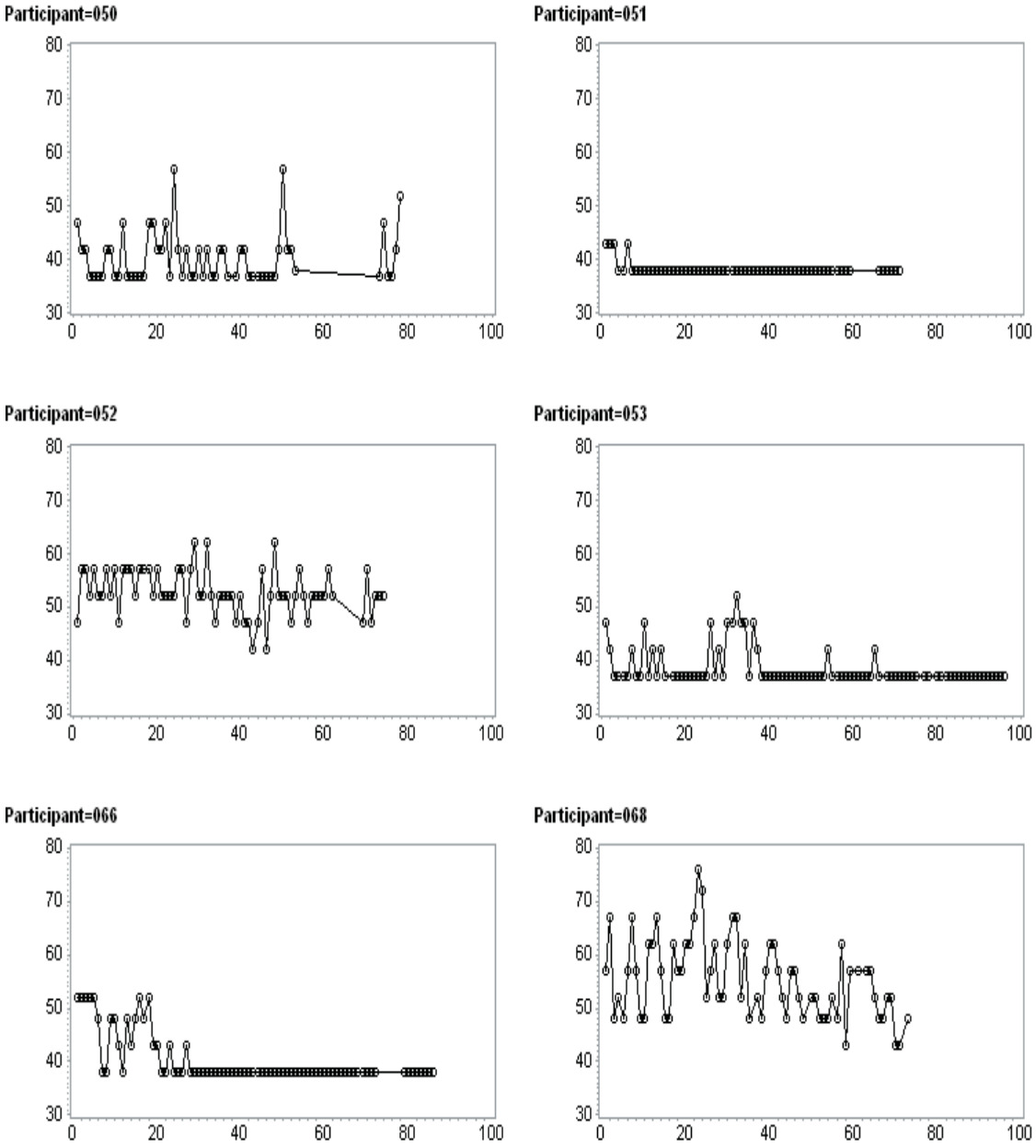

*Figure E9.*Trauma Symptom Checklist for Children, Fantasy subscale, T-score by week. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

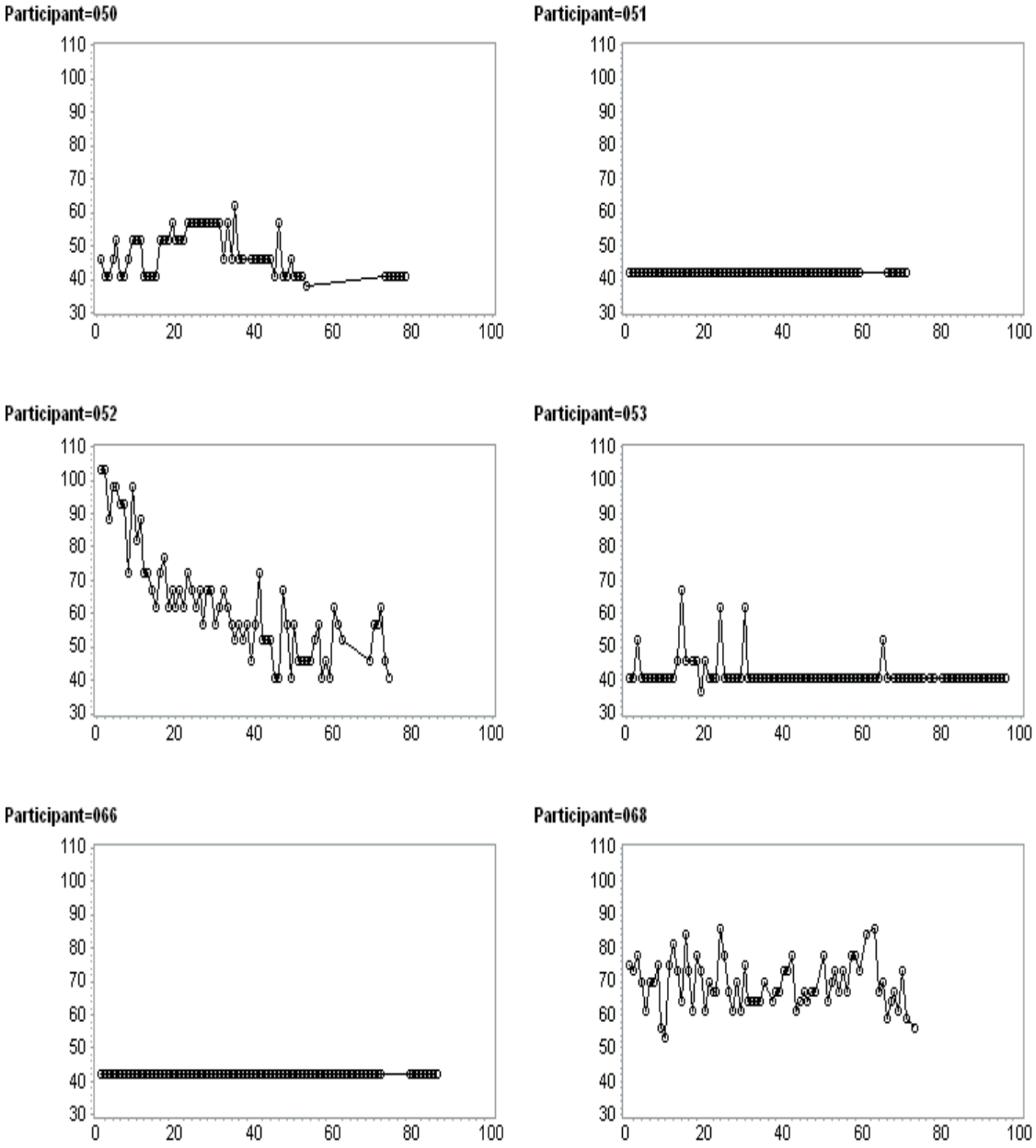

Figure E10. Trauma Symptom Checklist for Children, Sexual Concerns subscale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

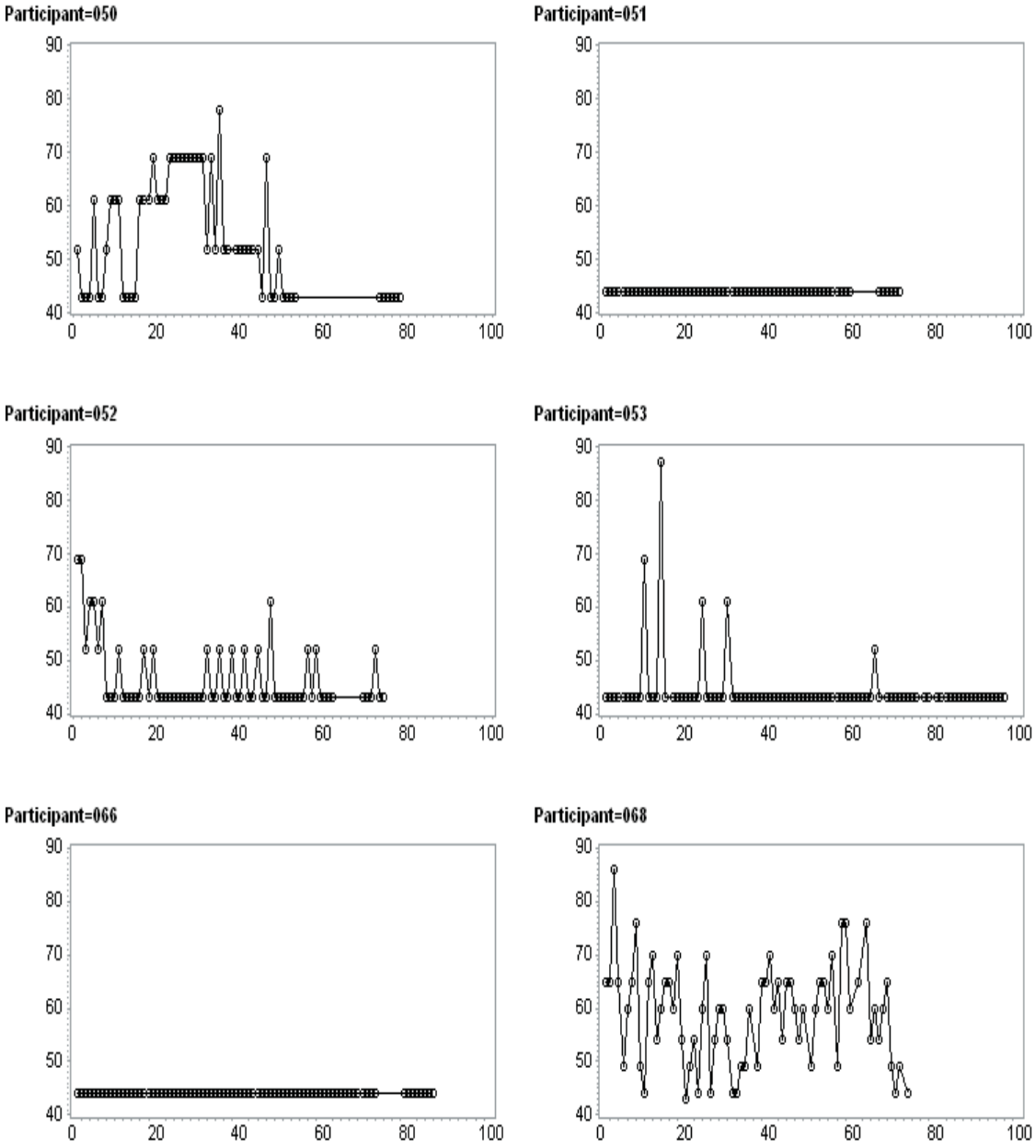

Figure E11. Trauma Symptom Checklist for Children, Sexual Distress subscale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

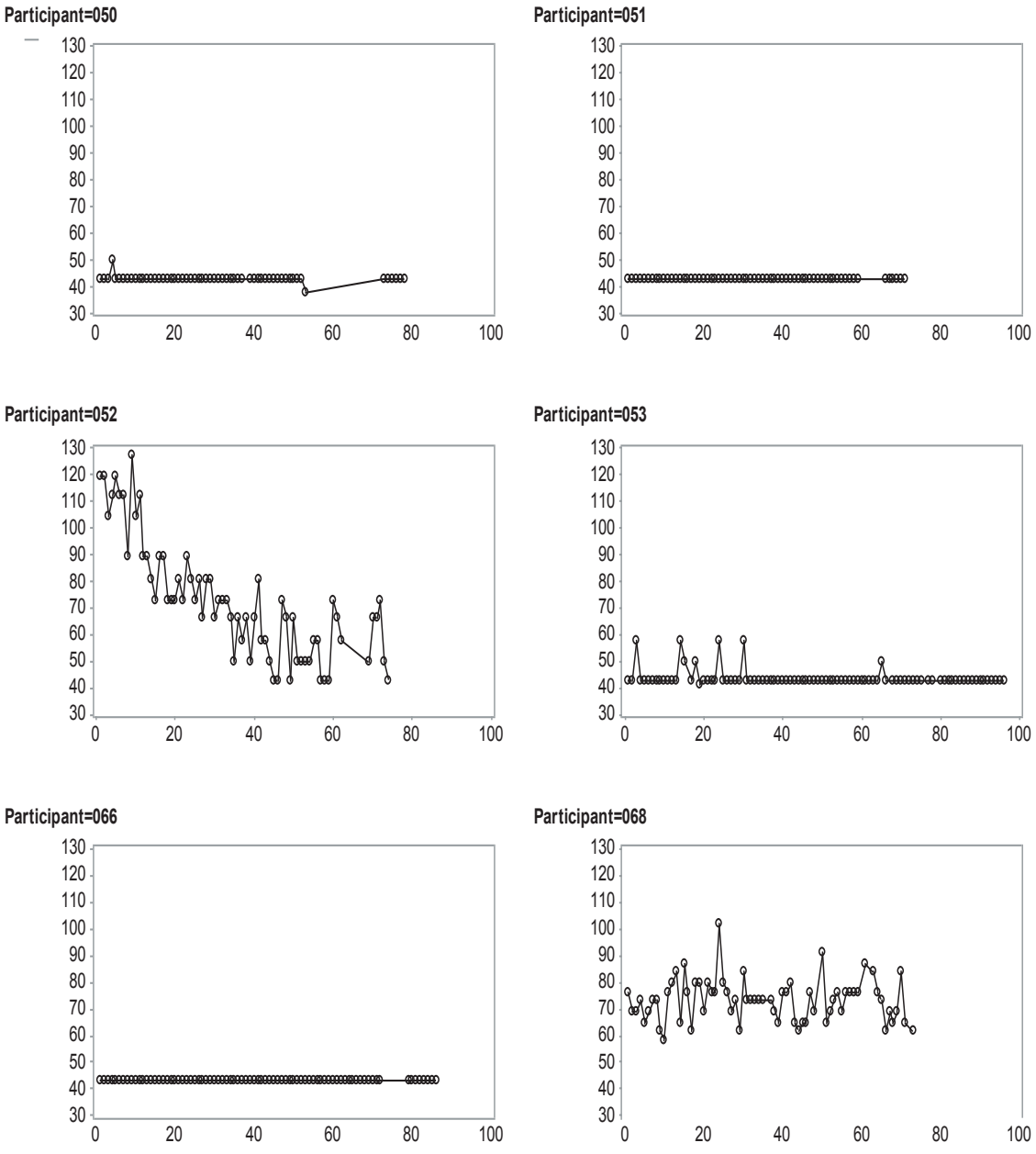

Figure E12. Trauma Symptom Checklist for Children, Sexual Preoccupation subscale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

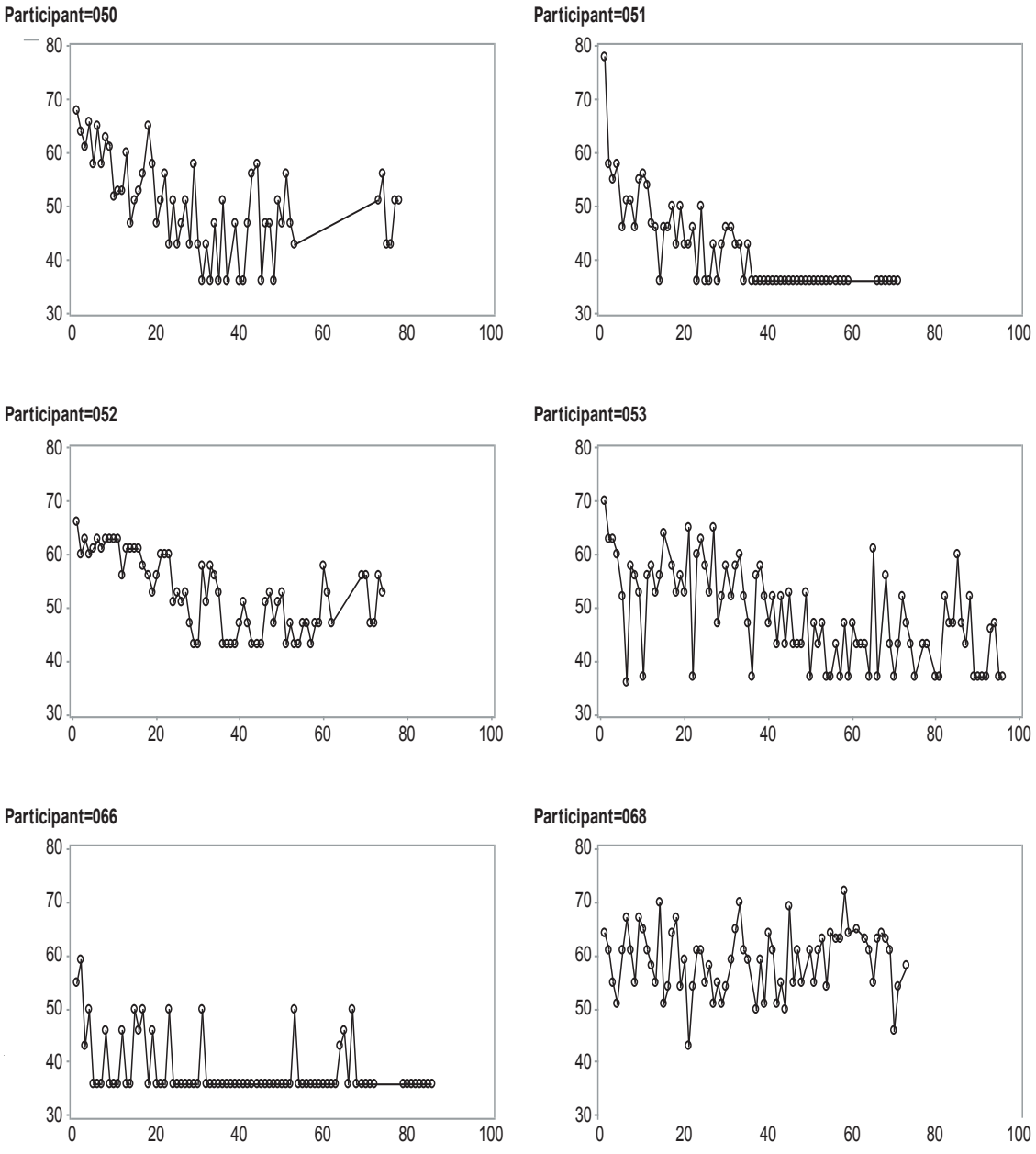

Figure E13. Brief Symptom Inventory, Somatization subscale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

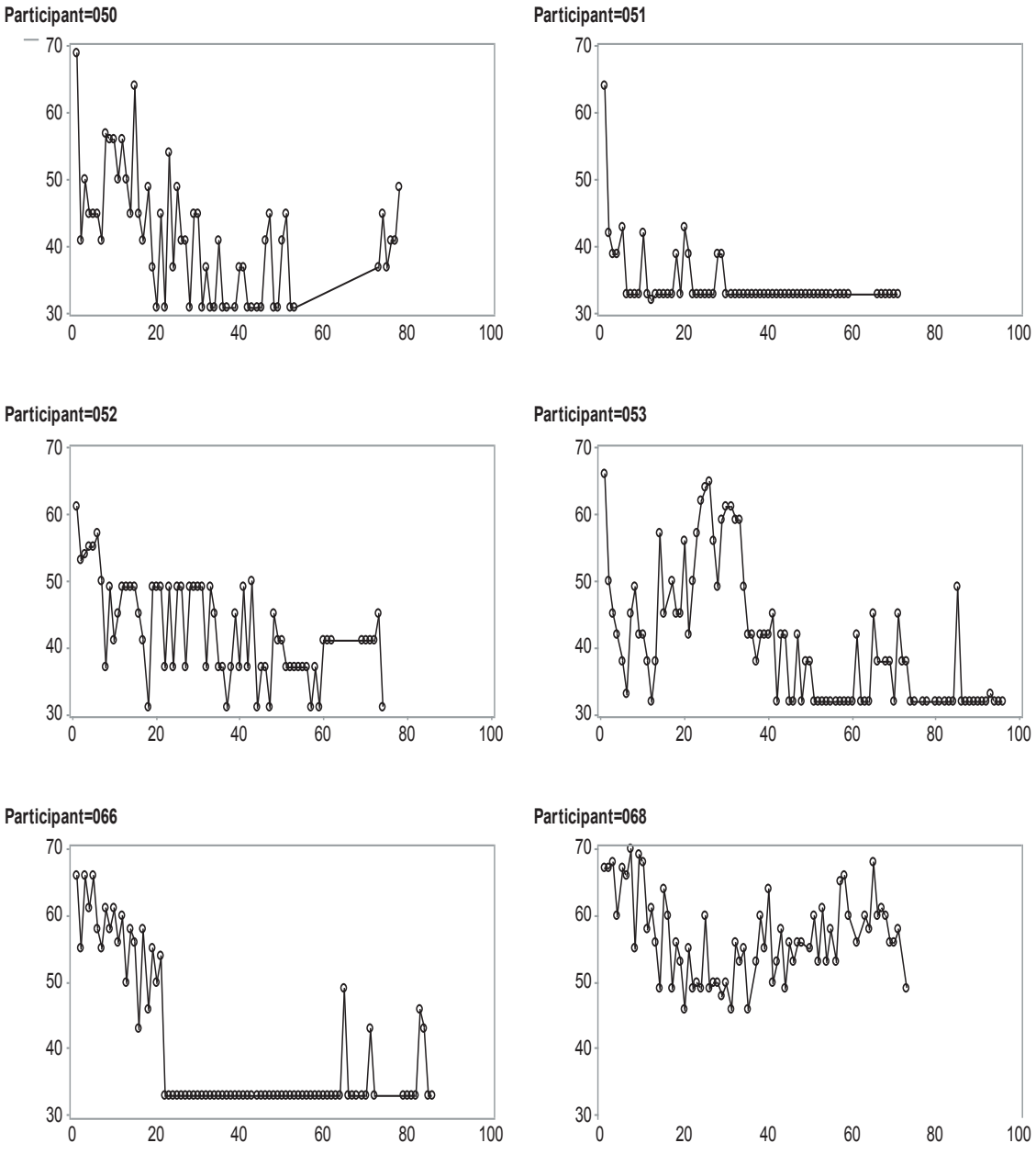

Figure E14. Brief Symptom Inventory, Obsessive Compulsive subscale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

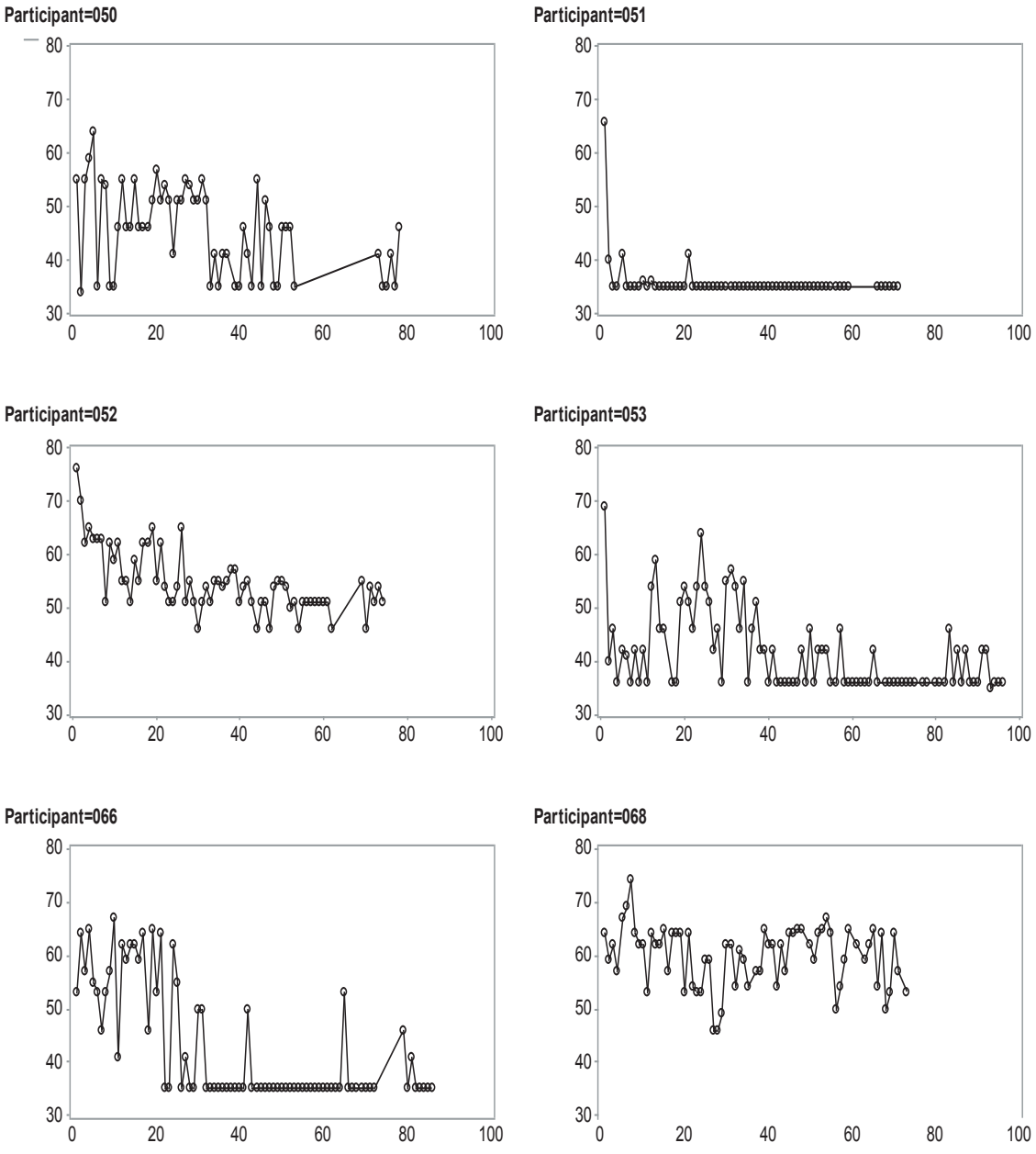

Figure E15. Brief Symptom Inventory, Interpersonal Sensitivity subscale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

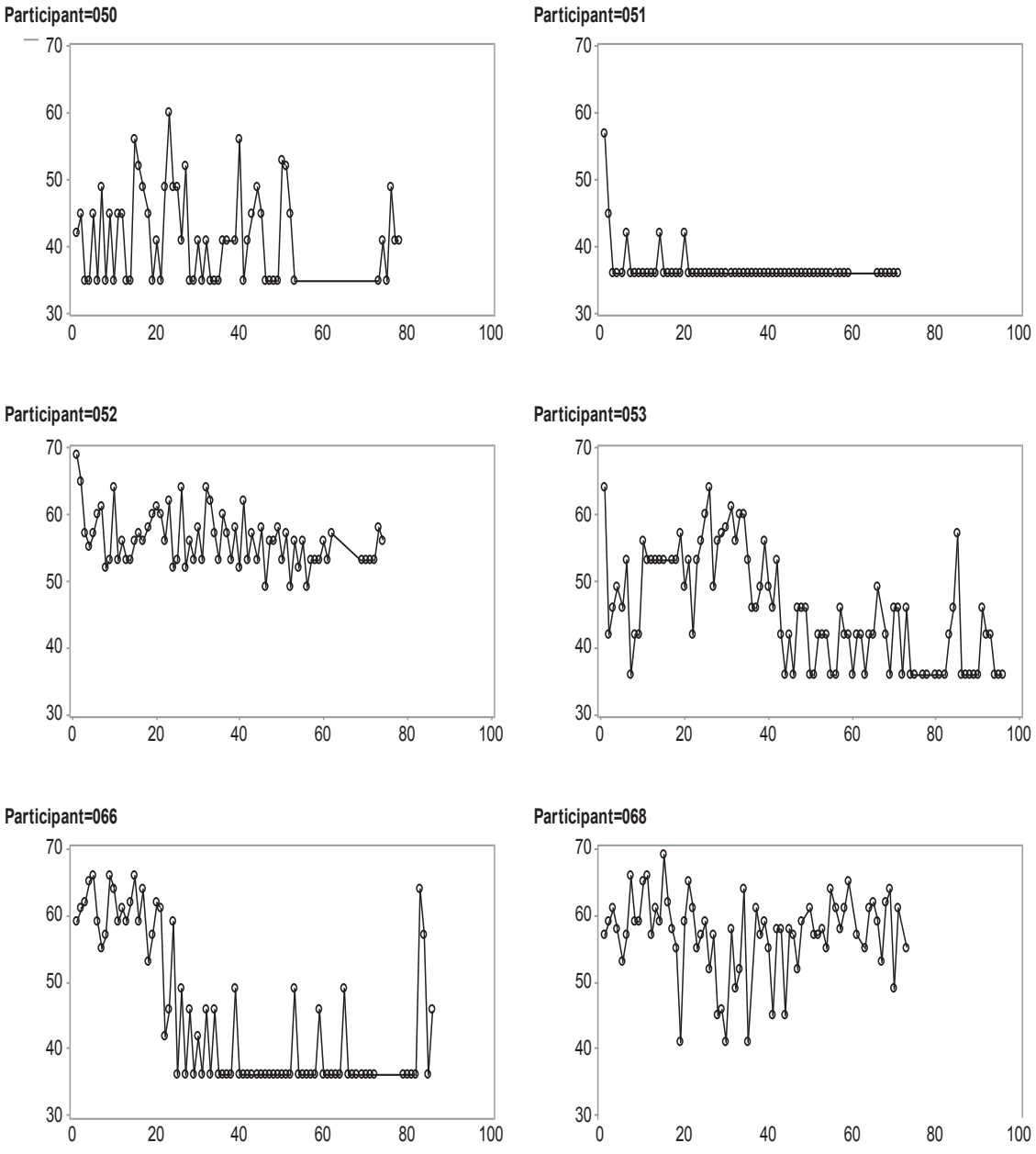

Figure E16. Brief Symptom Inventory, Depression subscale, T-score by week. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

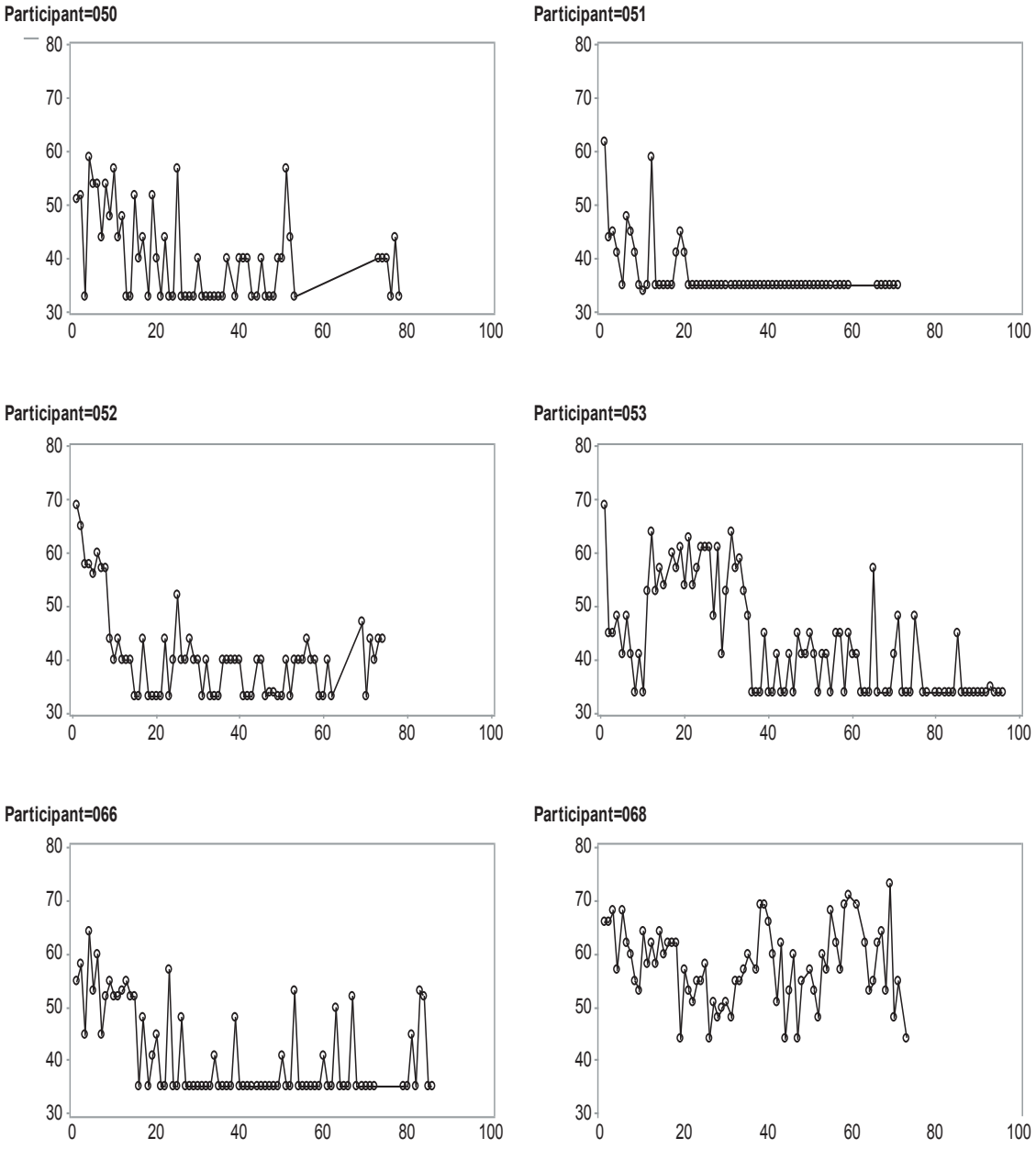

Figure E17. Brief Symptom Inventory, Anxiety subscale, T-score by week. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

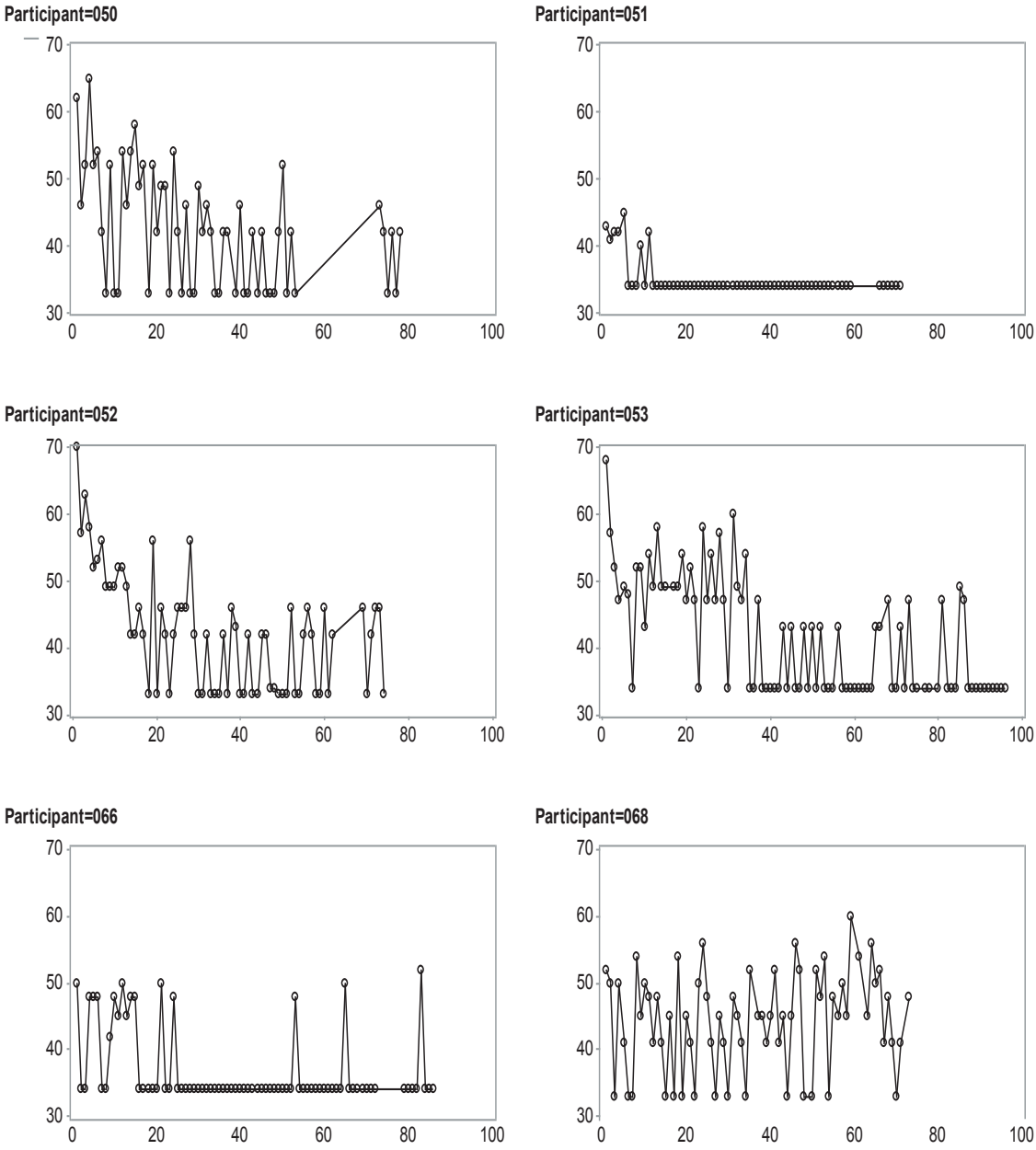

Figure E18. Brief Symptom Inventory, Hostility subscale, T-score by week. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

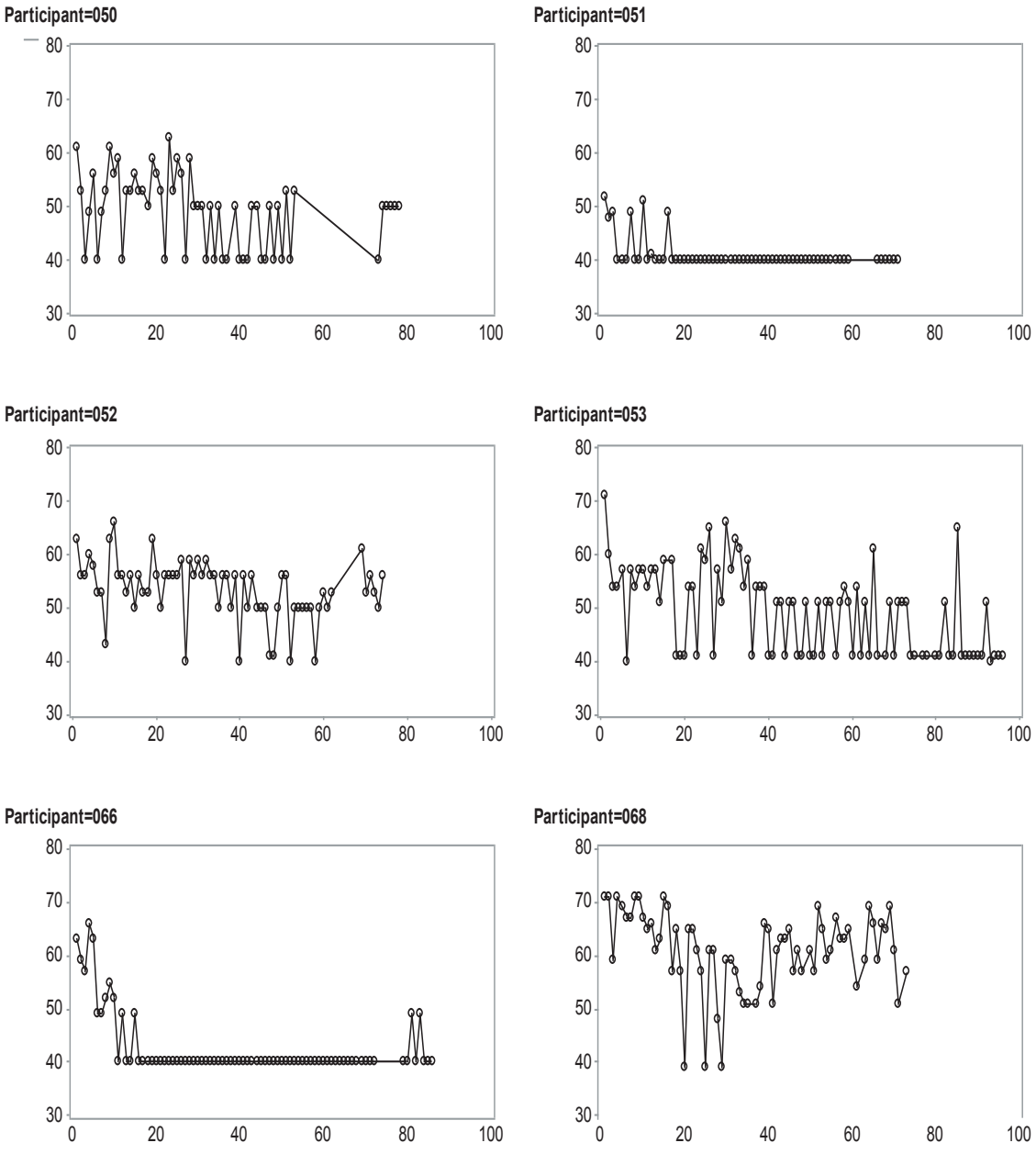

Figure E19. Brief Symptom Inventory, Phobias subscale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

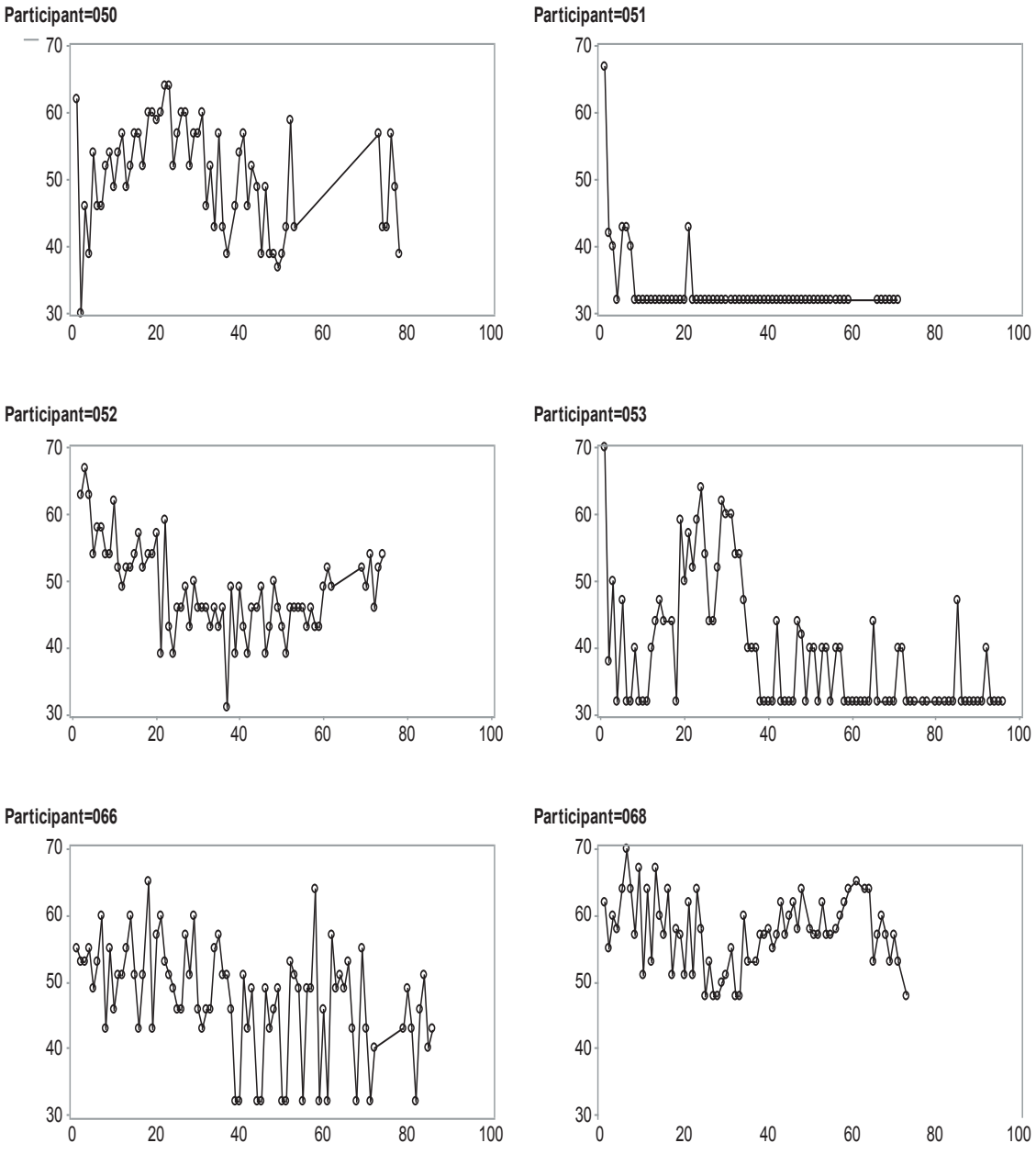

Figure E20. Brief Symptom Inventory, Paranoid Ideation subscale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

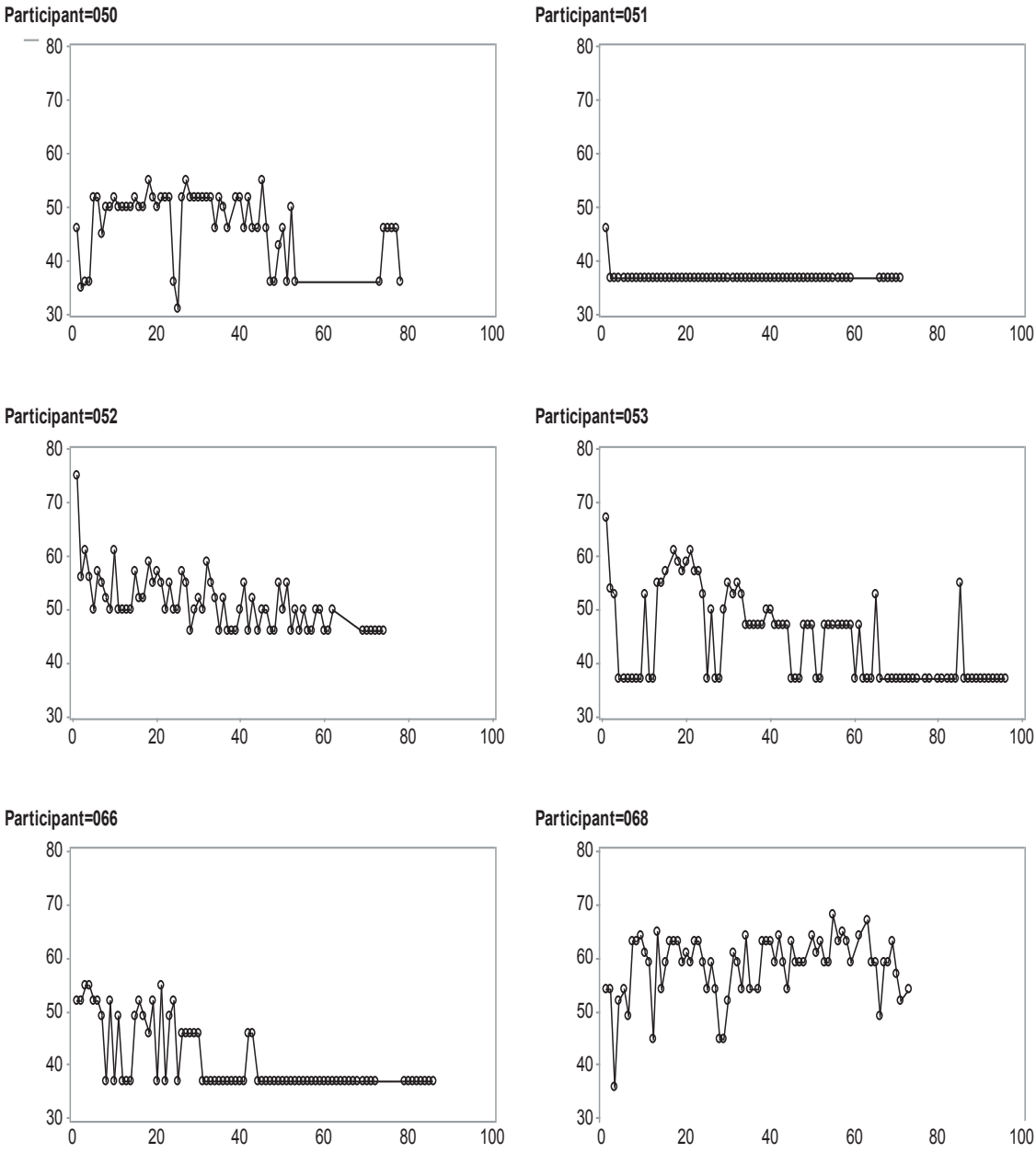

Figure E21. Brief Symptom Inventory, Psychotic Thinking subscale. The y-axis represents scale *t*-score and the x-axis is visit week number, for the six participants.

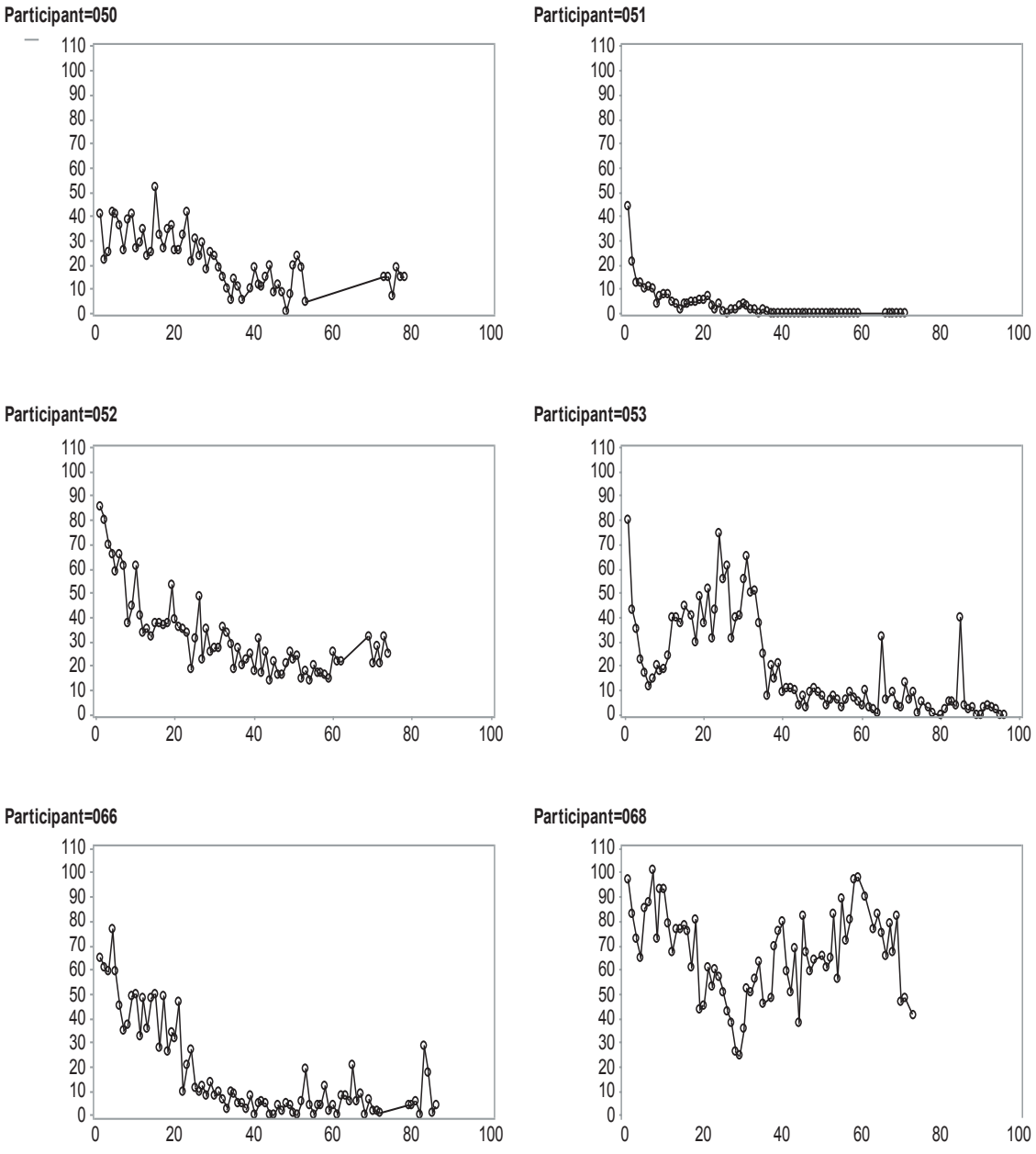

Figure E22. Brief Symptom Inventory, sum of 53 item values, by week. The y-axis represents the sum of raw score values on the 53 BSI items and the x-axis is visit week number, for the six participants.

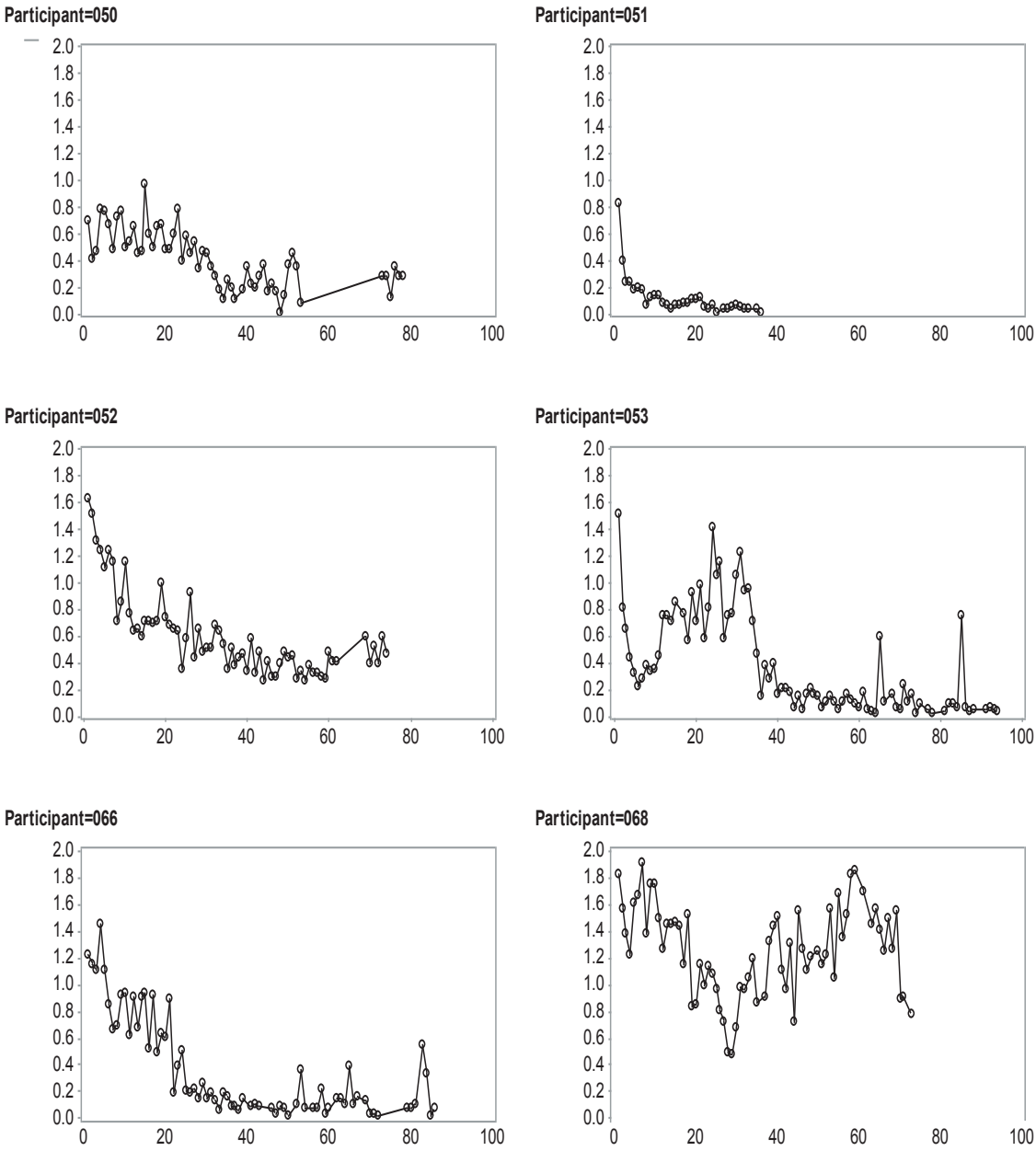

Figure E23. Brief Symptom Inventory, Global Severity Index (GSI). The y-axis represents the sum of 53 item values divided by the total number of responses (53) and the x-axis is visit week number, for the six participants.

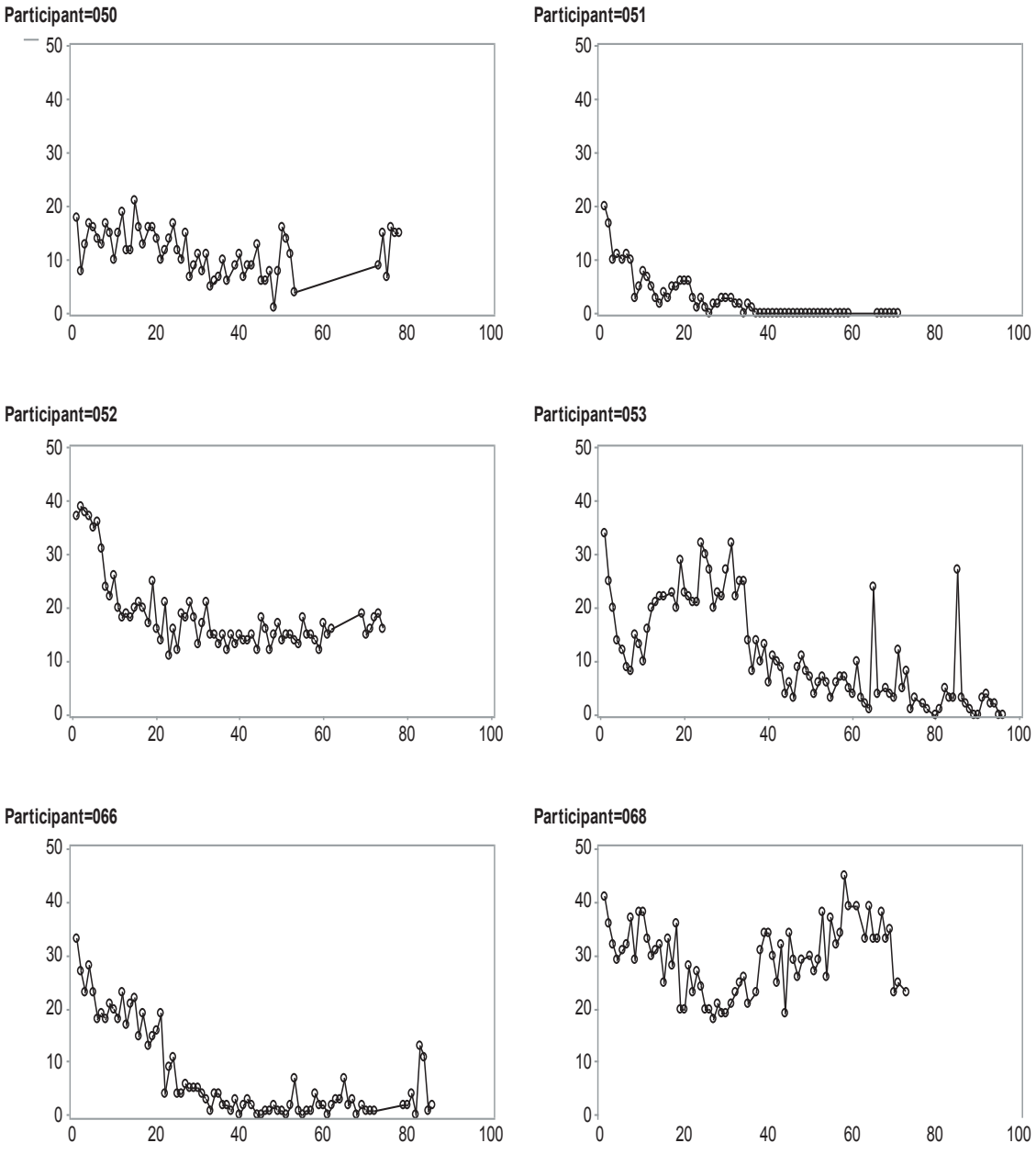

Figure E24. Brief Symptom Inventory, Positive Symptom Total (PST). The y-axis represents the count of items endorsed with a positive (nonzero) response and the x-axis is visit week number, for the six participants.

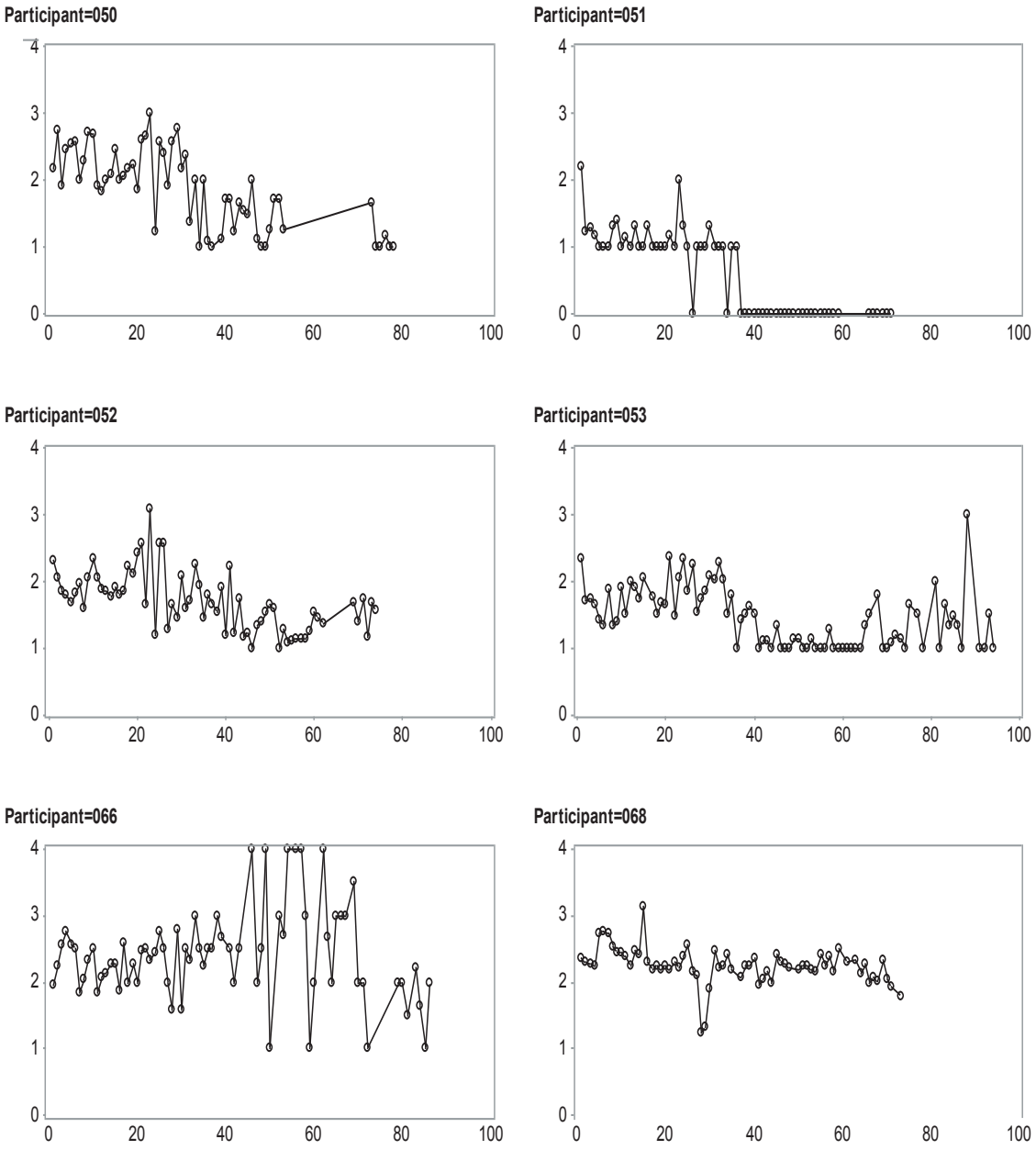

Figure E25. Brief Symptom Inventory, Positive Symptom Distress Index (PSDI). The y-axis represents the sum of 53 item values divided by the PST and the x-axis is visit week number, for the six participants.

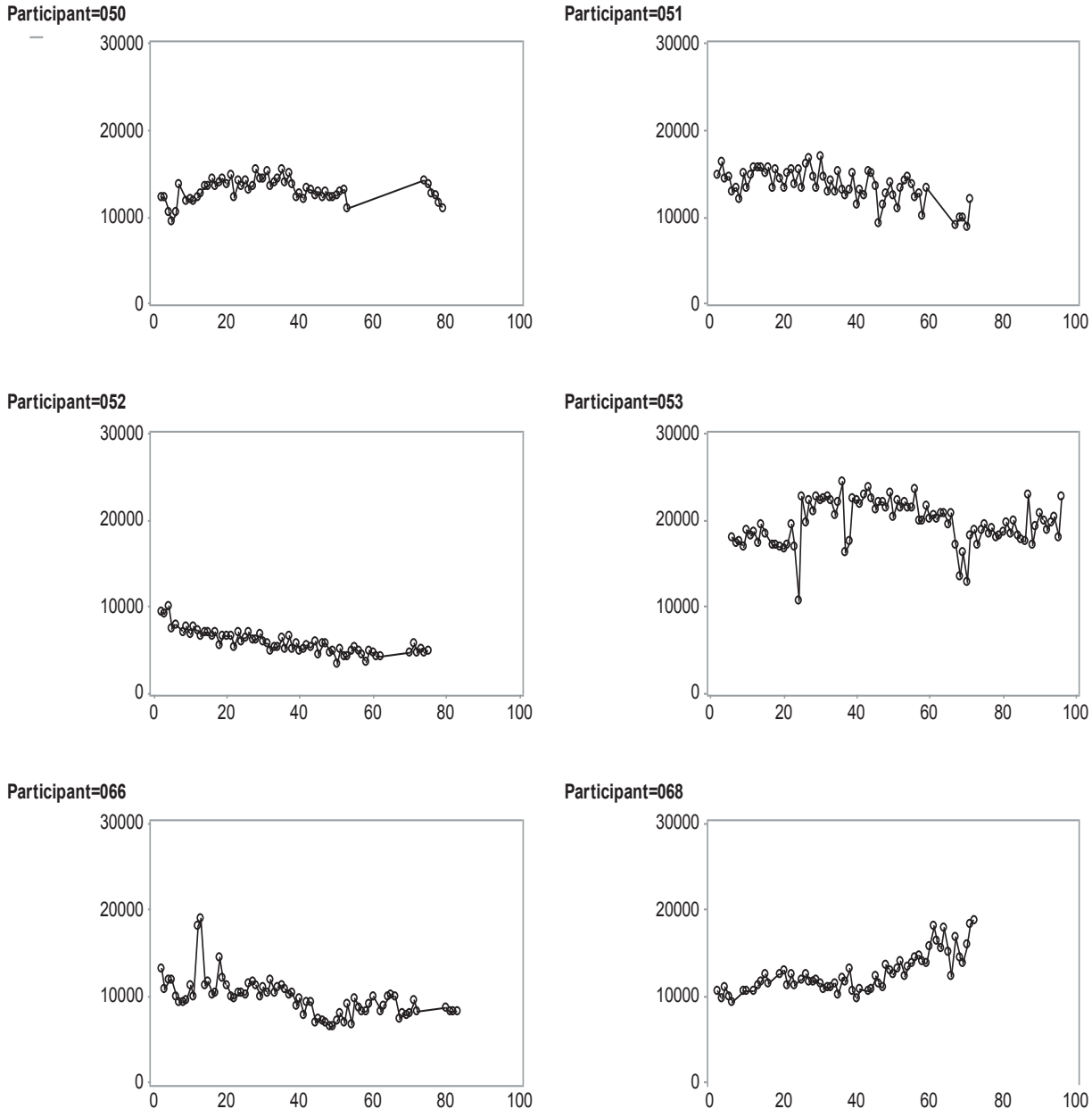

Figure E26. Activity, 24-hour mean. The y-axis represents total daily activity level in volts per 24 hours, averaged by week, and the x-axis is visit week number, for the six participants.

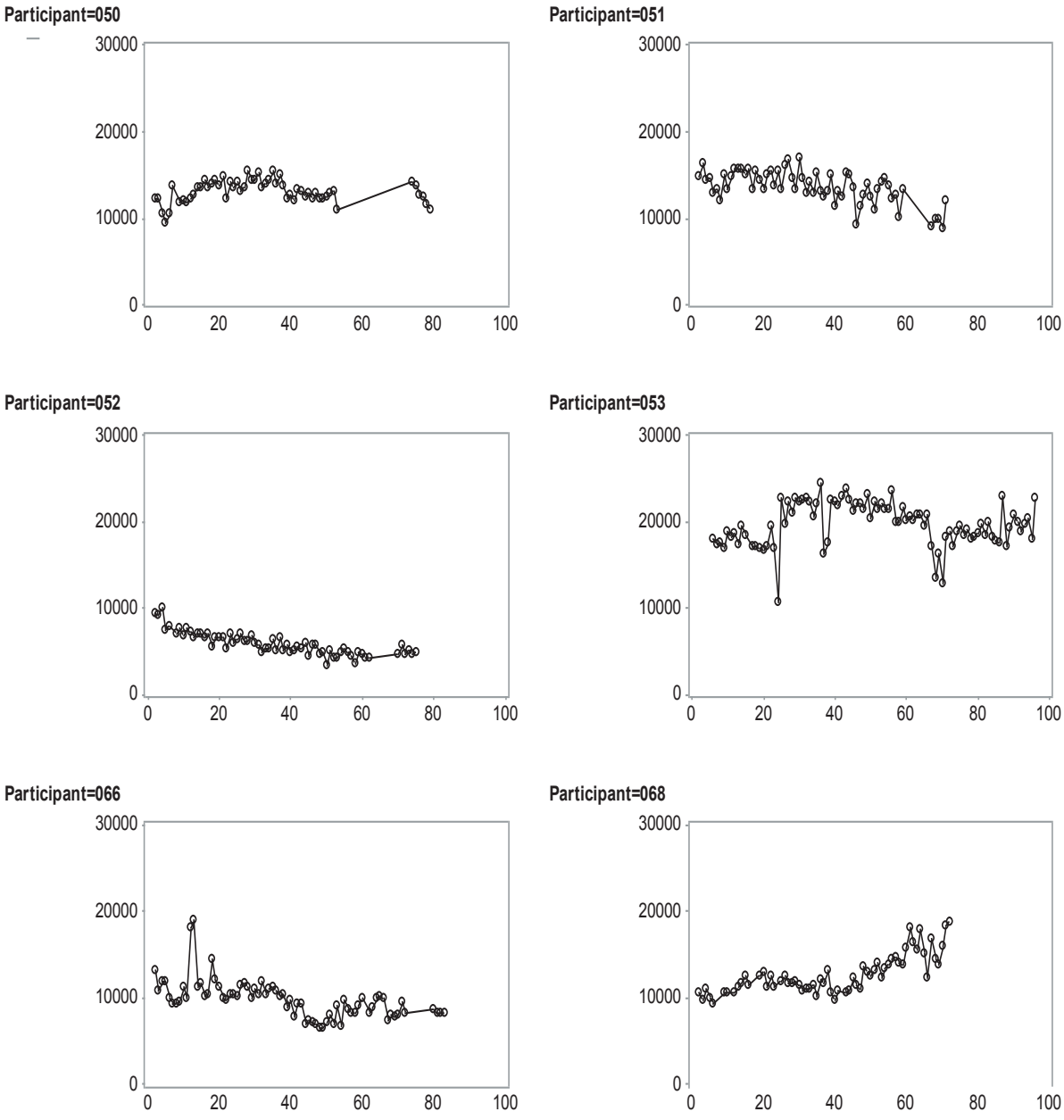

Figure E27. Activity, awake mean. The y-axis represents total daily activity during the portion of the day that the participant is awake, in volts per 24 hours, averaged by week, and the x-axis is visit week number, for the six participants.

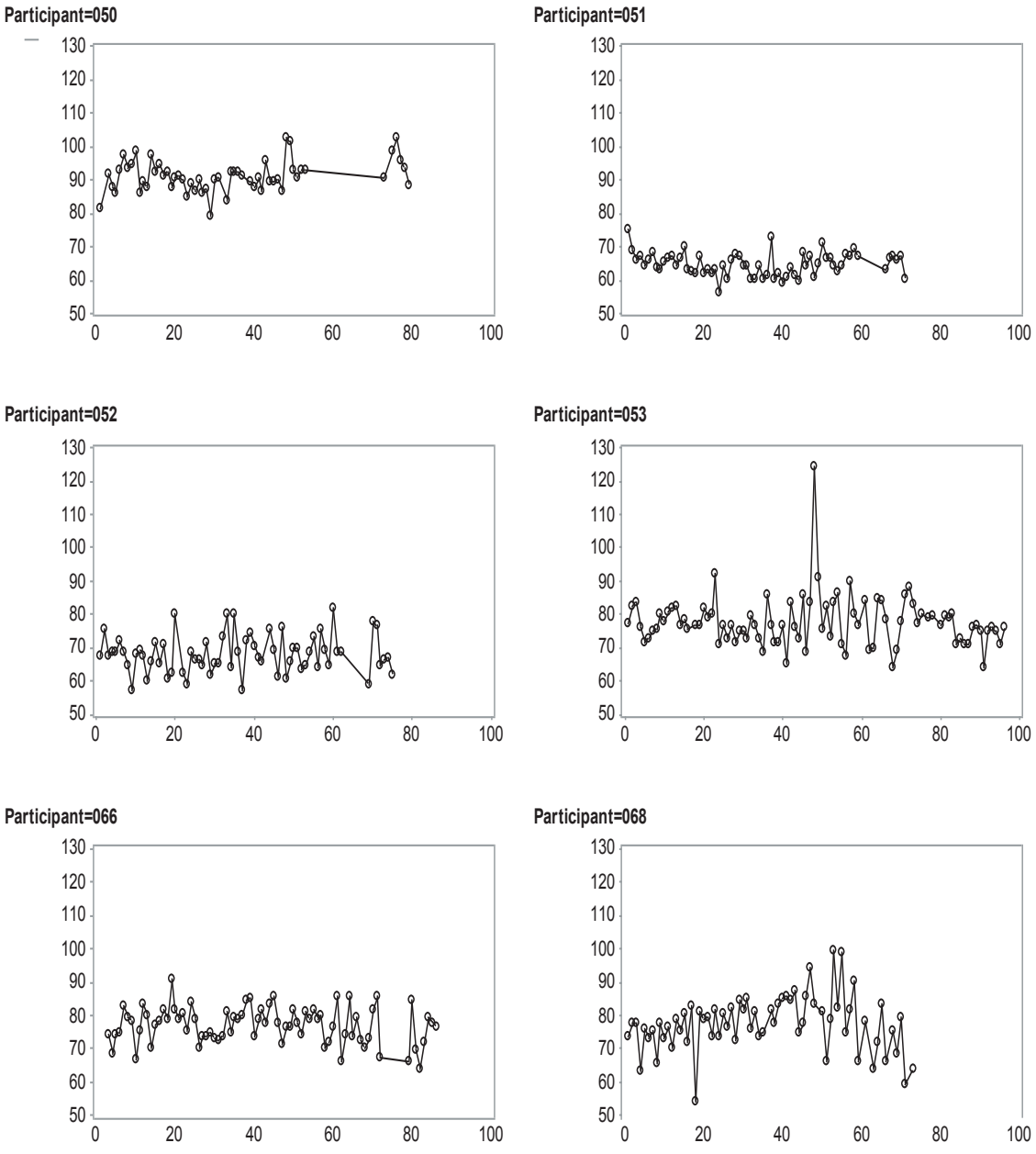

Figure E28. Diastolic blood pressure. The y-axis represents diastolic blood pressure in mmHg and the x-axis is visit week number, for the six participants.

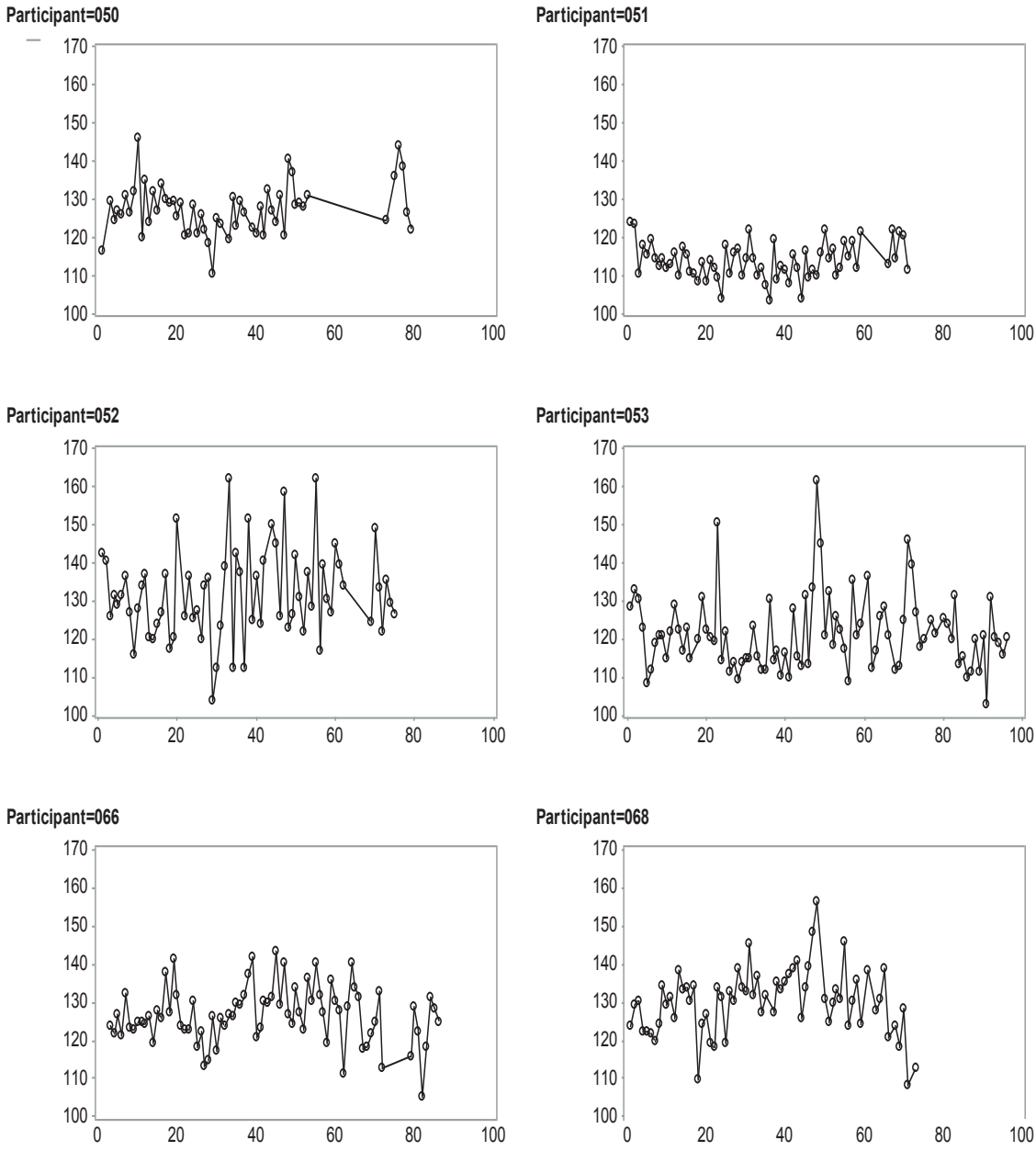

Figure E29. Systolic blood pressure. The y-axis represents systolic blood pressure in mmHg and the x-axis is visit week number, for the six participants.

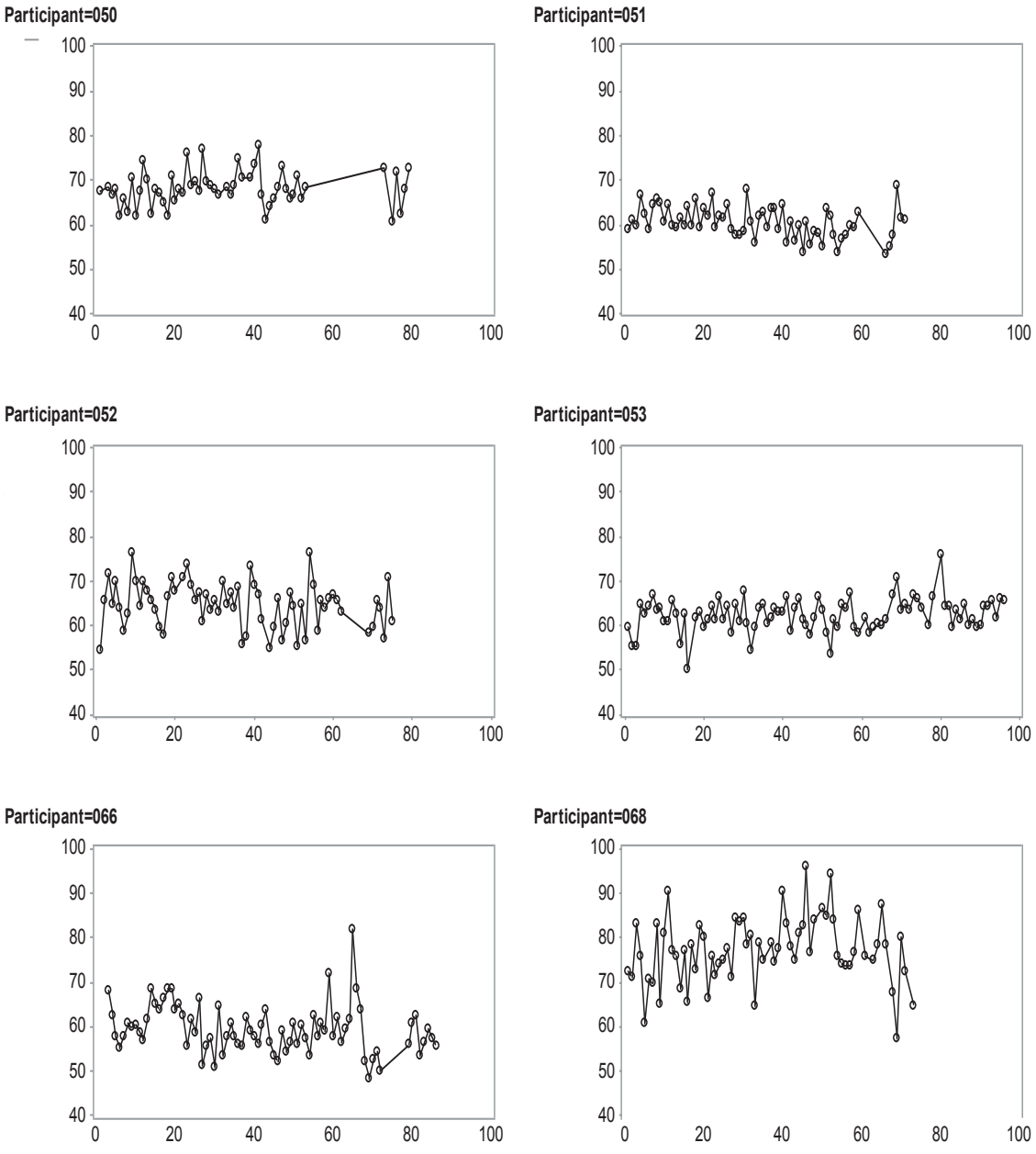

Figure E30. Heart rate (arm).The y-axis represents heart rate in beats per minute, taken by upper arm cuff, and the x-axis is visit week number, for the six participants.

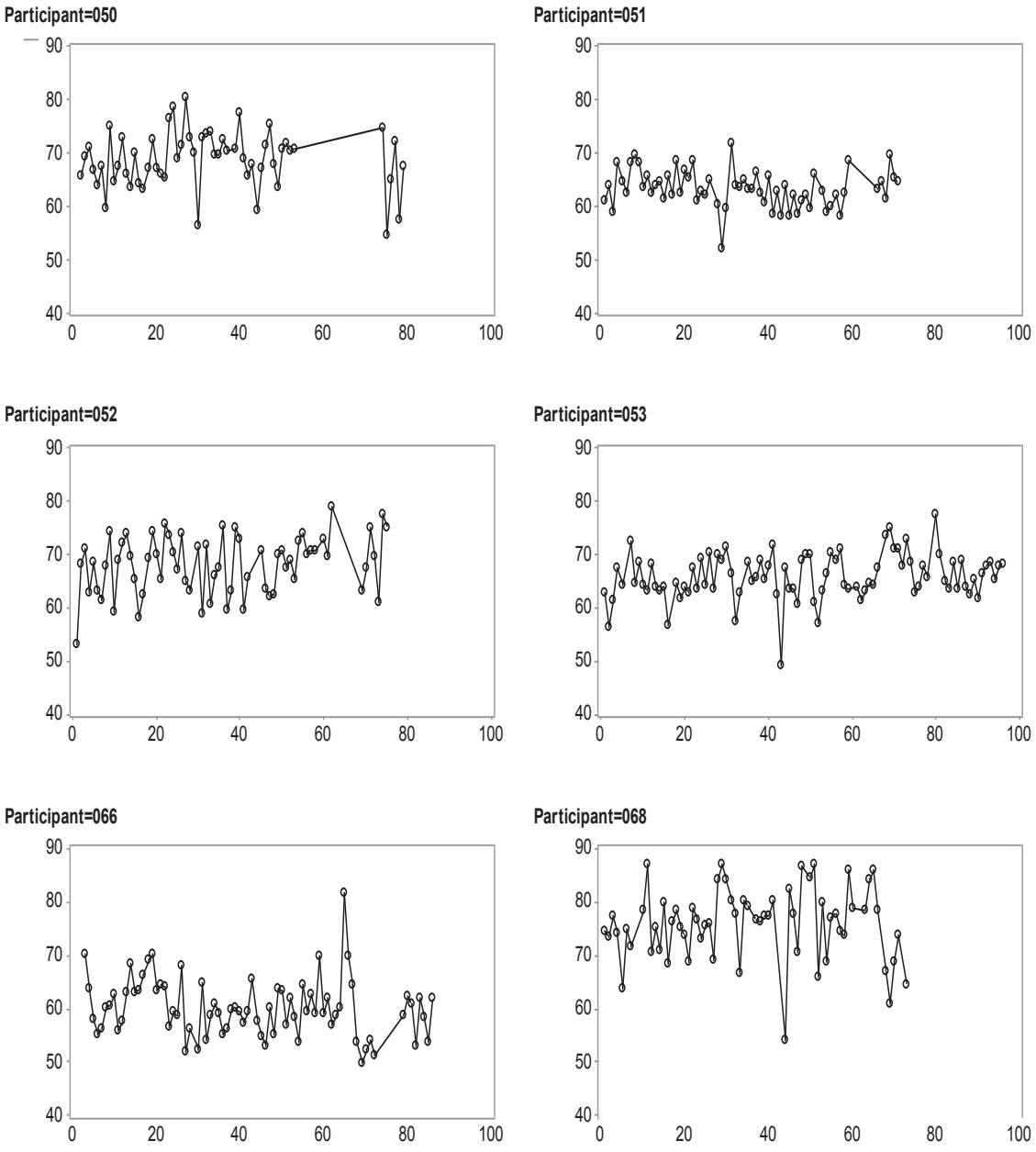

Figure E31. Heart rate (finger).The y-axis represents heart rate in beats per minute, taken by finger pulse plethysmograph, and the x-axis is visit week number, for the six participants.

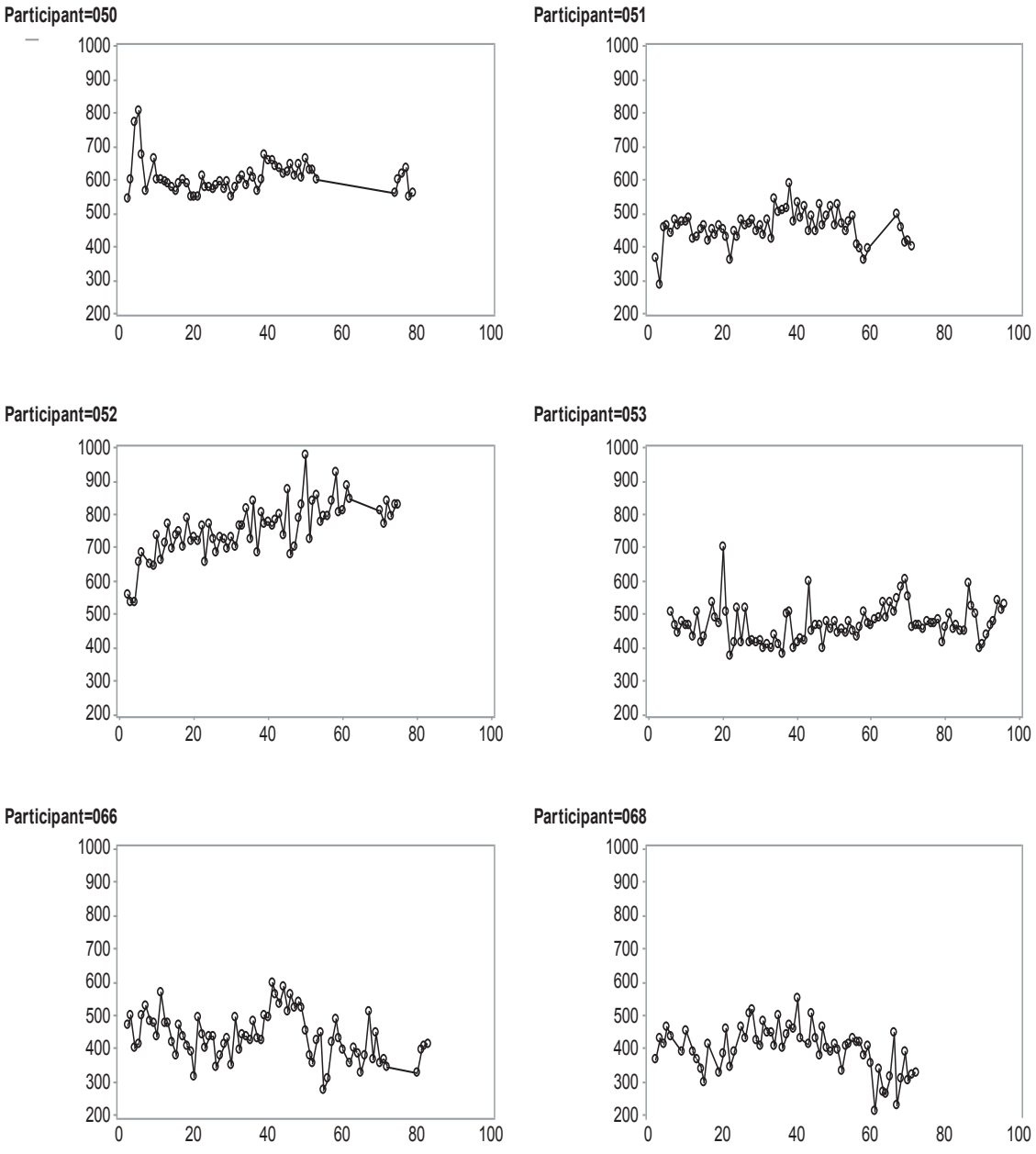

Figure E32. Sleep, 24-hour mean. The y-axis represents total daily sleep in minutes per 24 hours, averaged by week, and the x-axis is visit week number, for the six participants.

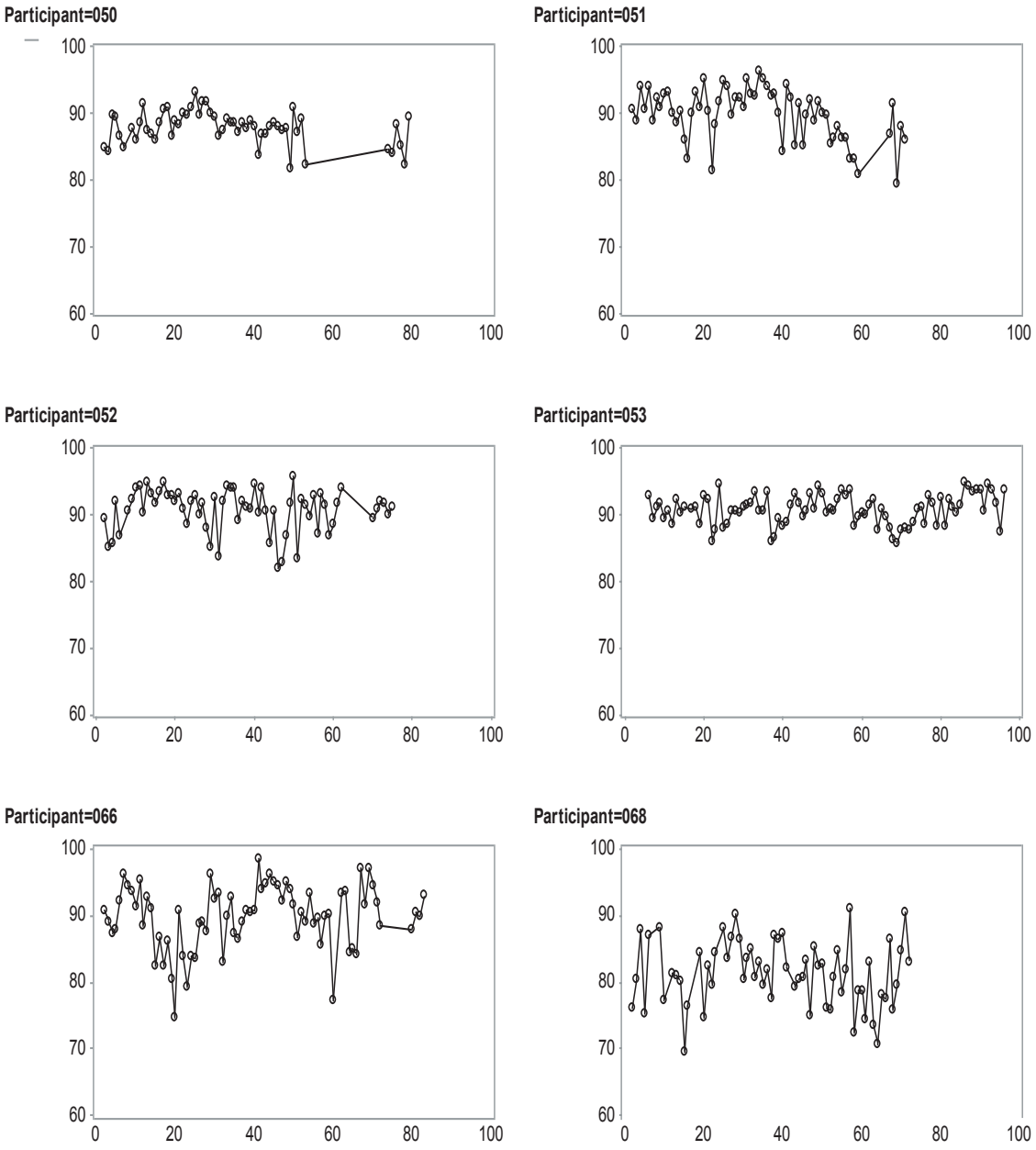

Figure E33. Sleep efficiency. The y-axis represents percentage of *down time* spent in sleep, averaged by week, and the x-axis is visit week number, for the six participants.

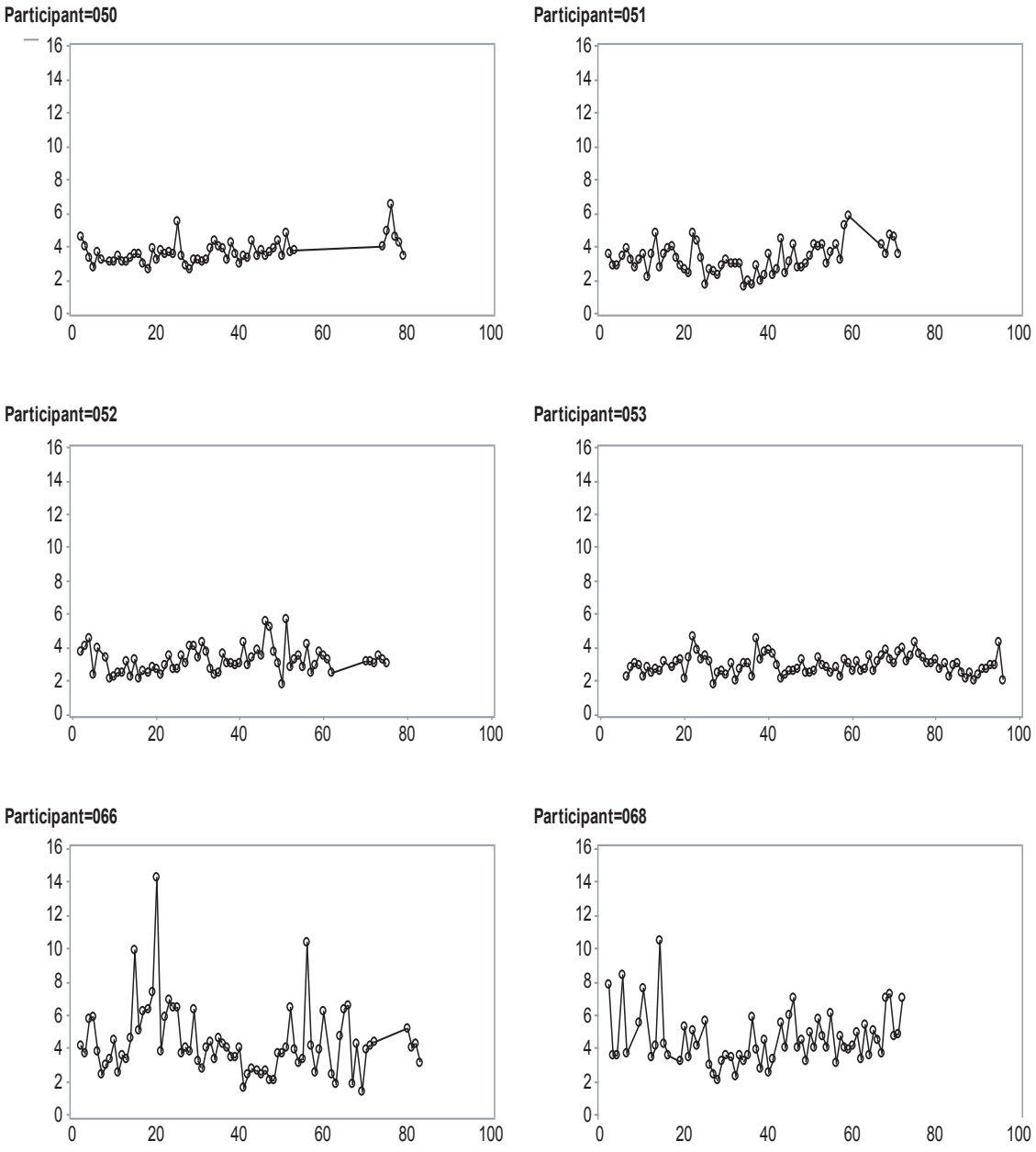

Figure E34. Sleep fragmentation index. The y-axis represents the number of brief arousals from sleep per hour, averaged by week, and the x-axis is visit week number, for the six participants.

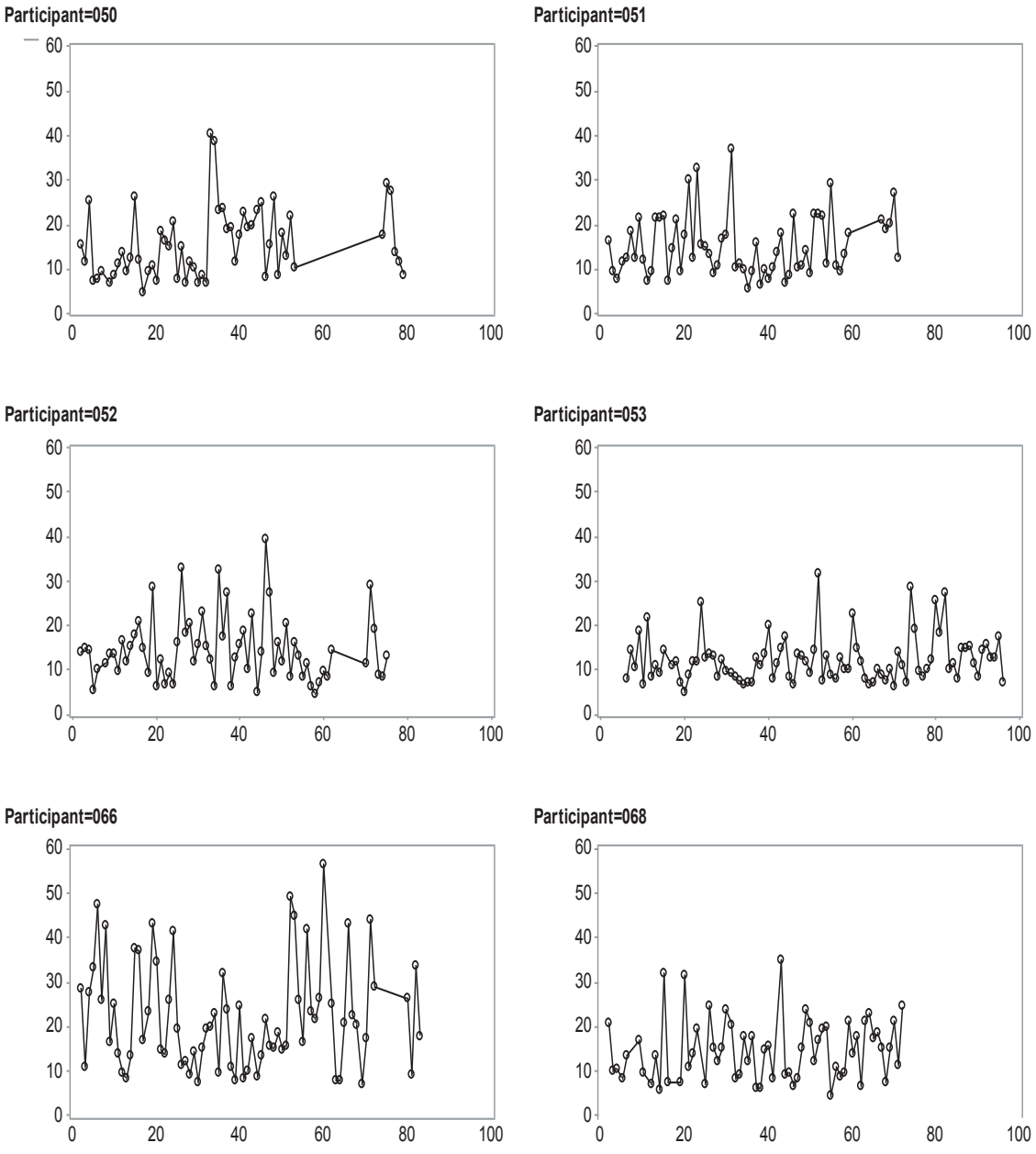

Figure E35. Sleep latency. The y-axis represents the number of minutes to complete transition from awake to sleep, averaged by week, and the x-axis is visit week number, for the six participants.

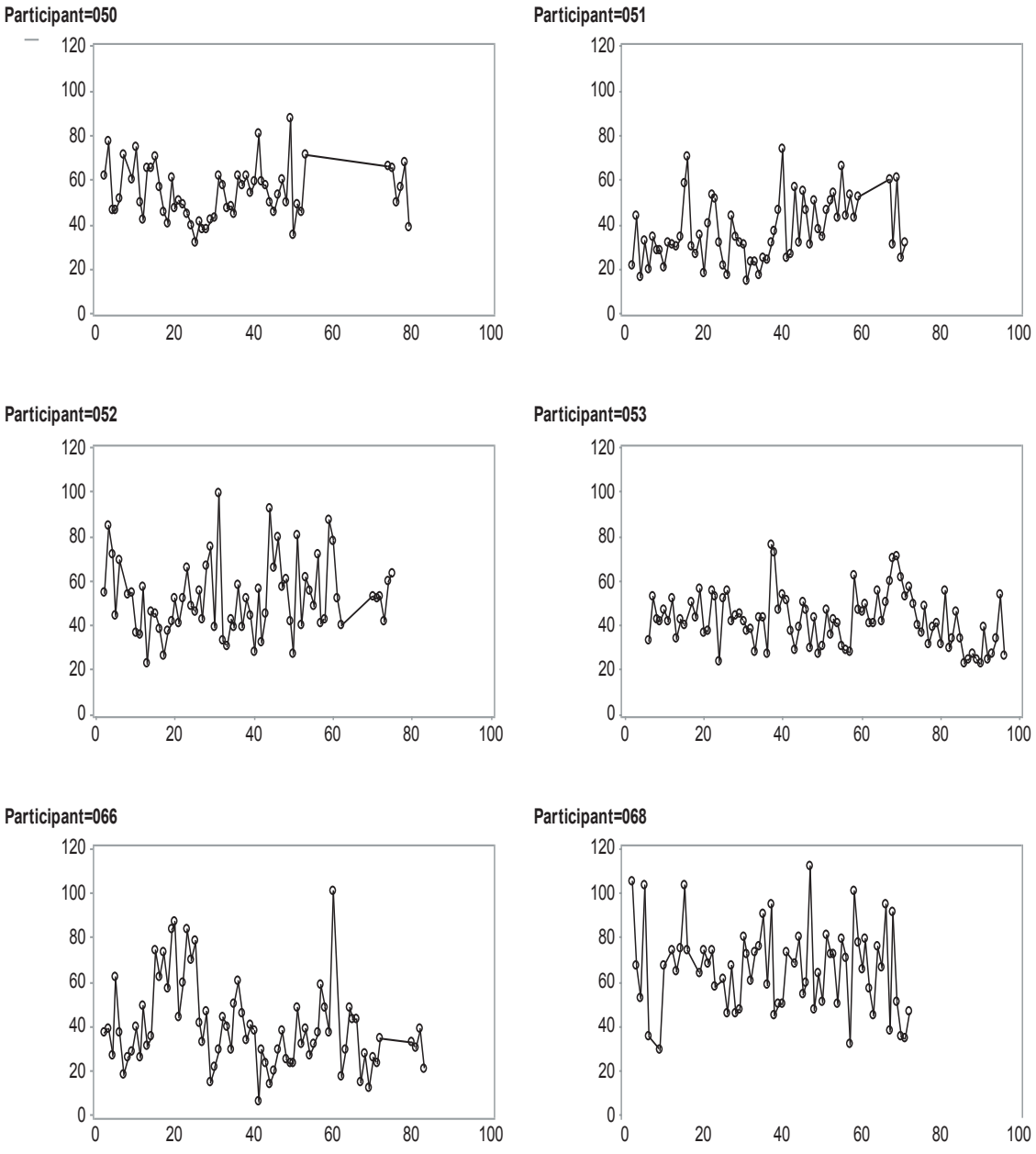

Figure E36. Sleep, wake after sleep onset. The y-axis represents the number of minutes awake from sleep onset to final awakening, averaged by week, and the x-axis is visit week number, for the six participants.

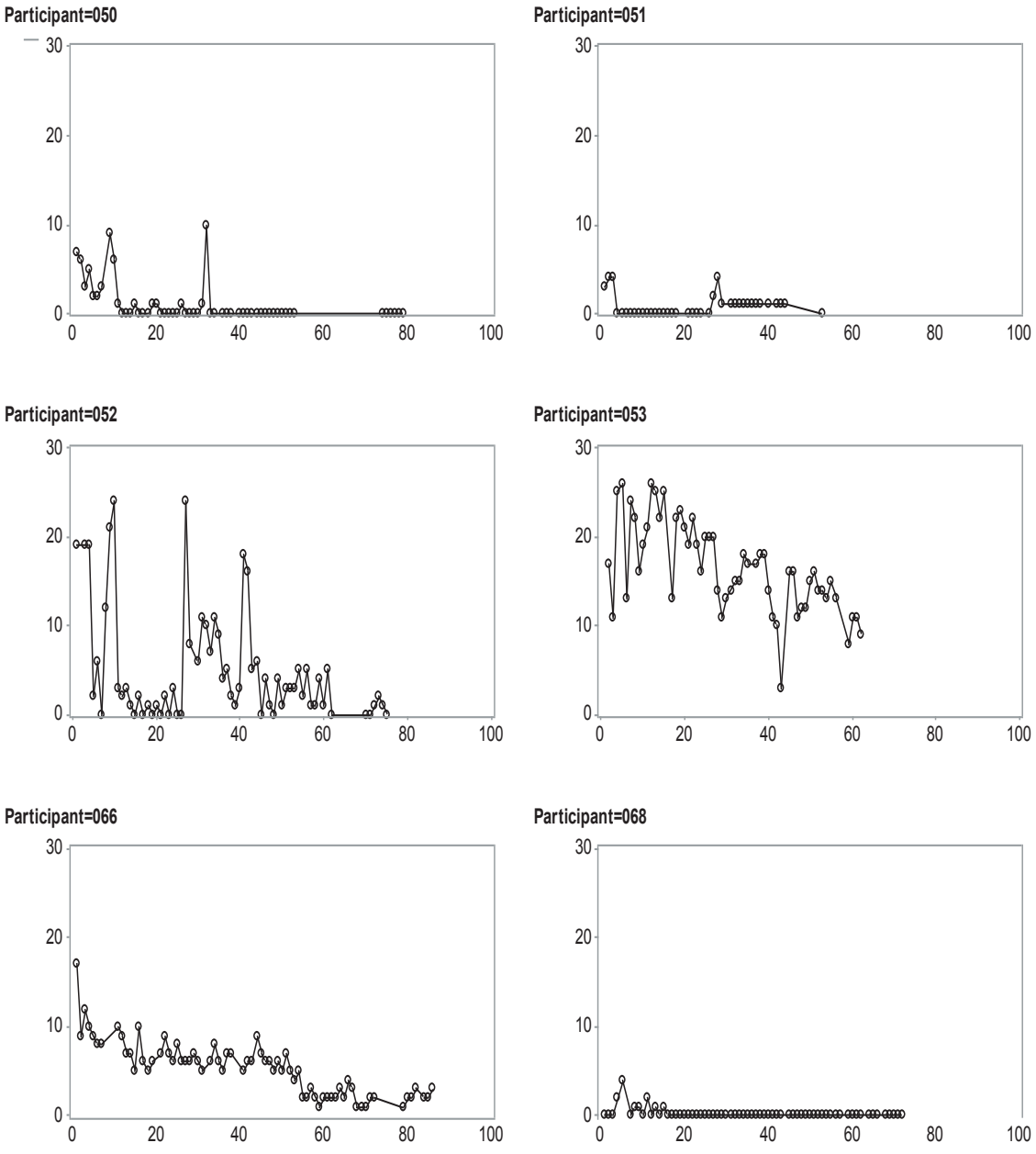

Figure E37. Aberrant Behavior Checklist, Irritability. The y-axis represents the weekly raw score on the Irritability subscale, and the x-axis is visit week number, for the six participants.

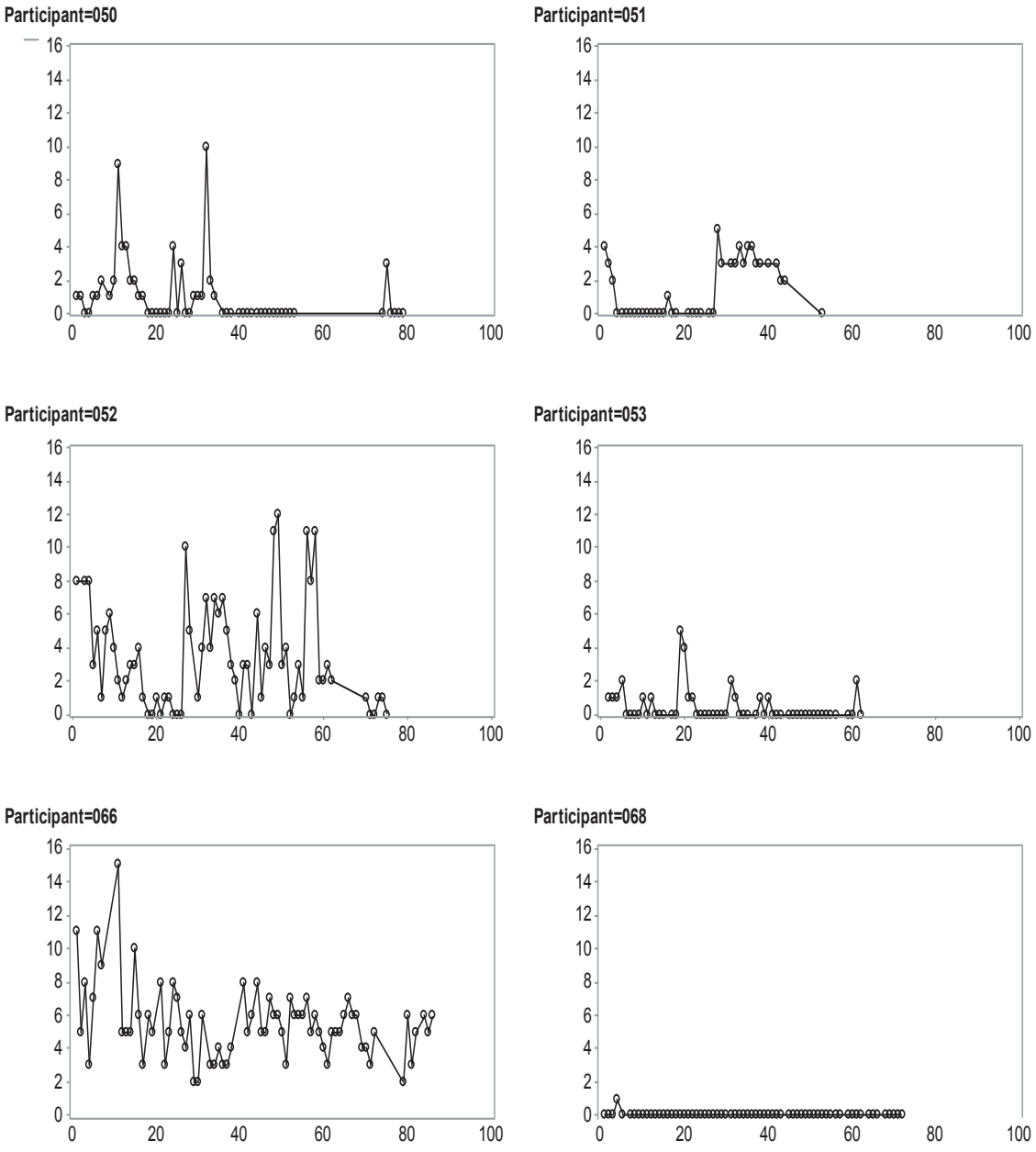

Figure E38. Aberrant Behavior Checklist, Lethargy. The y-axis represents the weekly raw score on the Lethargy subscale, and the x-axis is visit week number, for the six participants.

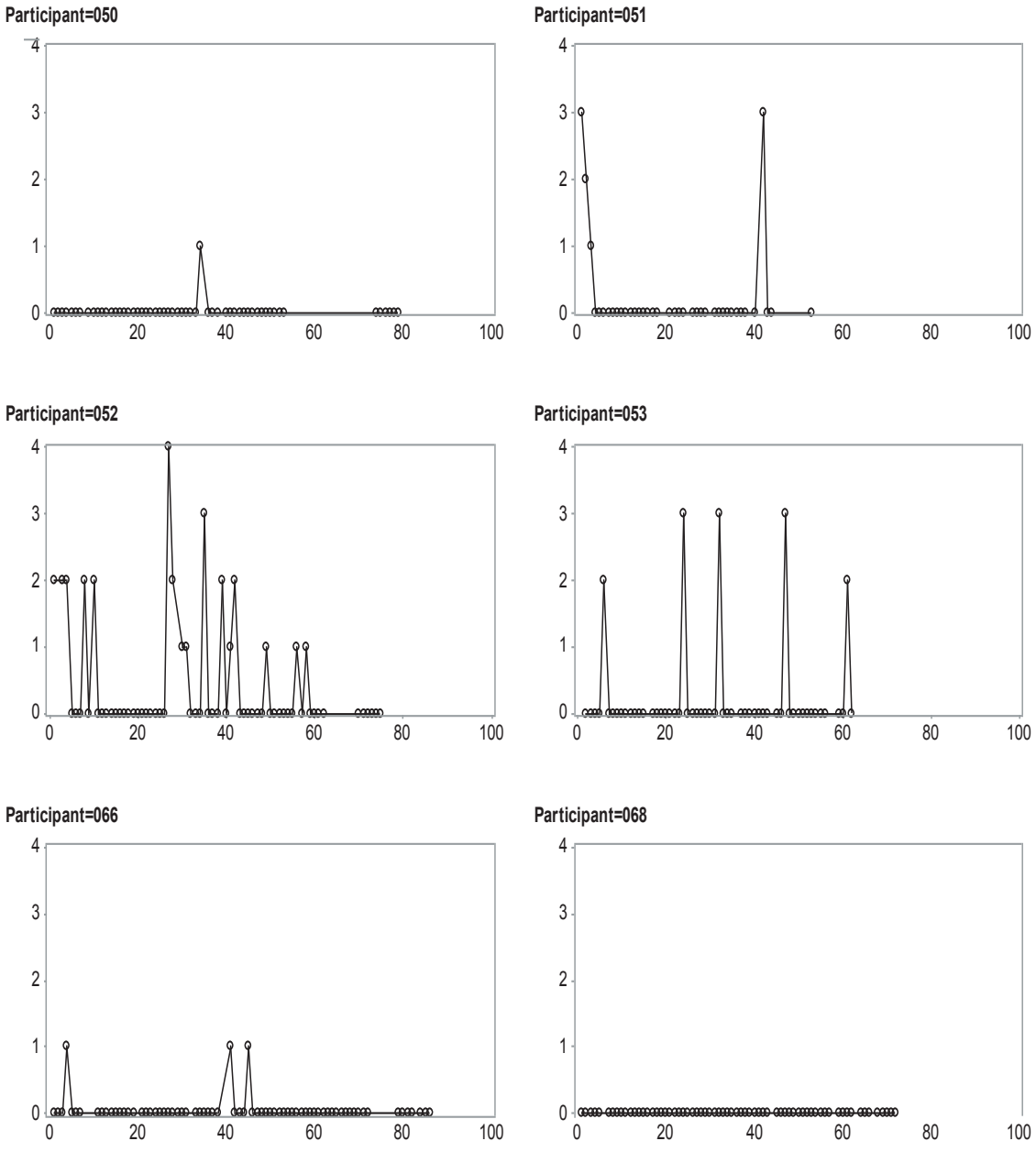

Figure E39. Aberrant Behavior Checklist, Stereotypy. The y-axis represents the weekly raw score on the Stereotypy subscale, and the x-axis is visit week number, for the six participants.

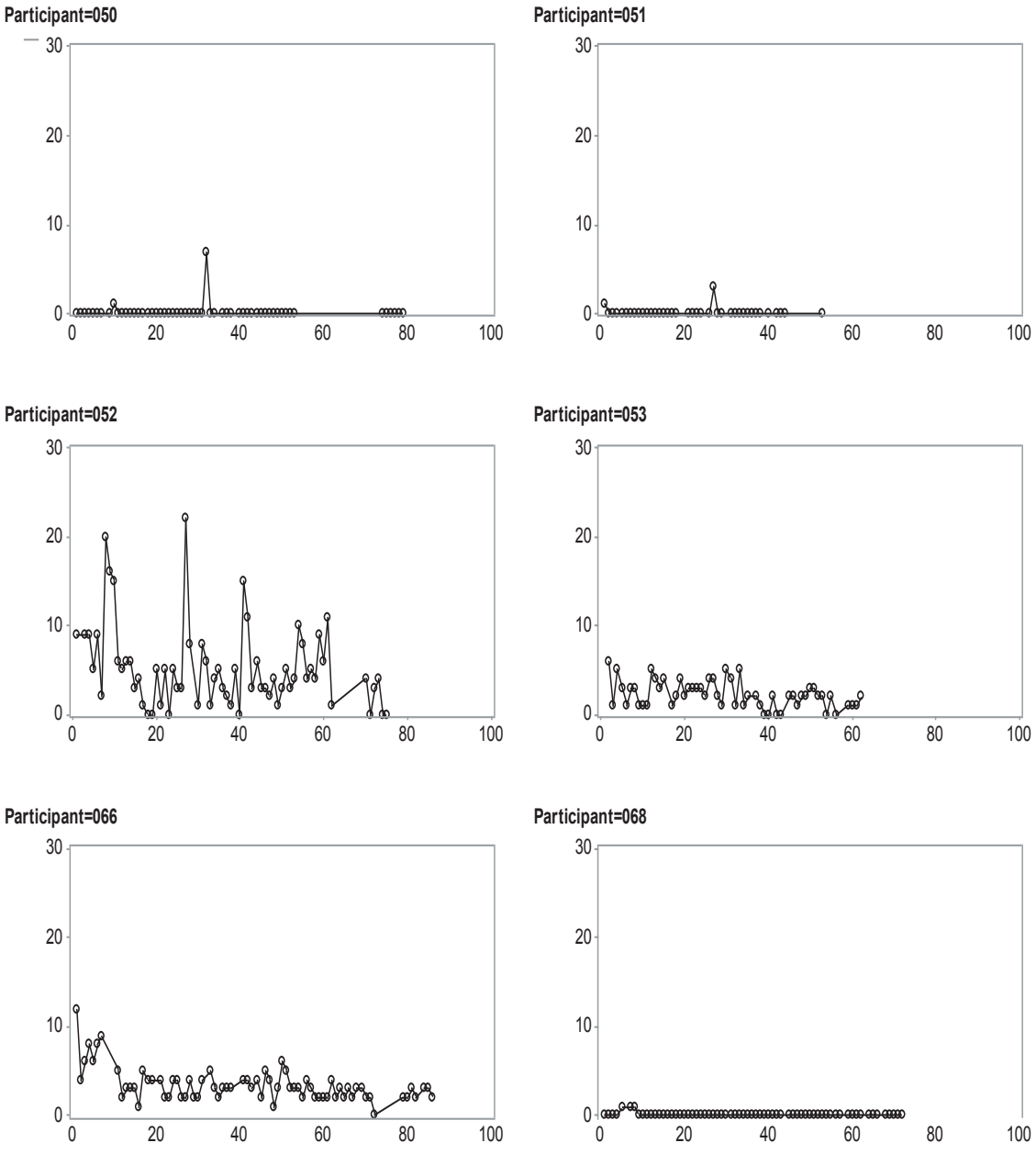

Figure E40. Aberrant Behavior Checklist, Hyperactivity. The y-axis represents the weekly raw score on the Hyperactivity subscale, and the x-axis is visit week number, for the six participants.

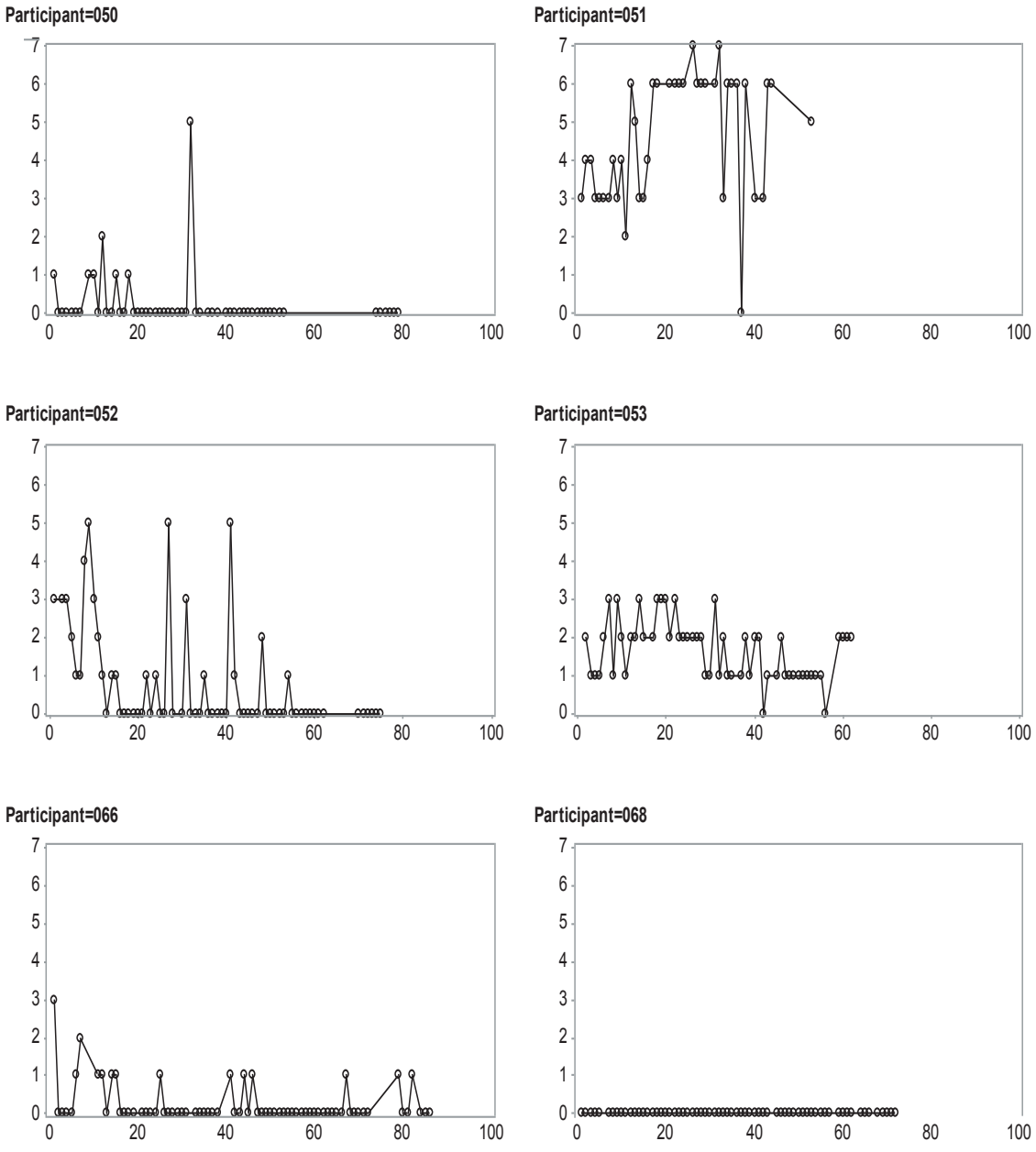

Figure E41. Aberrant Behavior Checklist, Inappropriate Speech. The y-axis represents the weekly raw score on the Inappropriate Speech subscale, and the x-axis is visit week number, for the six participants.

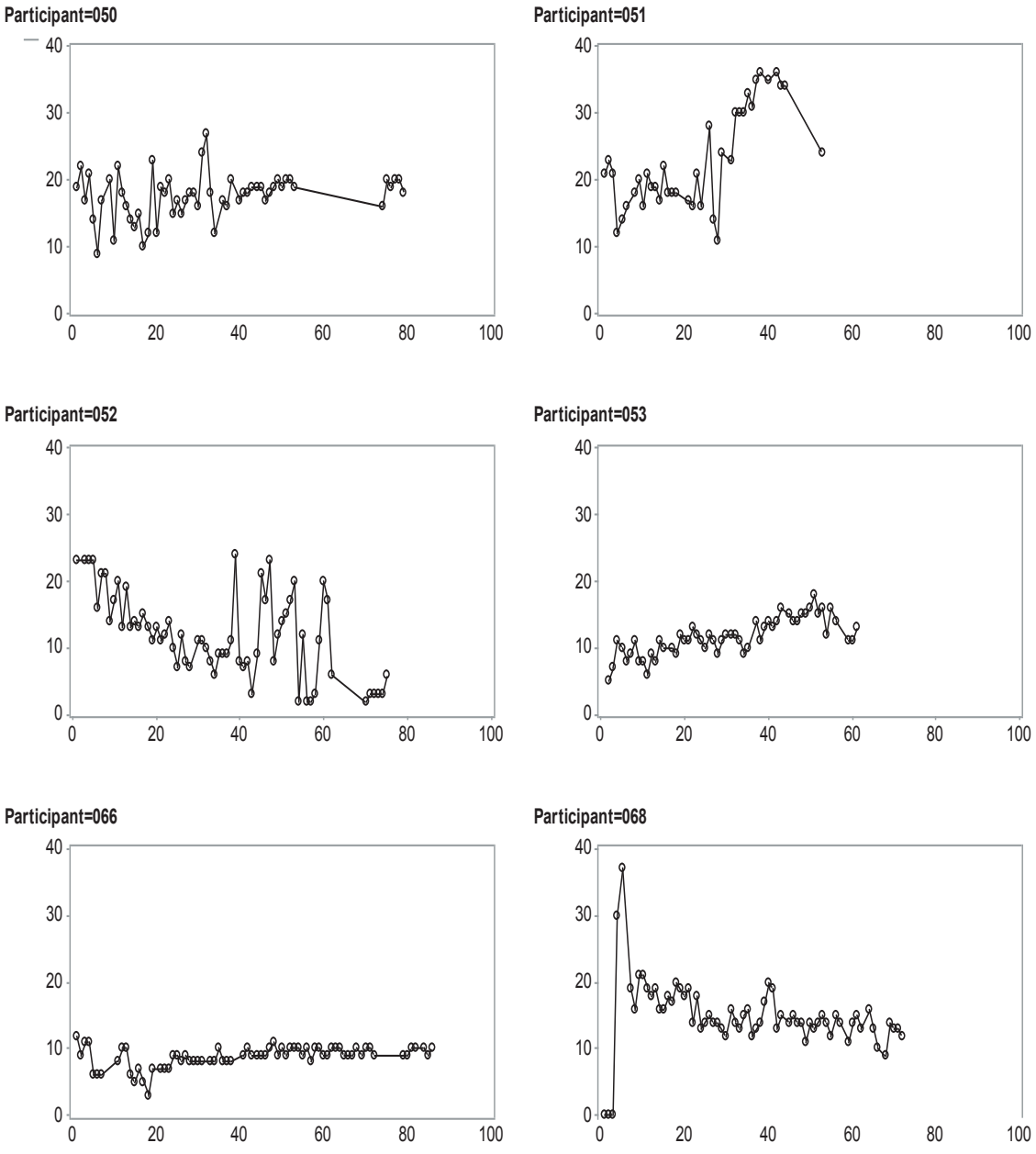

Figure E42. Social Performance Survey Schedule, Appropriate Social Skills. The y-axis represents the weekly raw score on the Appropriate Social Skills subscale, and the x-axis is visit week number, for the six participants. Higher scores indicate better social skills.

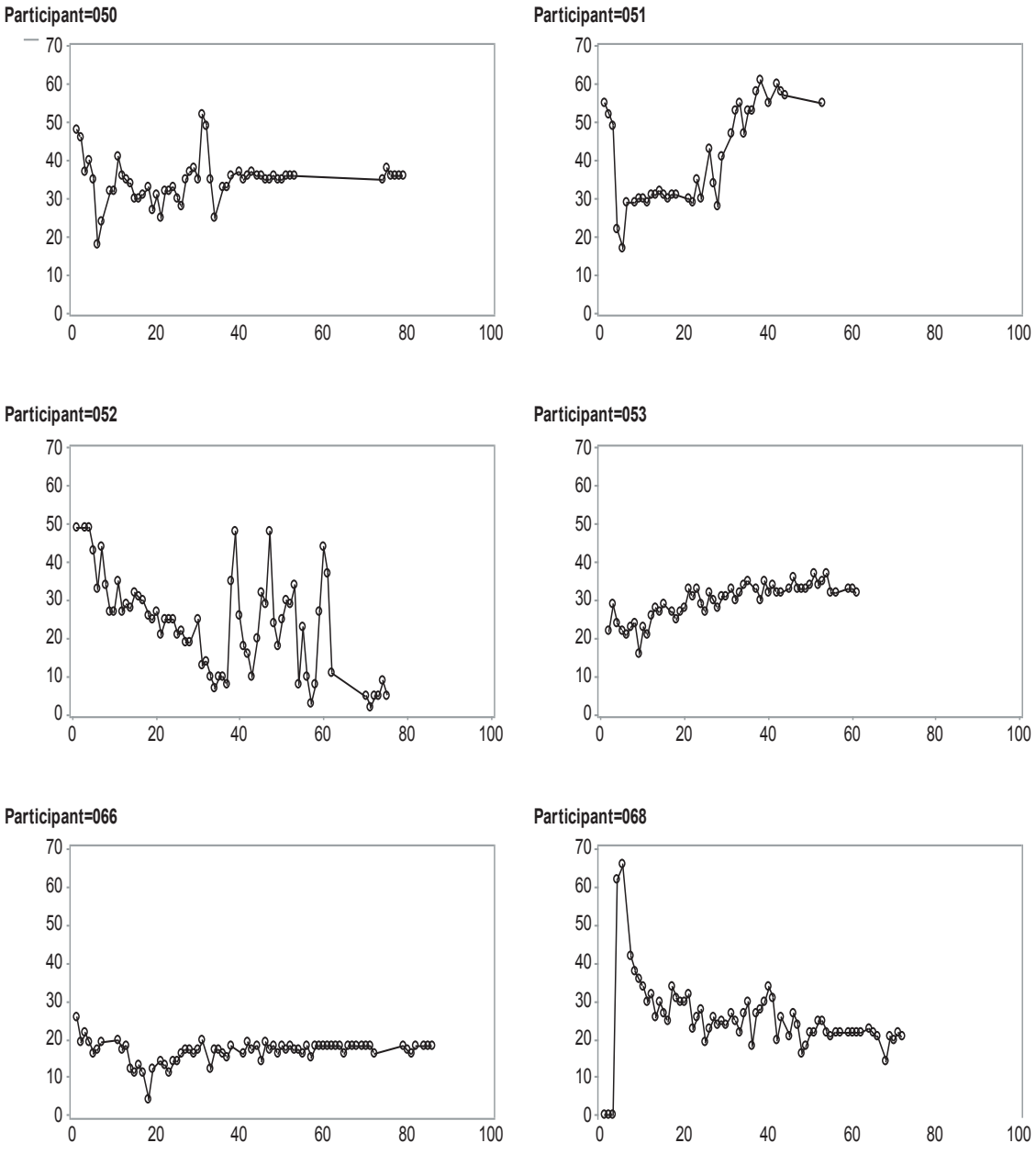

Figure E43. Social Performance Survey Schedule, Communication Skills. The y-axis represents the weekly raw score on the Communication Skills subscale, and the x-axis is visit week number, for the six participants. Higher scores indicate better communication skills.

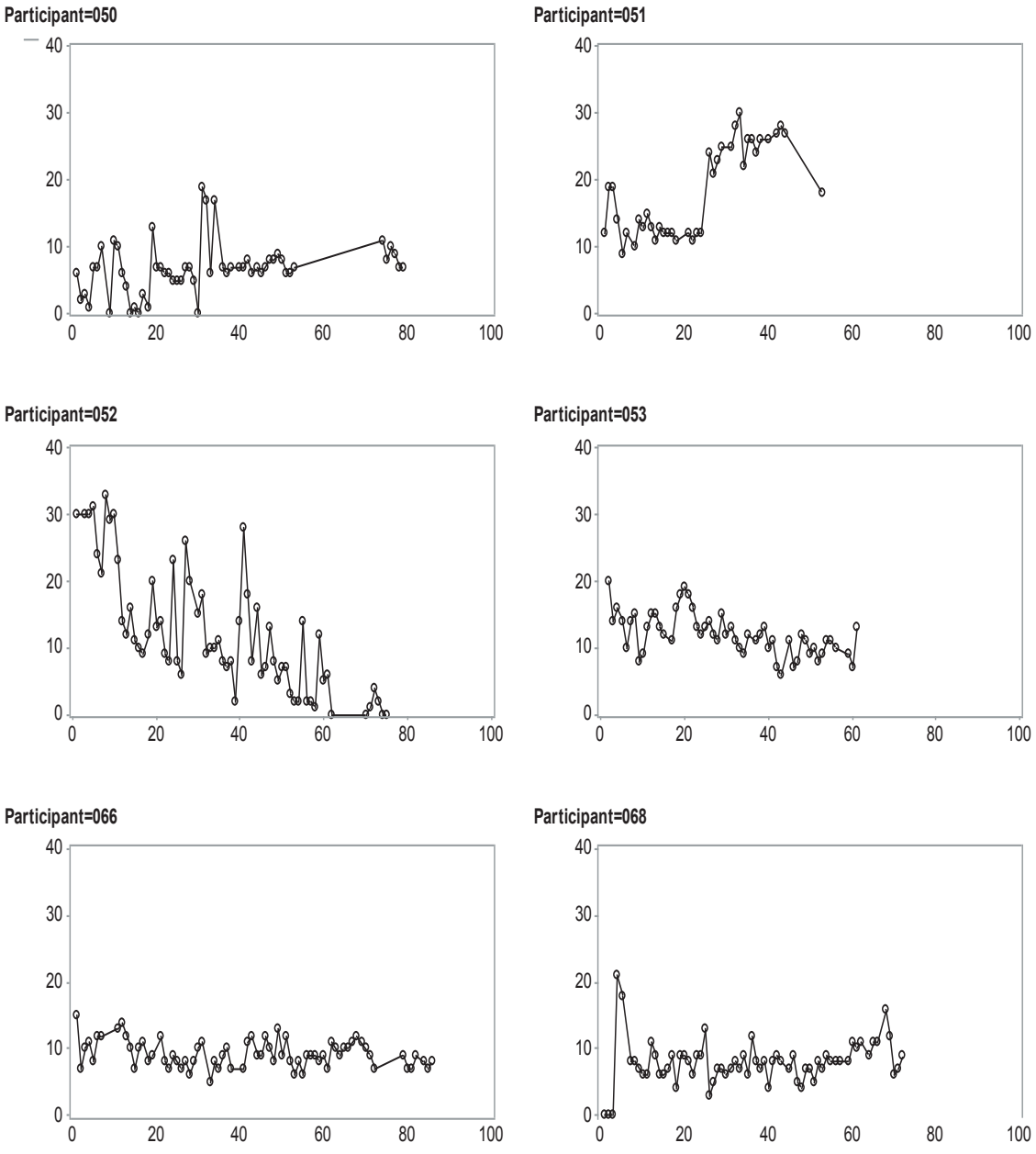

Figure E44. Social Performance Survey Schedule, Inappropriate Assertion. The y-axis represents the weekly raw score on the Inappropriate Assertion subscale, and the x-axis is visit week number, for the six participants.

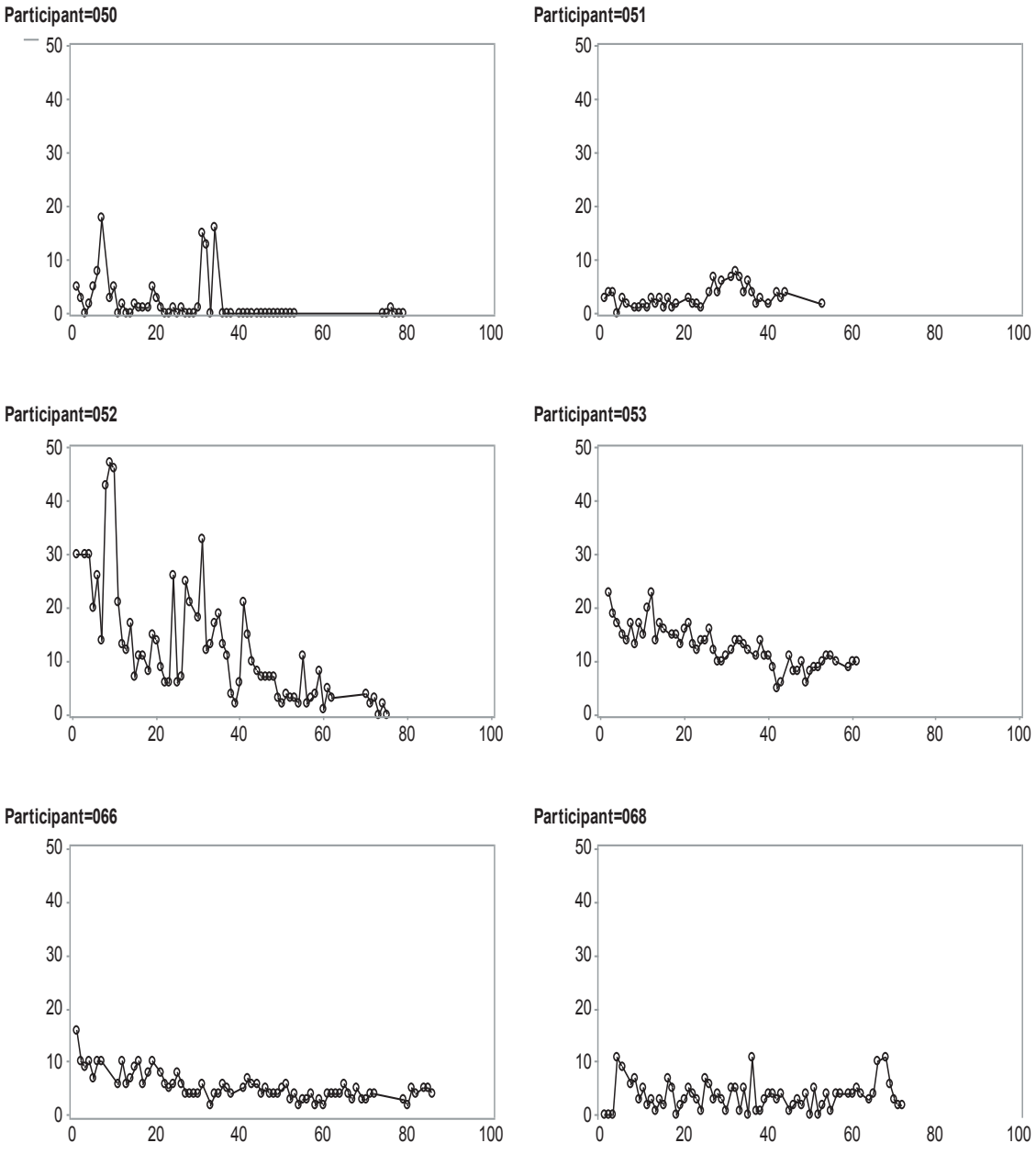

Figure E45. Social Performance Survey Schedule, Sociopathic Behavior. The y-axis represents the weekly raw score on the Sociopathic Behavior subscale, and the x-axis is visit week number, for the six participants.

Table E9

Summary of Individual Models: Self-report Measure - Trauma Symptom Checklist for Children

ID #	Subscales	Intercept	Slope	*SE*	*t* Value	*p*
050	Under-responsive	80.59	-.034	.06	-0.57	.5735
050	Hyper-responsive	51.09	-.080	.03	-2.60	.0118*
050	Anxiety	33.13	.007	.01	0.54	.5901
050	Depression	35.88	-.036	.02	-1.73	.0883
050	Anger	39.69	-.005	.03	-0.16	.8731
050	Posttraumatic Stress	38.58	-.020	.03	-0.77	.4447
050	Dissociation	40.56	.013	.03	0.43	.6694
050	Overt Dissociation	42.84	.004	.03	0.14	.8901
050	Fantasy	40.05	.016	.03	0.51	.6104
050	Sexual Concerns	50.89	-.099	.04	-2.50	.0152*
050	Sexual Distress	58.81	-.148	.07	-2.28	.0266*
050	Sexual Preoccupation	43.41	-.012	.01	-1.69	.0957
051	Under-responsive	82.94	.171	.03	5.13	<.0001***
051	Hyper-responsive	47.00	0	0	na	na
051	Anxiety	35.70	-.035	.01	-4.49	<.0001***
051	Depression	32.72	-.015	.01	-2.89	.0053**
051	Anger	35.03	-.043	.01	-5.17	<.0001***
051	Posttraumatic Stress	35.32	-.028	.01	-3.67	.0005***
051	Dissociation	36.90	-.038	.01	-4.66	<.0001*
051	Overt Dissociation	38.61	-.032	.01	-4.28	<.0001*
051	Fantasy	39.12	-.024	.01	-3.44	.0010**
051	Sexual Concerns	42.00	0	0	na	na
051	Sexual Distress	44.00	0	0	na	na
051	Sexual Preoccupation	43.00	0	0	na	na
052	Under-responsive	60.97	.096	.05	1.92	.0589
052	Hyper-responsive	48.01	-.021	.01	-1.68	.0975
052	Anxiety	46.05	-.112	.03	-3.44	.0010**
052	Depression	47.25	-.121	.03	-3.78	.0003***
052	Anger	42.15	-.076	.03	-2.69	.0090**
052	Posttraumatic Stress	49.11	-.044	.03	-1.77	.0810

ID #	Subscales	Intercept	Slope	*SE*	*t* Value	*p*
052	Dissociation	50.03	.005	.02	0.30	.7623
052	Overt Dissociation	48.03	.035	.02	1.73	.0880
052	Fantasy	54.59	-.055	.02	-2.22	.0296*
052	Sexual Concerns	84.76	-.624	.06	-10.69	<.0001***
052	Sexual Distress	50.63	-.117	.04	-3.24	.0019**
052	Sexual Preoccupation	102.54	-.852	.08	-10.98	<.0001***
053	Under-responsive	63.76	.294	.03	11.07	<.0001***
053	Hyper-responsive	51.84	-.064	.02	-3.34	.0012**
053	Anxiety	41.01	-.094	.02	-5.37	<.0001***
053	Depression	44.47	-.140	.01	-9.72	<.0001***
053	Anger	45.24	-.144	.02	-8.55	<.0001***
053	Posttraumatic Stress	38.60	-.069	.02	-5.45	<.0001***
053	Dissociation	44.13	-.095	.02	-6.66	<.0001***
053	Overt Dissociation	47.55	-.106	.02	-6.28	<.0001***
053	Fantasy	40.44	-.041	.01	-3.43	.0009***
053	Sexual Concerns	44.07	-.039	.02	-2.38	.0196**
053	Sexual Distress	46.35	-.044	.02	-1.99	.0493**
053	Sexual Preoccupation	45.27	-.030	.01	-2.45	.0164**
066	Under-responsive	80.83	.154	.03	6.06	<.0001***
066	Hyper-responsive	48.70	-.028	.01	-2.12	.0374*
066	Anxiety	37.40	-.051	.01	-4.52	<.0001***
066	Depression	42.43	-.169	.02	-8.89	<.0001***
066	Anger	33.07	.004	.01	0.64	.5270
066	Posttraumatic Stress	35.96	-.034	.01	-4.47	<.0001***
066	Dissociation	43.43	-.141	.02	-9.28	<.0001***
066	Overt Dissociation	43.91	-.116	.01	-7.94	<.0001***
066	Fantasy	45.46	-.124	.02	-7.63	<.0001***
066	Sexual Concerns	42.00	0	0	na	na
066	Sexual Distress	44.00	0	0	na	na
066	Sexual Preoccupation	43.00	0	0	na	na
068	Under-responsive	64.02	-.010	.05	-0.21	.8360
068	Hyper-responsive	57.08	-.133	.05	-2.79	.0068**
068	Anxiety	54.52	-.095	.05	-2.07	.0425*

ID #	Subscales	Intercept	Slope	*SE*	*t* Value	*p*
068	Depression	51.55	-.030	.03	-1.02	.3096
068	Anger	42.63	-.004	.03	-0.16	.8752
068	Posttraumatic Stress	50.57	-.044	.04	-1.20	.2356
068	Dissociation	58.73	-.043	.03	-1.30	.1977
068	Overt Dissociation	55.67	.021	.04	0.47	.6369
068	Fantasy	60.15	-.136	.04	-3.47	.0009***
068	Sexual Concerns	70.39	-.031	.04	-0.73	.4664
068	Sexual Distress	60.31	-.039	.06	-0.70	.4876
068	Sexual Preoccupation	73.63	-.014	.05	-0.30	.7643

Note. ID# = Participant Number. na = Not applicable, used when all values for a given measure are constant.

*$p < .05$. **$p < .01$. ***$p < .001$.

Table E10

Summary of Individual Models: Self-report Measure - Brief Symptom Inventory.

ID #	Subscale	Intercept	Slope	*SE*	*t* Value	*p*
050	Somatization	56.45	-.195	.05	-3.97	.0002***
050	Obsessive-Compulsive	47.50	-.192	.05	-3.64	.0006***
050	Interpersonal Sensitivity	51.05	-.174	.05	-3.74	.0004***
050	Depression	42.45	-.019	.04	-0.43	.6669
050	Anxiety	44.98	-.147	.05	-3.03	.0037**
050	Hostility	48.36	-.183	.05	-3.67	.0005***
050	Phobias	52.40	-.103	.04	-2.44	.0179*
050	Paranoid Ideation	53.75	-.098	.05	-1.98	.0526
050	Psychotic Thinking	49.50	-.075	.04	-1.91	.0613
050	Sum of Values on 53 Items	34.16	-.372	.05	-6.98	<.0001***
050	Global Severity Index	0.68	-.009	<.01	-11.4	<.0001***
050	Positive Symptom Total	13.71	-.066	.03	-2.59	.0123*
050	Positive Symptom Distress Index	2.51	-.020	<.01	-7.65	<.0001***
051	Somatization	52.40	-.314	.03	-9.29	<.0001***
051	Obsessive-Compulsive	37.92	-.099	.03	-3.72	.0004***
051	Interpersonal Sensitivity	37.71	-.058	.02	-2.38	.0202*
051	Depression	38.51	-.053	.02	-2.91	.0050**
051	Anxiety	41.25	-.128	.03	-4.42	<.0001***
051	Hostility	37.06	-.065	.01	-4.55	<.0001***
051	Phobias	43.03	-.063	.02	-3.90	.0002***
051	Paranoid Ideation	37.00	-.106	.03	-3.57	.0007***
051	Psychotic Thinking	37.53	-.012	.01	-1.68	.0986
051	Sum of Values on 53 Items	10.60	-.211	.03	-6.58	<.0001***
051	Global Severity Index	0.20	-.004	<.01	-6.58	<.0001***
051	Positive Symptom Total	8.30	-.163	.02	-9.40	<.0001***
051	Positive Symptom Distress Index	1.30	-.008	<.01	-1.80	.0807
052	Somatization	60.24	-.214	.03	-6.56	<.0001***
052	Obsessive-Compulsive	50.05	-.208	.03	-6.00	<.0001***
052	Interpersonal Sensitivity	61.41	-.188	.03	-7.03	<.0001***
052	Depression	58.77	-.076	.02	-3.40	.0011**
052	Anxiety	47.17	-.184	.05	-4.09	.0001***

ID #	Subscale	Intercept	Slope	*SE*	*t* Value	*p*
052	Hostility	50.43	-.233	.04	-5.40	<.0001***
052	Phobias	56.70	-.096	.03	-3.03	.0035**
052	Paranoid Ideation	53.89	-.146	.04	-4.00	.0002***
052	Psychotic Thinking	56.64	-.156	.02	-6.48	<.0001***
052	Sum of Values on 53 Items	52.46	-.579	.07	-8.88	<.0001***
052	Global Severity Index	0.99	-.011	<.01	-8.88	<.0001***
052	Positive Symptom Total	25.76	-.206	.03	-6.48	<.0001***
052	Positive Symptom Distress Index	2.11	-.012	<.01	-5.46	<.0001***
053	Somatization	57.32	-.184	.03	-6.74	<.0001***
053	Obsessive-Compulsive	50.95	-.216	.023	-7.30	<.0001***
053	Interpersonal Sensitivity	47.73	-.132	.02	-5.40	<.0001***
053	Depression	54.10	-.180	.02	-7.40	<.0001***
053	Anxiety	54.10	-.228	.03	-7.62	<.0001***
053	Hostility	50.85	-.196	.02	-7.84	<.0001***
053	Phobias	56.52	-.154	.03	-5.95	<.0001***
053	Paranoid Ideation	47.51	-.173	.03	-5.58	<.0001***
053	Psychotic Thinking	51.71	-.158	.03	-6.06	<.0001***
053	Sum of Values on 53 Items	41.74	-.475	.05	-8.69	<.0001***
053	Global Severity Index	0.79	-.009	<.01	-9.05	<.0001***
053	Positive Symptom Total	22.99	-.242	.03	-9.64	<.0001***
053	Positive Symptom Distress Index	1.79	-.007	<.01	-4.54	<.0001***
066	Somatization	41.84	-.080	.02	-3.37	.0012**
066	Obsessive-Compulsive	52.18	-.300	.04	-7.80	<.0001***
066	Interpersonal Sensitivity	55.13	-.306	.04	-8.19	<.0001***
066	Depression	57.24	-.299	.04	-7.51	<.0001***
066	Anxiety	47.54	-.162	.03	-4.72	<.0001***
066	Hostility	40.31	-.085	.03	-3.42	.0010**
066	Phobias	47.60	-.124	.02	-5.06	<.0001***
066	Paranoid Ideation	53.27	-.143	.04	-4.02	.0001***
066	Psychotic Thinking	47.72	-.168	.02	-7.82	<.0001***
066	Sum of Values on 53 Items	41.19	-.585	.06	-9.43	<.0001***
066	Global Severity Index	0.78	-.011	<.01	-9.43	<.0001***
066	Positive Symptom Total	18.00	-.256	.03	-9.52	<.0001***
066	Positive Symptom Distress	2.40	<.01	<.01	0.09	.9262

ID #	Subscale	Intercept	Slope	*SE*	*t* Value	*p*
	Index					
068	Somatization	58.47	.014	.03	0.41	.6801
068	Obsessive-Compulsive	58.20	-.039	.03	-1.05	.2996
068	Interpersonal Sensitivity	61.18	-.038	.03	-1.16	.2483
068	Depression	57.38	-.008	.04	-0.23	.8172
068	Anxiety	58.59	-.023	.04	-0.54	.5906
068	Hostility	42.21	.058	.04	1.36	.1791
068	Phobias	62.70	-.050	.04	-1.15	.2560
068	Paranoid Ideation	58.11	-.017	.03	-0.55	.5826
068	Psychotic Thinking	56.00	.067	.03	2.02	.0472*
068	Sum of Values on 53 Items	69.07	-.064	.10	-0.62	.5384
068	Global Severity Index	1.35	-.005	<.01	-1.91	.0599
068	Positive Symptom Total	28.29	.033	.04	0.87	.3855
068	Positive Symptom Distress Index	2.41	-.004	<.01	-3.01	.0037**

Note. ID# = Participant Number.

*$p < .05$. **$p < .01$. ***$p < .001$.

Table E11

Summary of Individual Models: Physiological Measures

ID #	Measure	Intercept	Slope	*SE*	*t* Value	*p*
050	Activity 24-Hour Mean	13082.00	0.042	8.34	0.00	.9960
050	Activity, Awake Mean	18432.00	-22.448	14.03	-1.60	.1152
050	Diastolic Blood Pressure	89.12	0.063	0.034	2.18	.0340*
050	Systolic Blood Pressure	125.50	0.057	0.045	1.38	.1734
050	Heart Rate (Arm)	67.58	0.0194	0.03	0.75	.4588
050	Heart Rate (Finger)	69.31	-0.015	0.03	-0.43	.6660
050	Sleep, 24-Hour Mean	614.69	-0.176	0.32	-0.55	.5867
050	Sleep Efficiency	88.17	-0.028	0.036	-0.78	.4390
050	Sleep Fragmentation Index	3.16	0.016	<.0001	4.03	.0002***
050	Sleep Latency	12.14	0.105	0.05	2.12	.0385*
050	Wake After Sleep Onset	53.48	0.027	0.08	0.34	.7331
051	Activity 24-Hour Mean	15648.00	-60.875	9.84	-6.19	<.0001***
051	Activity, Awake Mean	15135.00	-35.990	8.93	-4.03	.0002***
051	Diastolic Blood Pressure	65.21	-0.011	0.02	-0.53	.6000
051	Systolic Blood Pressure	113.35	0.017	0.03	0.56	.5803
051	Heart Rate (Arm)	62.65	-0.062	0.02	-2.96	.0044**
051	Heart Rate (Finger)	64.41	-0.030	0.02	-1.35	.1813
051	Sleep, 24-Hour Mean	448.44	0.307	0.32	0.95	.3458
051	Sleep Efficiency	92.69	-0.084	0.02	-3.59	.0007***
051	Sleep Fragmentation Index	2.88	0.012	0.01	2.19	.0325*
051	Sleep Latency	13.93	0.037	0.05	0.83	.4087
051	Wake After Sleep Onset	28.06	0.274	0.09	3.13	.0027**
052	Activity 24-Hour Mean	7804.96	-53.554	4.63	-11.57	<.0001***
052	Activity, Awake Mean	6396.91	24.527	20.57	1.19	.2376
052	Diastolic Blood Pressure	67.35	0.023	0.03	0.69	.4936
052	Systolic Blood Pressure	128.97	0.080	0.07	1.17	.2454
052	Heart Rate (Arm)	66.57	-0.051	0.03	-1.73	.0876
052	Heart Rate (Finger)	65.78	0.065	0.03	2.10	.0396*
052	Sleep, 24-Hour Mean	651.73	2.879	0.34	8.37	<.0001***
052	Sleep Efficiency	91.11	-0.013	0.02	-0.65	.5170
052	Sleep Fragmentation Index	3.07	0.005	<.01	1.14	.2573
052	Sleep Latency	14.93	-0.008	0.05	-0.18	.8556

ID #	Measure	Intercept	Slope	*SE*	*t* Value	*p*
052	Wake After Sleep Onset	49.13	0.093	0.10	0.92	.3597
053	Activity 24-Hour Mean	19573.00	1.833	10.07	0.18	.8560
053	Activity, Awake Mean	27738.00	7.733	15.93	0.49	.6286
053	Diastolic Blood Pressure	78.82	-0.024	0.03	-0.83	.4086
053	Systolic Blood Pressure	121.66	-0.004	0.04	-0.11	.9134
053	Heart Rate (Arm)	60.96	0.031	0.01	2.25	.0267*
053	Heart Rate (Finger)	64.19	0.034	0.02	2.11	.0378*
053	Sleep, 24-Hour Mean	19573	1.833	10.07	0.18	.8560
053	Sleep Efficiency	90.18	0.011	0.01	1.24	.2165
053	Sleep Fragmentation Index	2.93	0.001	<.01	0.32	.7495
053	Sleep Latency	10.94	0.027	0.02	1.25	.2154
053	Wake After Sleep Onset	47.3646	-0.092	0.05	-1.94	.0552
066	Activity 24-Hour Mean	12072.00	-57.772	9.37	-6.17	<.0001***
066	Activity, Awake Mean	17050.00	-93.568	13.99	-6.69	<.0001***
066	Diastolic Blood Pressure	78.41	-0.030	0.03	-1.16	.2508
066	Systolic Blood Pressure	127.29	-0.012	0.04	-0.33	.7428
066	Heart Rate (Arm)	61.57	-0.049	0.03	-1.90	.0607
066	Heart Rate (Finger)	61.78	-0.039	0.03	-1.50	.1378
066	Sleep Efficiency	88.52	0.031	0.02	1.26	.2122
066	Sleep, 24-Hour Mean	472.00	-0.886	0.35	-2.56	.0127*
066	Sleep Fragmentation Index	5.02	-0.017	0.01	-1.60	.1135
066	Sleep Latency	22.27	0.001	0.06	0.02	.9823
066	Wake After Sleep Onset	48.83	-0.232	0.10	-2.40	.0192*
068	Activity 24-Hour Mean	9404.75	84.196	9.10	9.25	<.0001***
068	Activity, Awake Mean	12595.00	88.241	10.82	8.15	<.0001***
068	Diastolic Blood Pressure	76.45	0.031	0.05	0.63	.5322
068	Systolic Blood Pressure	129.44	0.024	0.05	0.46	.6440
068	Heart Rate (Arm)	75.72	0.044	0.04	1.00	.3215
068	Heart Rate (Finger)	75.72	0.002	0.04	0.05	.9567
068	Sleep, 24-Hour Mean	449.04	-1.246	0.39	-3.17	.0024**
068	Sleep Efficiency	82.10	-0.021	0.03	-0.7	.4852
068	Sleep Fragmentation Index	4.58	<.-01	0.01	0.00	.9961
068	Sleep Latency	13.21	0.038	0.04	0.89	.3774
068	Wake After Sleep Onset	71.23	-0.127	0.12	-1.07	.2877

Note. ID# = Participant Number.

*$p < .05$. **$p < .01$. ***$p < .001$.

Table E12

Summary of Individual Models: Observational Measure - Aberrant Behavior Checklist.

ID #	Subscale	Intercept	Slope	*SE*	*t* Value	*p*
050	Irritability	2.64	-0.049	0.01	-3.72	.0005***
050	Lethargy	1.83	-0.025	0.01	-2.01	.0491*
050	Stereotypy	0.02	<.0001	<0.01	0.08	.9362
050	Hyperactivity	0.17	-0.001	0.01	-0.16	.8723
050	Inappropriate Speech	0.41	-0.006	<0.01	-1.27	.2110
051	Irritability	0.79	-0.001	0.01	-0.05	.9569
051	Lethargy	0.24	0.053	0.02	2.97	.0052
051	Stereotypy	0.43	-0.009	0.01	-1.02	.3160
051	Hyperactivity	0.12	-0.001	0.01	-0.16	.8709
051	Inappropriate Speech	3.73	0.041	0.02	2.25	.0307*
052	Irritability	9.11	-0.114	0.04	-3.17	.0023*
052	Lethargy	3.92	-0.014	0.02	-0.74	.4612
052	Stereotypy	0.81	-0.010	0.01	-2.00	.0494*
052	Hyperactivity	7.47	-0.063	0.03	-2.33	.0228*
052	Inappropriate Speech	1.86	-0.031	0.01	-4.27	<.0001***
053	Irritability	22.27	-0.187	0.03	-6.38	<.0001***
053	Lethargy	0.85	-0.013	0.01	-1.80	.0775
053	Stereotypy	0.16	0.002	0.01	0.39	.7011
053	Hyperactivity	3.31	-0.035	0.01	-3.39	.0013**
053	Inappropriate Speech	2.17	-0.016	0.01	-2.96	.0045**
066	Irritability	9.82	-0.106	0.01	-12.85	<.0001***
066	Lethargy	6.72	-0.028	0.01	-2.66	.0097**
066	Stereotypy	0.08	-0.001	<0.01	-0.91	.3674
066	Hyperactivity	5.13	-0.041	0.01	-5.08	<.0001***
066	Inappropriate Speech	0.50	-0.006	<0.01	-2.45	.0167*
068	Irritability	0.60	-0.012	<0.01	-3.43	.0010**
068	Lethargy	0.06	-0.001	<0.01	-1.57	.1220
068	Stereotypy	0	0	0	na	na
068	Hyperactivity	0.16	-0.003	<0.01	-2.60	.0114*
068	Inappropriate Speech	0	0	0	na	na

Table E13

Summary of Individual Models: Observational Measure - Social Performance Survey Schedule.

ID #	Subscale	Intercept	Slope	*SE*	*t* Value	*p*
050	Appropriate Social Skills	16.25	0.043	0.02	2.05	.0457*
050	Communication Skills	33.64	0.034	0.04	0.96	.3434
050	Inappropriate Assertion	4.86	0.057	0.02	2.42	.0191*
050	Sociopathic Behavior	3.94	-0.060	0.02	-2.35	.0223*
051	Appropriate Social Skills	14.26	0.382	0.06	6.03	<.0001***
051	Communication Skills	26.78	0.607	0.12	5.25	<.0001***
051	Inappropriate Assertion	10.06	0.361	0.05	6.66	<.0001***
051	Sociopathic Behavior	2.00	0.052	0.02	2.40	.0215*
052	Appropriate Social Skills	18.10	-0.171	0.03	-5.44	<.0001***
052	Communication Skills	35.90	-0.342	0.06	-5.37	<.0001***
052	Inappropriate Assertion	24.39	-0.342	0.04	-9.53	<.0001***
052	Sociopathic Behavior	25.60	-0.371	0.05	-7.73	<.0001***
053	Appropriate Social Skills	7.92	0.121	0.01	8.59	<.0001***
053	Communication Skills	23.37	0.215	0.02	9.97	<.0001***
053	Inappropriate Assertion	15.20	-0.105	0.02	-5.25	<.0001***
053	Sociopathic Behavior	18.13	-0.177	0.02	-9.44	<.0001***
066	Appropriate Social Skills	7.55	0.029	0.01	4.07	.0001***
066	Communication Skills	15.69	0.023	0.01	1.60	.1149
066	Inappropriate Assertion	10.12	-0.021	0.01	-2.09	.0399*
066	Sociopathic Behavior	8.59	-0.076	0.01	-8.37	<.0001***
068	Appropriate Social Skills	17.12	-0.062	0.03	-2.01	.0486*
068	Communication Skills	30.83	-0.150	0.06	-2.60	.0115*
068	Inappropriate Assertion	6.81	0.031	0.02	1.52	.1323
068	Sociopathic Behavior	3.45	0.005	0.02	0.31	.7543

Note. ID# = Participant Number. na = Not applicable, used when all values for a given meausre are constant.

*$p < .05$. **$p < .01$. ***$p < .001$.

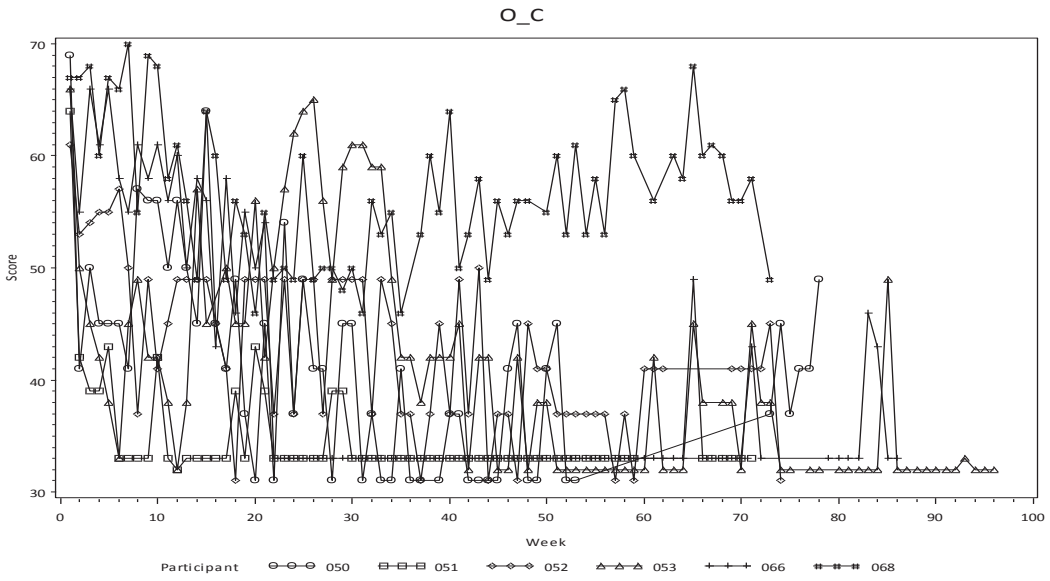

Figure E46. Brief Symptom Inventory, Obsessive Compulsive subscale. The y-axis represents scale *t*-score and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

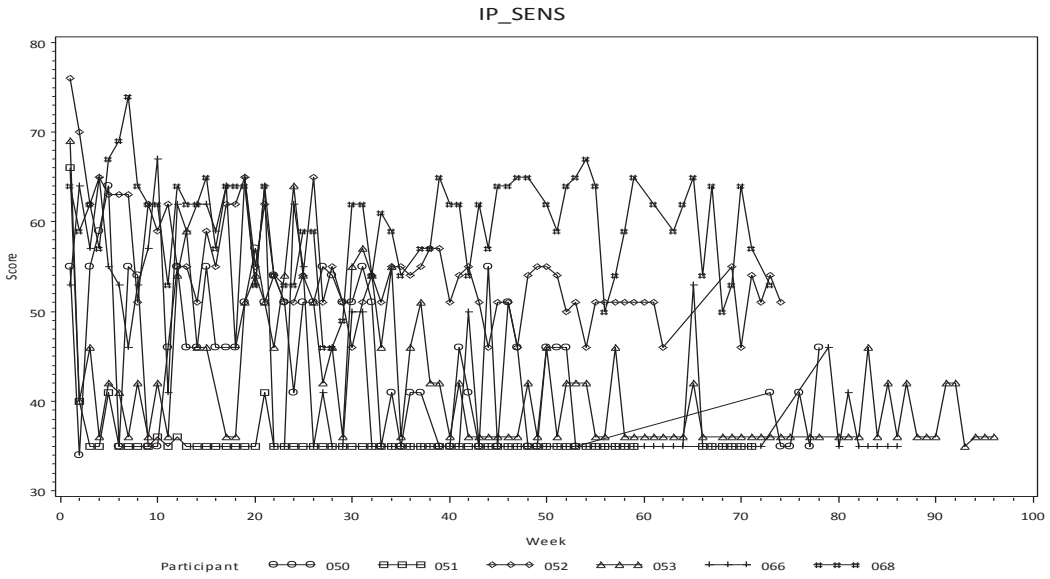

Figure E47. Brief Symptom Inventory, Interpersonal Sensitivity subscale. The y-axis represents scale *t*-score and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

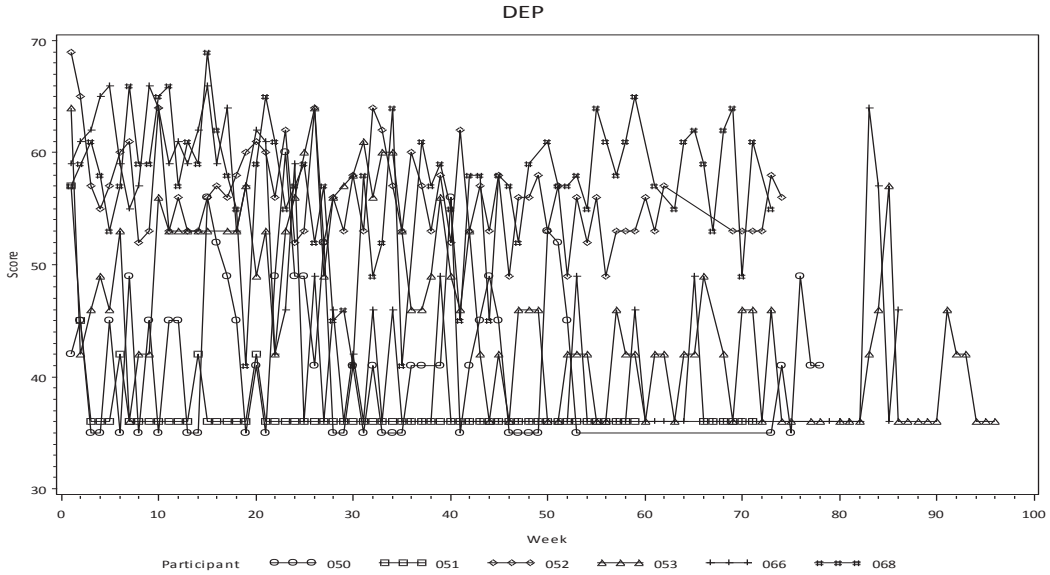

Figure E48. Brief Symptom Inventory, Depression subscale. The y-axis represents scale *t*-score and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

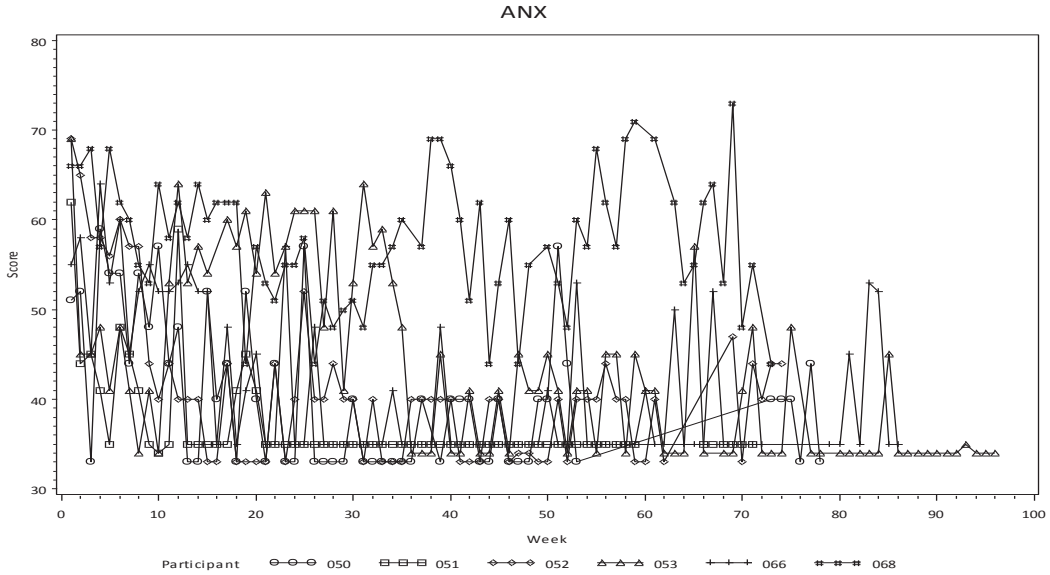

Figure E49. Brief Symptom Inventory, Anxiety subscale. The y-axis represents scale *t*-score and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

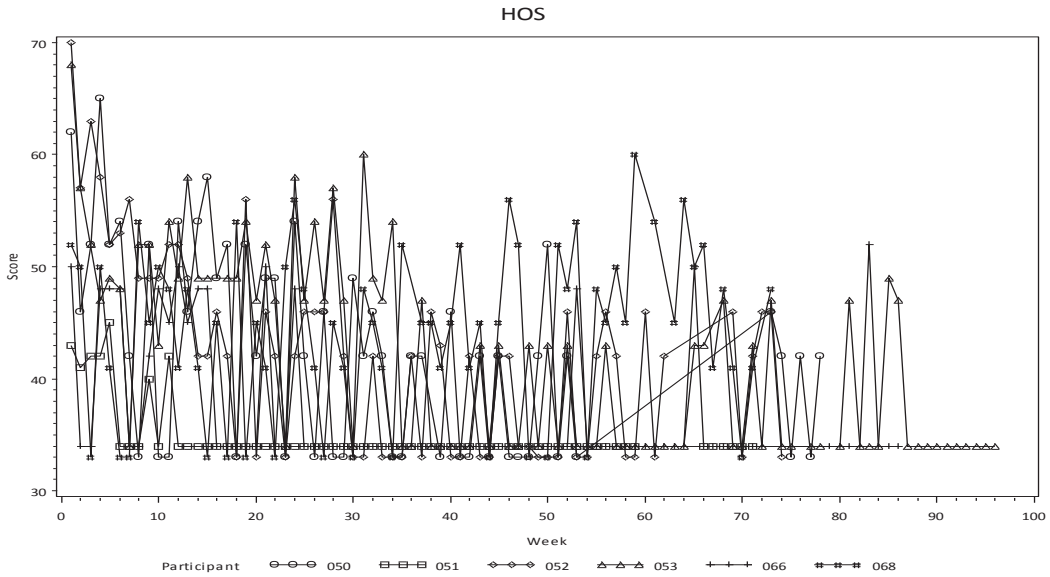

Figure E50. Brief Symptom Inventory, Hostility subscale. The y-axis represents scale *t*-score and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

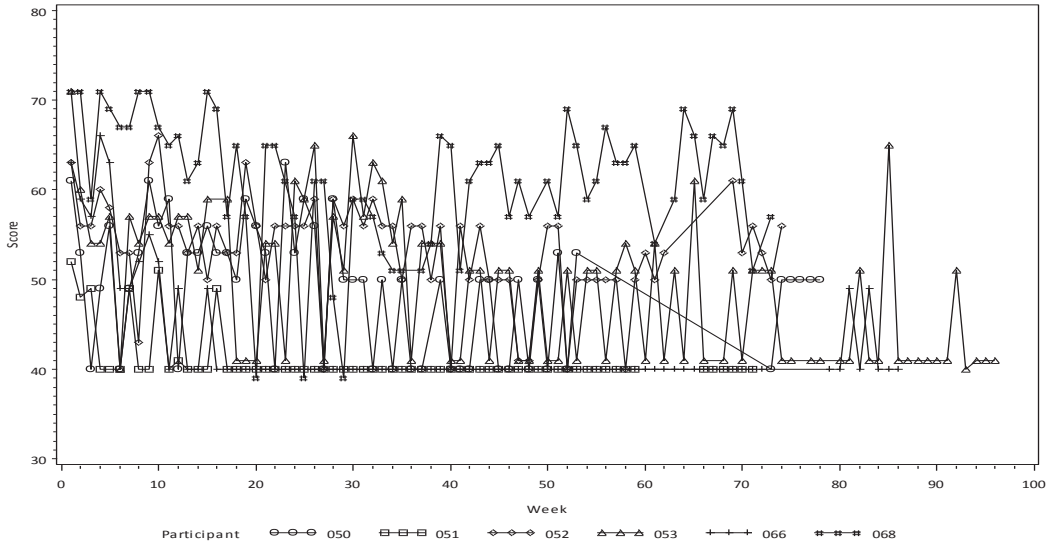

Figure E51. Brief Symptom Inventory, Phobias subscale. The y-axis represents scale *t*-score and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

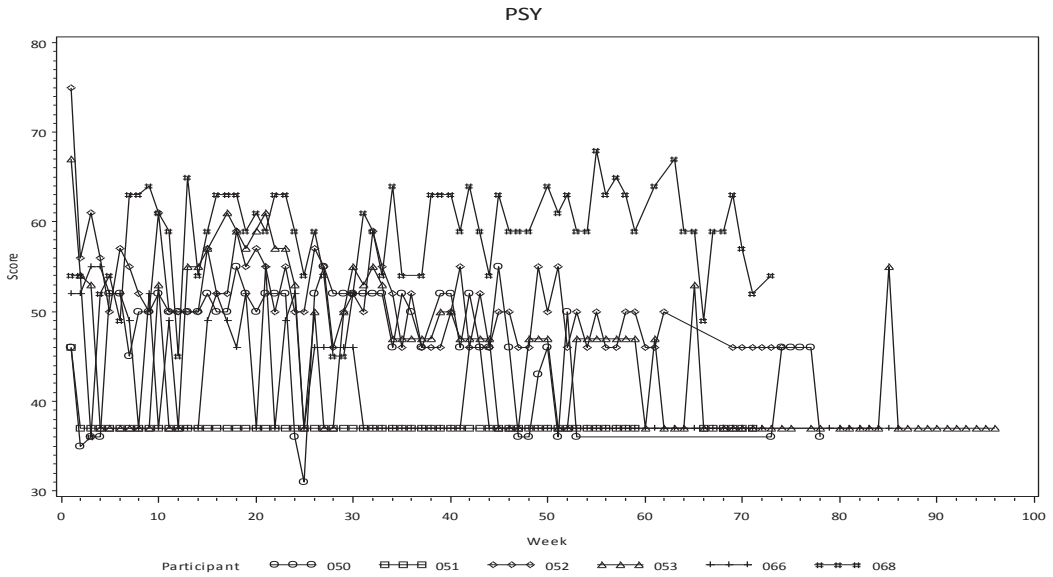

Figure E52. Brief Symptom Inventory, Psychotic Thinking subscale. The y-axis represents scale *t*-score and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

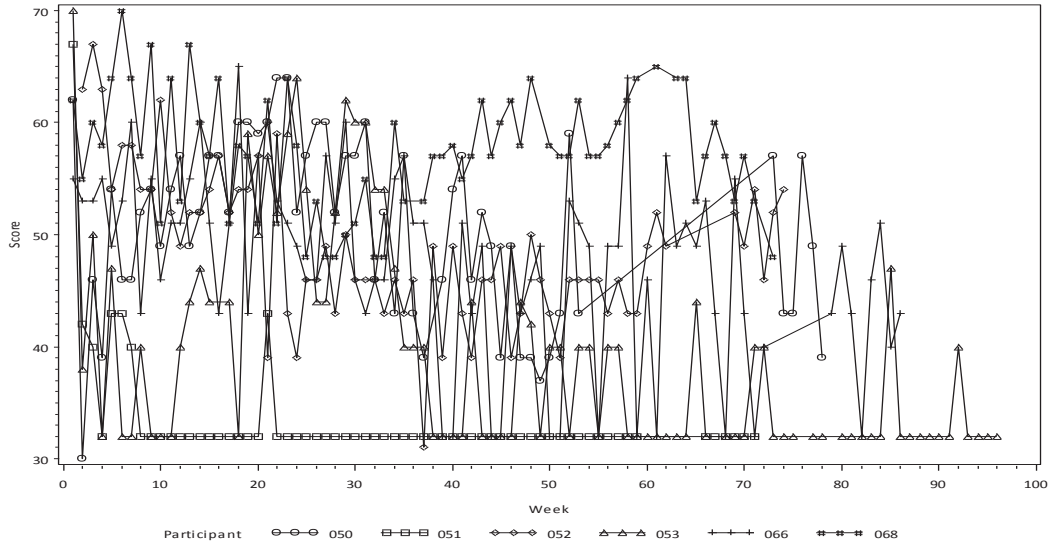

Figure E53. Brief Symptom Inventory, Paranoid Ideation subscale. The y-axis represents scale *t*-score and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

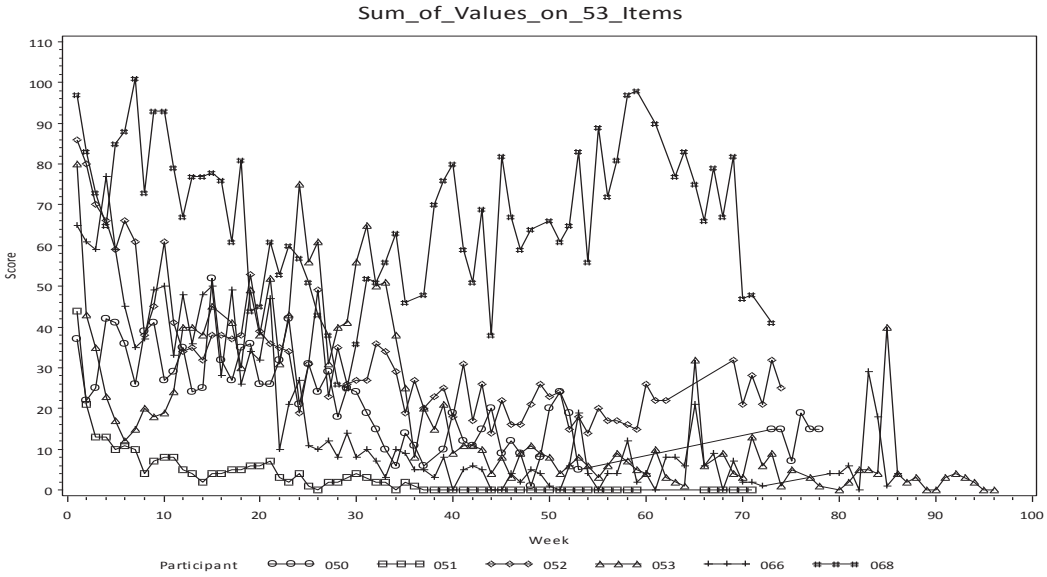

Figure E54. Brief Symptom Inventory, sum of 53 item values, by week. The y-axis represents the sum of raw score values on the 53 BSI items and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

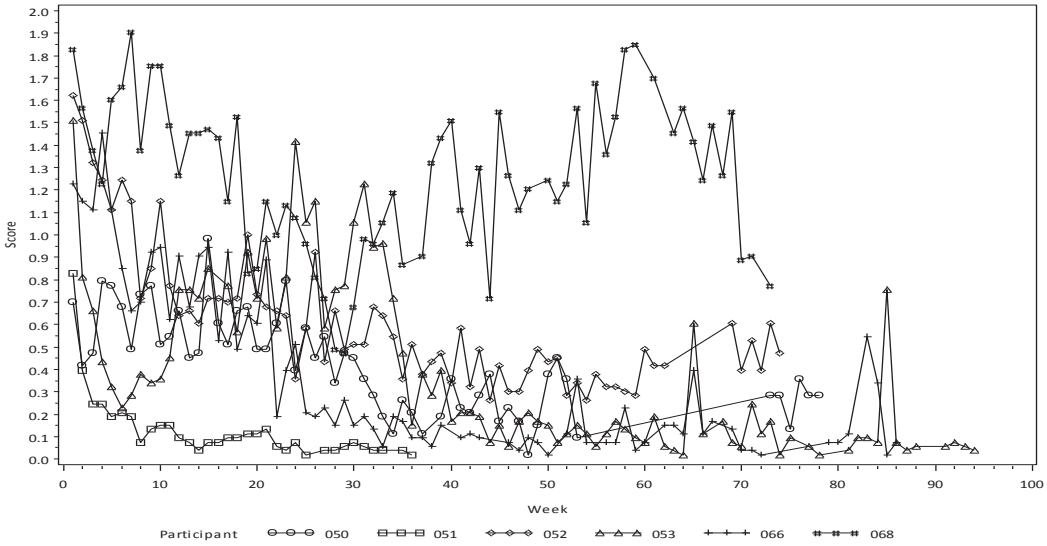

Figure E55. Brief Symptom Inventory, Global Severity Index (GSI).. The y-axis represents the sum of 53 item values divided by the total number of responses (53) and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

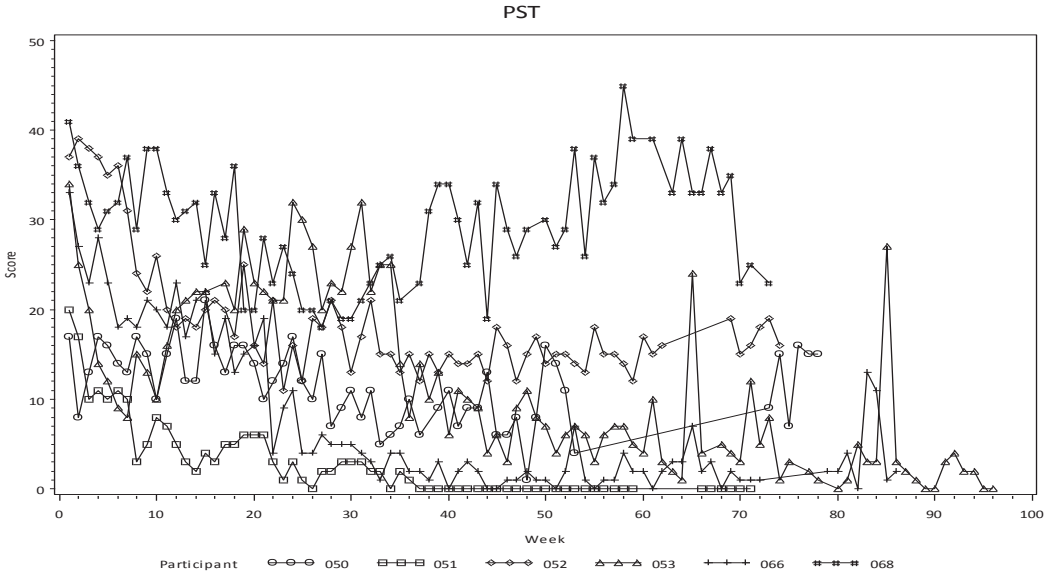

Figure E56. Brief Symptom Inventory, Positive Symptom Total (PST). The y-axis represents the count of items endorsed with a positive (nonzero) response and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

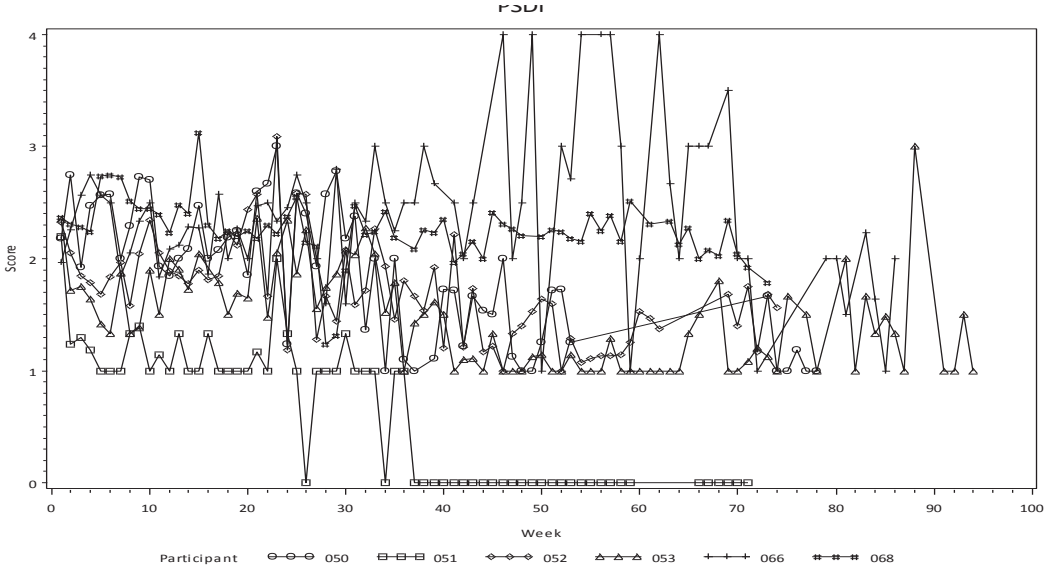

Figure E57. Brief Symptom Inventory, Positive Symptom Distress Index (PSDI).The y-axis represents the sum of 53 item values divided by the PST and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

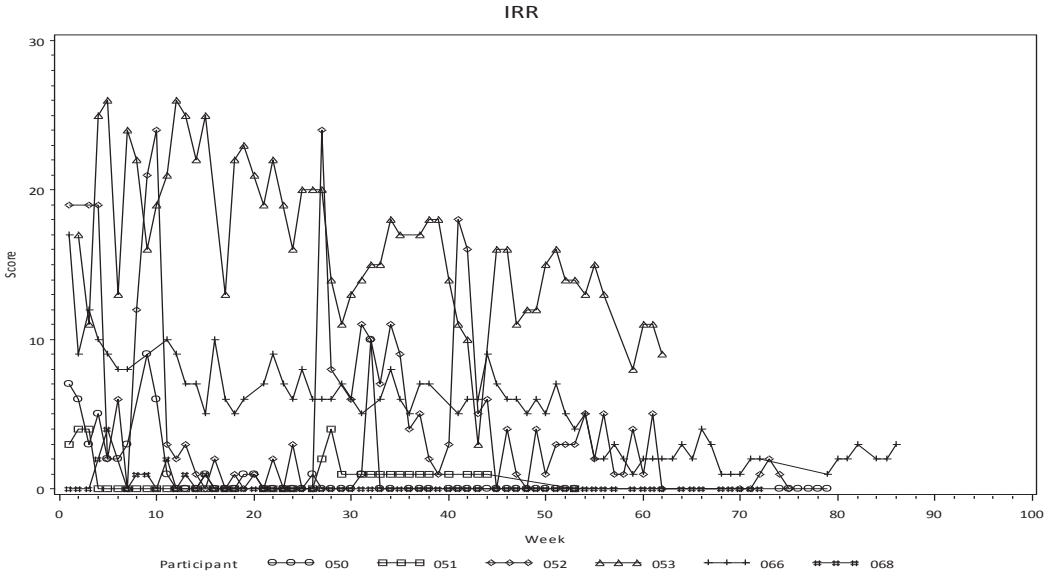

Figure E58. Aberrant Behavior Checklist, Irritability. The y-axis represents the weekly raw score on the Irritability subscale, and the x-axis is visit week number. All participants' data are displayed, with symbols identifying each.

Table E14

Linear Growth Model: Group Data - Self-Report Measures

Measure	Intercept	Slope	*SE*	DF	*t* Value	*p*
Trauma Symptom Checklist for Children						
Under-responsive	72.116	.115	.05	424	2.26	.0244*
Hyper-responsive	Not enough data to estimate the covariance structure.					
Anxiety	41.399	-.068	.02	424	-3.77	.0002***
Depression	42.425	-.087	.03	424	-3.21	.0014**
Anger	39.667	-.046	.02	424	-1.90	.0579
Posttraumatic Stress	41.464	-.044	.01	424	-4.93	<.0001***
Dissociation	45.672	-.052	.02	424	-2.12	.0345*
Overt Dissociation	46.172	-.035	.03	424	-1.29	.1983
Fantasy	46.677	-.063	.02	424	-2.62	.0091**
Sexual Concerns	55.684	-.132	.10	424	-1.33	.1837
Sexual Preoccupation	58.475	-.151	.14	424	-1.08	.2808
Sexual Distress	50.654	-.056	.02	424	-2.41	.0164*
Brief Symptom Inventory						
Somatization	54.427	-.161	.05	424	-3.48	.0006***
Obsessive-Compulsive	49.545	-.179	.04	424	-4.69	<.0001***
Interpersonal Sensitivity	52.399	-.150	.04	424	-3.74	.0002***
Depression	51.462	-.108	.05	424	-2.31	.0212*
Anxiety	49.082	-.151	.03	424	-5.05	<.0001***
Hostility	44.877	-.118	.04	424	-2.68	.0076**
Phobias	53.316	-.105	.02	424	-5.98	<.0001***
Paranoid Ideation	50.737	-.120	.02	423	-5.20	<.0001***
Psychotic Thinking	49.887	-.085	.04	424	-2.17	.0304*
Sum of Values, 53 Items	41.629	-.385	.08	424	-4.54	<.0001***
Global Severity Index	0.800	-.008	<.01	452	-6.92	<.0001***
Positive Symptom Total	19.553	-.151	.05	424	-3.29	.0011***
Positive Symptom Distress Index	2.088	-.009	<.01	380	-2.86	.0045**

*$p < .05$. **$p < .01$. ***$p < .001$.

Table E15

Linear Growth Model: Group Data - Physiological Measures

Measure	Intercept	Slope	*SE*	DF	*t* Value	*p*
Activity, 24-Hour Mean	12935	-14.416	22.82	407	-0.22	.8297
Activity, Awake Mean	16232	-5.393	25.06	406	-0.63	.5280
Diastolic Blood Pressure	76.091	<0.0001	0.02	417	0.02	.9845
Systolic Blood Pressure	Not enough data to estimate the covariance structure.					
Heart Rate (Arm)	65.728	-0.008	0.02	417	-0.40	.6886
Heart Rate (Finger)	66.794	0.005	0.02	408	0.32	.7455
Sleep, 24-Hour Mean	514.67	-14.416	22.82	407	-0.63	.5280
Sleep Efficiency	88.736	-0.014	0.02	407	-0.92	.3581
Sleep Fragmentation Index	3.634	0.002	<0.01	407	0.37	.7147
Sleep Latency	14.720	0.027	0.02	407	1.53	.1270
Wake After Sleep Onset	49.867	-0.018	0.07	407	-0.25	.8035

Table E16

Linear Growth Model: Group Data - Observational Measures

Measure	Intercept	Slope	*SE*	DF	*t* Value	*p*
Aberrant Behavior Checklist						
Irritability	7.668	-.085	.03	349	-2.97	.0032**
Lethargy	Not enough data to estimate the covariance structure.					
Stereotypy	Not enough data to estimate the covariance structure.					
Hyperactivity	Not enough data to estimate the covariance structure.					
Inappropriate Speech	1.450	.0035	.01	349	-0.36	.7174
Social Performance Survey Schedule						
Appropriate Social Skills	13.580	.054	.08	347	0.72	.4722
Communication Skills	27.794	.060	.13	347	0.46	.6476
Inappropriate Assertion	11.941	-.005	.09	347	-0.05	.9565
Sociopathic Behavior	10.381	-.109	.06	347	-1.78	.0765

*$p < .05$. **$p < .01$. ***$p < .001$.

References

Adams, Z. W., & Boyd, S. E. (2010). Ethical challenges in the treatment of individuals with intellectual disabilities. *Ethics & Behavior, 20*(6), 407-418.

Ainsworth, P., & Baker, P. C. (2004). *Understanding mental retardation*. Jackson, MS: University Press of Mississippi.

Aman, M. G., & Singh, N. N. (1986). *Abberrant Behavior Checklist: Manual*. East Aurora, NY: Slosson Educational Publications, Inc.

Aman, M. G., Singh, N. N., Stewart, A. W., & Field, C. J. (1985). Psychometric characteristics of the Aberrant Behavior Checklist. *American Journal of Mental Deficiency, 89*(5), 492-502.

American Association of Mental Retardation, Definition of mental retardation, classification, and systems of supports (10th ed.). Washington, DC: American Association on Mental Retardation.

American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders (4th ed., text revision). Washington, DC: American Psychiatric Association.

American Psychiatric Association. (2004). *Practice guideline for the treatment of patients with acute stress disorder and posttraumatic stress disorder*. Arlington, VA: American Psychiatric Association.

American Psychological Association. (2014). *Division 33: Intellectual and Developmental Disabilities*. Retrieved from http://www.apa.org/about/division/div33.aspx

Armstrong, M. S., & Vaughan, K. (1996). An orienting response model of eye movement desensitization. *Journal of Behavior Therapy and Experimental Psychiatry, 27*(1), 21-32.

Axelrod, B. N. (2002). Validity of the Wechsler Abbreviated Scale of Intelligence and other very short forms of estimating intellectual functioning. *Assessment, 9*, 17-23.

Bandura, A. (2004). Swimming against the mainstream: The early years from chilly tributary to transformative mainstream. *Behaviour Research and Therapy, 42*, 613-630.

Barlow, D. H., Nock, M. K., & Herson, M. (2009). *Single case experimental designs: Strategies for studying behavior change* (3rd ed.). Boston, MA: Pearson Education, Inc.

Barol, B., & Seubert, A. (2010). Stepping stones: EMDR treatment of individuals with intellectual and developmental disabilities and challenging behavior. *Journal of EMDR Practice and Research, 4*(4), 156-169.

Beail, N. (2003). What works for people with mental retardation? Critical commentary on cognitive-behavioral and psychodynamic psychotherapy research. *Mental Retardation, 41*(6), 468-472.

Beail, N. (2005). Responses to Sturmey (2005) on psychotherapy evidence base for behavioral interventions: Critical commentary. *Mental Retardation, 43*(6), 442-445.

Beck, A. T., Rush, A. J., Shaw, B., & Emery, G. (1979). *Cognitive therapy of depression*. New York, NY: Guilford Press.

Belter, R. W., & Piotrowski, C. (2001). Current status of doctoral-level training in psychological testing. *Journal of Clinical Psychology, 57*, 717-726.

Bergmann, U. (2010). EMDR's neurobiological mechanisms of action: A survey of 20 years of searching. *Journal of EMDR Practice and Research, 4*(1), 22-42.

Bisson, J., & Andrew, M. (2007). Psychological treatment of post-traumatic stress disorder (PTSD). *Cochrane Database of Systemic Reviews*(3), CD003388.

Black, E. (2003). *War against the weak: Eugenics and America's campaign to create a master race*. New York, NY: Four Walls Eight Windows.

Boccaccini, M. T., & Brodsky, S. L. (1999). Diagnostic test usage by forensic psychologists in emotional injury cases. *Professional Psychology: Research and Practice, 30*(3), 253-259.

Briere, J. (1996). *Trauma Symptom Checklist for Children (TSCC): Professional manual*. Lutz, FL: Psychological Assessment Resources, Inc.

Briere, J. (1997). *Psychological assessment of adult posttraumatic states.* Psychotherapy practitioner resource book series. Washington, DC: American Psychological Association.

Brown, E., C., Aman, M., G., & Havercamp, S., M. (2002). Factor analysis and norms for parent ratings on the Aberrant Behavior Checklist-Community for young people in special education. *Research in Developmental Disabilities, 23*, 45-60.

Butz, M. R., & Bowling, J. B. (2000). Psychotherapy with the mentally retarded: A review of the literature and the implications. *Professional Psychology: Research & Practice, 31*(1), 42.

Cahill, L., & McGaugh, J. L. (1998). Mechanisms of emotional arousal and lasting declarative memory. *Trends in Neurosciences, 21*, 294-299.

iWorx Physiology Lab Data System (Equipment and analysis software). (2009). Dover, New Hampshire. CB Sciences, Inc.

Chambless, D. L., & Hollon, S. D. (1998). Defining empirically supported therapies. *Journal of Consulting and Clinical Psychology, 66*(1), 7-18.

Chambless, D. L., & Ollendick, T. H. (2001). Empirically supported psychological interventions: Controversies and evidence. *Annual Review Psychology, 52*, 685-716.

Chambless, D. L., Sanderson, W. C., Shoham, V., Bennett Johnson, S., Pope, K. S., Crits-Cristoph, P., McCurry, S. (1996). Update on empirically validated therapies. *The Clinical Psychologist, 49*, 5-18.

Cole, R. J., Kripke, D. F., Gruen, W., Mullaney, D. J., & Gillin, J. C. (1992). Automatic sleep/wake identification from wrist activity. *Sleep, 15*(5), 461-469.

Cooke, L. B. (2003). Treating the sequelae of abuse in adults with learning disabilities. *British Journal of Developmental Disabilities, 49*(96), 23-28.

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

EyeScan Deluxe (Equipment). (2009). Wheat Ridge, Colorado: Neurotek Corporation

Corrigan, P. W. (2002). Testing social cognitive models of mental illness stigma: The Prairie State Stigma Studies. *Psychiatric Rehabilitation Skills, 6*, 232-254.

Davidson, J. R. T., & Foa, E. B. (1993). *Posttraumatic stress disorder: DSM-IV and beyond*. Washington, DC: American Psychiatric Press.

Deb, S., Thomas, M., & Bright, C. (2001). Mental disorder in adults with intellectual disability. I: Prevalence of functional psychiatric illness among a community-based population aged between 16 and 64 years. *Journal of Intellectual Disability Research, 45*(6), 495-505.

Delahanty, D. L., & Nugent, N. R. (2006). Predicting PTSD prospectively based on prior trauma history and immediate biological responses. *Annals of The New York Academy of Sciences, 1071*, 27-40.

Department of Defense and Department of Veterans Affairs. (2010). *Clinical practice guideline for the management of post-traumatic stress*. Washington, DC: Veterans Health Administration, Department of Veterans Affairs and Health Affairs, Department of Defense.

Derogatis, L. R. (1993). *BSI administration, scoring & procedures manual-II*. Bloomington, MD: Pearson.

Derogatis, L. R., & Cleary, P. A. (1977). Confirmation of the dimensional structure of the SCL-90-R: A study in construct validation. *Journal of Clinical Psychology, 33*(4), 981-989.

Derogatis, L. R., & Melisaratos, N. (1983). The Brief Symptom Inventory: An introductory report. *Psychological Medicine, 13*(3), 595-605.

Dilly, R. (2014). Eye movement desensitization and reprocessing in the treatment of trauma with mild intellectual disabilities: A case study. *Advances in Mental Health and Intellectual Disabilities, 8*(1), 63-71

Dyck, M. J. (1993). A proposal for a conditioning model of eye movement desensitization treatment for posttraumatic stress disorder. *Journal of Behavior Therapy and Experimental Psychiatry, 24*(3), 201-210.

Einfeld, S., & Tonge, B. (2002). *Developmental Behaviour Checklist (DBC)*. Victoria, Australia: Centre for Developmental Psychiatry and Psychology Monash University.

Elliott, R., Fox, C. M., Beltyukova, S. A., Stone, G. E., Gunderson, J., & Zhang, X. (2006). Deconstructing therapy outcome measurement with Rasch analysis of a measure of general clinical distress: The Symptom Checklist-90-Revised. *Psychological Assessment, 18*(4), 359-372.

Elofsson, U. O., von Scheele, B., Theorell, T., & Sondergaard, H. P. (2008). Physiological correlates of eye movement desensitization and reprocessing. *Journal of Anxiety Disorders, 22*(4), 622-634.

EMDR International Association. (2014). *EMDR: Trauma research findings and further reading*. Retrieved from http://www.emdria.org/associations/12049/files/EMDR%20Research%202013.pdf

EMDR International Association. (2014). *Francine Shapiro Library*. Retrieved from http://emdr.nku.edu/

Esralew, L. (2002). How to help persons with disabilities cope with fears about terrorism. *Healthy Times, 13*(2), 1-7.

Eysenck, H. J. (1952). The effects of psychotherapy: An evaluation. *Journal of Consulting Psychology, 16*(5), 319-324.

Eysenck, H. J. (1965). The effects of psychotherapy. *International Journal of Psychiatry, 1*, 99-178.

Fernando, K., & Medlicott, L. (2009). My shield will protect me against the ANTS: Treatment of PTSD in a client with an intellectual disability. *Journal of Intellectual & Developmental Disability, 34*(2), 187-192.

Firth, H., Balogh, R., Berney, T., Bretherton, K., Graham, S., & Whibley, S. (2001). Psychopathology of sexual abuse in young people with intellectual disability. *Journal Of Intellectual Disability Research, 45*(3), 244-252.

Fletcher, R., Loschen, E., Stavrakaki, C., & First, M. (2007). Diagnostic manual--intellectual disability: A textbook of diagnosis of mental disorders in persons with intellectual disability. In R. Fletcher, E. Loschen, C. Stavrakaki & M. First (Eds.), *Diagnostic manual--intellectual disability: A textbook of diagnosis of mental disorders in persons with intellectual disability* (pp. 63-68). Kingston, NY: National Association for the Dually Diagnosed.

Foa, E. B., Keane, T. M., Friedman, M. J., & Cohen, J. A. (2008). *Effective treatments for PTSD: Practice guidelines from the International Society for Traumatic Stress Studies* (2nd ed.). New York, NY: Guilford Press.

Focht-New, G., Barol, B., Clements, P. T., & Milliken, T. F. (2008). Persons with developmental disability exposed to interpersonal violence and crime: Approaches for intervention. *Perspectives in Psychiatric Care, 44*(2), 89-98.

Gaus, V., Palacio, G., & Carbone, D. (2000). Posttraumatic stress disorder: Providing psychotherapy for adults with developmental disabilities. In A. Poindexter (Ed.),

Assessment and treatment of anxiety disorders in persons with mental retardation (pp. 61-64). Kingston, NY: National Association for the Dually Diagnosed Press.

Gentile, J. P., & Gillig, P. M. (2012). *Psychiatry of Intellectual Disability: A Practical Manual*. West Sussex, UK: John Wiley & Sons.

Gentile, J. P., & Jackson, C. S. (2008). Supportive psychotherapy with the dual diagnosis patient: Co-occurring mental illness/intellectual disabilities. *Psychiatry, 5*(3), 49-57.

Giamp, J. S. (2004). Honoring their voice: Eye movement desensitization and reprocessing through the eyes of inmates with developmental disabilities. *Dissertation Abstracts International: Section B. Sciences and Engineering, 65*(1), 436.

Giltaij, H. (2004). Alsof er een stofzuiger door mijn hoofd is gegaan. EMDR bij mensen met een visuele en verstandelijke beperking. [As if a vacuum cleaner went through my head. EMDR in people with visual and intellectual disabilities]. *Tijdschrift voor Kinder-& Jeugdpsychotherapie, 3*, 81-97.

Greenwald, R. (May, 2004,). *Child trauma measures for research and practice*. Paper presented at the Annual meeting of the EMDR International Association, Montreal. http://www.childtrauma.com/publications/child-trauma-measures

Greenwald, R. (2007). *EMDR: Within a phase model of trauma-informed treatment*. Binghamton, NY: Haworth Press, Inc.

Grossman, H. J. (1983). *Classification in mental retardation*. Washington, DC: American Association on Mental Retardation.

Gurvits, T. V., Gilbertson, M. W., Lasko, N. B., Tarhan, A. S., Simeon, D., Macklin, M. L., Pitman, R. K. (2000). Neurologic soft signs in chronic posttraumatic stress disorder. *Archives of General Psychiatry, 57*(2), 181-186.

Hartley, S. L., Horrell, S. V., & Maclean, W. E., Jr. (2007). Science to practice in intellectual disability: The role of empirically supported treatments. In J. W. Jacobson, J. A. Mulick & J. Rojahn (Eds.), *Handbook of intellectual and developmental disabilities* (pp. 425-443). New York, NY: Springer.

Hatton, C. (2002). Psychosocial interventions for adults with intellectual disabilities and mental health problems: A review. *Journal of Mental Health, 11*(4), 357-374.

Hays, J. R., Reas, D. L., & Shaw, J. B. (2002). Concurrent validity of the Wechsler Abbreviated Scale of Intelligence and the Kaufman Brief Intelligence Test among psychiatric inpatients. *Psychological Reports, 90*, 355-359.

Helmes, E. (1993). A modern instrument for evaluating psychopathology: The Personality Assessment Inventory. *Journal of Personality Assessment, 61*, 414-417.

Hodapp, R. M., Burack, J. A., & Zigler, E. (1990). *Issues in the developmental approach to mental retardation*. New York, NY: Cambridge University Press.

Hodapp, R. M., & Dykens, E. M. (2001). Strengthening behavioral research on genetic mental retardation syndromes. *American Journal on Mental Retardation, 106*(1), 4-15.

Hopper, J. W., Spinazzola, J., Simpson, W. B., & van der Kolk, B. A. (2006). Preliminary evidence of parasympathetic influence on basal heart rate in posttraumatic stress disorder. *Journal of Psychosomatic Research, 60*(1), 83-90.

Horner-Johnson, W., & Drum, C. E. (2006). Prevalence of maltreatment of people with intellectual disabilities: A review of recently published research. *Mental Retardation and Developmental Disabilities Research Reviews, 12*(1), 57-69.

Horowitz, M., Wilner, N., & Alvarez, W. (1979). Impact of Event Scale: A measure of subjective stress. *Psychosomatic Medicine, 41*(3), 209-218.

Hurley, A. D. (2005). Psychotherapy is an essential tool in the treatment of psychiatric disorders for people with mental retardation. *Mental Retardation, 43*(6), 445-448.

Hurley, A. D., Pfadt, A., Tomasulo, D., & Gardner, W. I. (1996). *Counseling and psychotherapy* (Vol. 1, pp. 371-378). Washington, DC: American Psychological Association.

Jacobson, J. W. (2007). *Handbook of intellectual and developmental disabilities*. New York, NY: Springer.

Jacobson, J. W., & Mulick, J. A. (1996). *Manual of diagnosis and professional practice in mental retardation* (Vol. 1). Washington, DC: American Psychological Association.

Jeffries, F. W., & Davis, P. (2013). What is the role of eye movements in eye movement desensitization and reprocessing (EMDR) for post-traumatic stress disorder (PTSD)? A review. *Behavioural and Cognitive Psychotherapy, 41*(03), 290-300.

Joseph, J. (2005). The 1942 'euthanasia' debate in the American Journal of Psychiatry. *History of Psychiatry, 16*(62), 171-179.

Joyce, T., Globe, A., & Moody, C. (2006). Assessment of the component skills for cognitive therapy in adults with intellectual disability. *Journal of Applied Research in Intellectual Disabilities, 19*(1), 17-23.

Kanner, L. (1967). Medicine in the history of mental retardation: 1800-1965. *American Journal of Mental Deficiency, 72*(2), 165-170.

Kazdin, A. E. (2003). Drawing valid inferences from case studies. In A. E. Kazdin (Ed.), *Methodological issues & strategies in clinical research* (3rd ed., pp. 655-669). Washington, DC: American Psychological Association.

Kazdin, A. E. (2008). Evidence-based treatment and practice: New opportunities to bridge clinical research and practice, enhance the knowledge base, and improve patient care. *American Psychologist, 63*(3), 146-159.

Kellett, S., Beail, N., Newman, D. W., & Frankish, P. (2003). Utility of the Brief Symptom Inventory in the assessment of psychological distress. *Journal of Applied Research in Intellectual Disabilities, 16*(2), 127-134.

Kellett, S., Beail, N., Newman, D. W., & Mosley, E. (1999). Indexing psychological distress in people with an intellectual disability: Use of the Symptom Checklist-90-R. *Journal of Applied Research in Intellectual Disabilities, 12*, 323-334.

King, R. (2005). Proceeding with compassion while awaiting the evidence: Psychotherapy and individuals with mental retardation. *Mental Retardation, 43*(6), 448-450.

King, R., Nixon, J., Beatty, K., Szalajko, J., Marwick, L., & Prescott, H. (2004). Posttraumatic stress disorder and phenotype-specific challenging behavior in an individual with Smith-Magenis Syndrome: A multimodal approach. *Mental Health Aspects of Developmental Disabilities, 7*(4), 131-141.

Kinzie, J. D., Cheng, K., Tsai, J., & Riley, C. (2006). Traumatized refugee children: The case for individualized diagnosis and treatment. *Journal of Nervous and Mental Disease, 194*(7), 534-537.

Korn, D. L. (2010). *EMDR Fidelity Rating Scale - Clinician Instructions*. Austin, TX: EMDRIA.

Korn, D. L. (2010). *EMDR Fidelity Rating Scale - Rater Instructions*. Austin, TX: EMDRIA.

Korn, D. L. (2010). *EMDR Fidelity Rating Scale for Inter-rater Reliability Study*. Austin, TX: EMDRIA.

Korn, D. L., & Spinazzola, J. (2001). *EMDR Treatment Manual Research Protocol*. Austin, TX: EMDRIA.

Korn, D. L., Zangwill, W., Lipke, H., & Smyth, M. J. (2001). *EMDR fidelity rating scale*. Austin, TX: EMDRIA.

Kroese, B. S., & Thomas, G. (2006). Treating chronic nightmares of sexual assault survivors with an intellectual disability--Two descriptive case studies. *Journal of Applied Research in Intellectual Disabilities, 19*(1), 75-80.

Kuiken, D., Bears, M., Miall, D., & Smith, L. (2001). Eye movement desensitization reprocessing facilitates attentional orienting. *Imagination, Cognition and Personality, 21*(1), 3-20.

Lamprecht, F., Kohnke, C., Lempa, W., Sack, M., Matzke, M., & Munte, T. F. (2004). Event-related potentials and EMDR treatment of post-traumatic stress disorder. *Neuroscience Research, 49*(2), 267-272.

Lansing, K., Amen, D. G., Hanks, C., & Rudy, L. (2005). High-resolution brain SPECT imaging and eye movement desensitization and reprocessing in police officers with PTSD. *The Journal of Neuropsychiatry & Clinical Neurosciences, 17*(4), 526-532.

Lee, C. W., & Cuijpers, P. (2013). A meta-analysis of the contribution of eye movements in processing emotional memories. *Journal of Behavior Therapy and Experimental Psychiatry, 44*(2), 231-239.

Lee, C. W., & Cuijpers, P. (2014). What does the data say about the importance of eye movement in EMDR? *Journal of Behavior Therapy and Experimental Psychiatry, 45*(1), 226-228.

Lemmon, V. A., & Mizes, J. S. (2002). Effectiveness of exposure therapy: A case study of posttraumatic stress disorder and mental retardation. *Cognitive and Behavioral Practice, 9*(4), 317-323.

Levant, R. F. (2005). *Report of the 2005 Presidential Task Force on Evidence-Based Practice 1: American Psychological Association*. Washington, D.C

Levin, P., Lazrove, S., & van der Kolk, B. (1999). What psychological testing and neuroimaging tell us about the treatment of posttraumatic stress disorder by eye movement desensitization and reprocessing. *Journal of Anxiety Disorders, 13*(1-2), 159-172.

Levitt, E. E. (1957). The results of psychotherapy with children: An evaluation. *Journal of Consulting Psychology, 21*, 186-189.

Levitt, E. E. (1963). The results of psychotherapy with children: A further evaluation. *Behavior Research and Therapy, 60*, 326-329.

Levitt, E. E. (1971). Research of psychotherapy with children. In A. E. Bergin & S. L. Garfield (Eds.), *Handbook of Psychotherapy and Behavior Change* (pp. 474-493). New York, NY: Wiley.

Loschen, E. L., & Saliga, C. A. (2000). Anxiety disorders in a clinic population. In A. Poindexter (Ed.), *Assessment and treatment of anxiety disorders in persons with mental retardation* (pp. 13-18). Kingston, NY: National Association of the Dually Diagnosed.

Lowe, M. R. (1982). Validity of the Positive Behavior Subscale of the Social Performance Survey Schedule in a psychiatric population. *Psychological Reports, 50*(1), 83-87.

Lowe, M. R. (1985). Psychometric evaluation of the Social Performance Survey Schedule: Reliability and validity of the positive behavior subscale. *Behavior Modification, 9*(2), 193-210.

Lowe, M. R., & Cautela, J. R. (1978). A self-report measure of social skill. *Behavior Therapy, 9*(4), 535-544.

Luckasson, R., Borthwick-Duffy, S. A., Buntinx, W. H. E., Coulter, D. L., Craig, E. M., & Reeve, A. (2002). *Mental retardation: Definition, classification, and systems of supports* (Vol. 10). Washington, DC: American Association on Mental Retardation.

Lynch, C. (2004). Psychotherapy for persons with mental retardation. *Mental Retardation, 42*(5), 399-405.

MacCulloch, M. J., & Feldman, P. (1996). Eye movement desensitisation treatment utilises the positive visceral element of the investigatory reflex to inhibit the

memories of post-traumatic stress disorder: A theoretical analysis. *British Journal of Psychiatry, 169*(5), 571-579.

Mansell, J., & Sobsey, D. (2001). *Counseling people with developmental disabilities who have been sexually abused*. Kingston, NY: National Association for the Dually Diagnosed.

Maruish, M. E. (2004). *The use of psychological testing for treatment planning and outcomes assessment: Instruments for adults* (Vol. 3). Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Matson, J. L. (2013). Narrative overview of systematic reviews and meta-analyses: Evidence on many treatments for psychopathology in people with developmental disabilities is limited. *Evidence Based Mental Health, 16*(2), 44.

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

Matson, J. L., Laud, R. B., & Matson, M. L. (2004). *Behavior modification for persons with developmental disabilities: Treatments and supports* (Vol. 2). Kingston, NY: National Association for the Dually Diagnosed.

Matson, J. L., & Sevin, J. A. (1994). Theories of dual diagnosis in mental retardation. *Journal of Consulting and Clinical Psychology, 62*(1), 6-16.

McCarthy, J. (2001). Post-traumatic stress disorder in people with learning disability. *Advances in Psychiatric Treatment, 7*, 163-169.

McCreary, B. D., & Thompson, J. (1999). Psychiatric aspects of sexual abuse involving persons with developmental disabilities. *Canadian Journal of Psychiatry, 44*(4), 350-355.

Mevissen, L., & de Jongh, A. (2010). PTSD and its treatment in people with intellectual disabilities: A review of the literature. *Clinical Psychology Review, 30*(3), 308-316.

Mevissen, L., Lievegoed, R., & de Jongh, A. (2011). EMDR treatment in people with mild ID and PTSD: 4 cases. *Psychiatric Quarterly, 82*(1), 43-57.

Mevissen, L., Lievegoed, R., Seubert, A., & De Jongh, A. (2011). Do persons with intellectual disability and limited verbal capacities respond to trauma treatment? *Journal of Intellectual and Developmental Disability, 36*(4), 274-279.

Mevissen, L., Lievegoed, R., Seubert, A., & De Jongh, A. (2012). Treatment of PTSD in people with severe intellectual disabilities: A case series. *Developmental Neurorehabilitation, 15*(3), 223-232.

Meyer, M. P. (2001). *Use of the Wechsler Abbreviated Scale of Intelligence in a vocational rehabilitation sample*. Ann Arbor, MI: ProQuest Information & Learning.

Mitchell, A., & Clegg, J. (2005). Is post-traumatic stress disorder a helpful concept for adults with intellectual disability? *Journal of Intellectual Disability Research, 49*(7), 552-559.

Mohr, C., Tonge, B. J., & Einfeld, S. L. (2005). The development of a new measure for the assessment of psychopathology in adults with intellectual disability. *Journal of Intellectual Disability Research, 49*(7), 469-480.

Mohr, C., Tonge, B. J., Taffe, J., Rymill, A., Collins, D., Keating, C., & Einfeld, S. L. (2011). Inter-rater reliability of the Developmental Behaviour Checklist for Adults in community accommodation settings. *Journal of Intellectual Disability Research, 55*(7), 710-713.

Moran, D. S., Heled, Y., & Gonzalez, R. R. (2004). Metabolic rate monitoring and energy expenditure prediction using a novel actigraphy method. *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research, 10*(11), 117-120.

Morey, L. C. (2007). *Personality Assessment Inventory - Adolescent (PAI-A): Professional Manual*. Lutz, FL: Psychological Assessment Resources.

Motionlogger (actigraph and data transfer equipment). (2008). Ardsley, New York: Ambulatory Monitoring, Inc.

Nagels, G., Engelborghs, S., Vloeberghs, E., Van Dam, D., Pickut, B. A., & de Deyn, P. P. (2006). Actigraphic measurement of agitated behavior in dementia. *International Journal of Geriatric Psychiatry, 21*, 388-393.

National Center for Biotechnology Information. (2014, February 26). Online Mendelian Inheritance in Man (OMIM). Retrieved from http://(www.ncbi.nlm.nih.gov/omim).

Neblung, E. (2005). Symptomatic behaviors in adults with mental retardation who have been exposed to trauma. *Dissertation Abstracts International: Section B. Sciences and Engineering, 65*(10-B), 5415-B.

Nezu, A. M. (1994). Introduction to special section: Mental retardation and mental illness. *Journal of Consulting and Clinical Psychology, 62*(1), 4-5.

Nezu, C. M., Nezu, A. M., & Gill-Weiss, M. J. (1992). *Psychopathology in persons with mental retardation: Clinical guidelines for assessment and treatment*. Champaign, IL: Research Press.

Norcross, J. C., Beutler, L. E., & Levant, R. F. (2006). *Evidence-based practices in mental health: Debate and dialogue on the fundamental questions*. Washington, DC: American Psychological Association.

Oren, E., & Solomon, R. (2012). EMDR therapy: An overview of its development and mechanisms of action. *Revue Européenne de Psychologie Appliquée/European [Review of Applied Psychology], 62*(4), 197-203.

Piotrowski, C., & Belter, R. W. (1999). Internship training in psychological assessment: Has managed care had an impact? *Assessment, 6*(4), 381.

Poindexter, A. (2000). *Assessment and treatment of anxiety disorders in persons with mental retardation*. Kingston, NY: National Association for the Dually Diagnosed.

Pole, N. (2007). The psychophysiology of posttraumatic stress disorder: A meta-analysis. *Psychological Bulletin, 133*(5), 725-746.

Potter, H. W. (1922). Personality in the mental defective, with a method for its evaluation. *Mental Hygiene, 6*, 487-497.

Prinz, U., Nutzinger, D. O., Schulz, H., Petermann, F., Braukhaus, C., & Andreas, S. (2013). Comparative psychometric analyses of the SCL-90-R and its short versions in patients with affective disorders. *BMC Psychiatry, 13*(1), 1-9.

Prout, H. T., & Browning, B. K. (2011). Psychotherapy with persons with intellectual disabilities: A review of effectiveness research. *Advances in Mental Health and Intellectual Disabilities, 5*(5), 53-59.

Prout, H. T., & Nowak-Drabik, K. M. (2003). Psychotherapy with persons who have mental retardation: An evaluation of effectiveness. *American Journal of Mental Retardation, 108*(2), 82-93.

Prout, H. T., & Strohmer, D. C. (1994). Issues in counseling and psychotherapy. In D. C. Strohmer & H. T. Prout (Eds.), *Counseling and psychotherapy with persons with mental retardation and borderline intelligence* (pp. 1-19). Hoboken, NJ: Clinical Psychology Publishing.

Psychological Corporation. Wechsler Abbreviated Scale of Intelligence: Pearson, San Antonio, TX

Rachman, S. (1971). *The effects of psychotherapy*. Oxford, NY: Pergamon Press.

Rasolkhani-Kalhorn, T., & Harper, M. L. (2006). EMDR and low frequency stimulation of the brain. *Traumatology, 12*(1), 9-24.

Razza, N. J. (1997). The challenge of treating persons with posttraumatic stress disorder. *The Habilitative Mental Healthcare Newsletter, 16*, 94-98.

Reiss, S., & Bouras, N. (1994). Psychopathology in mental retardation *Mental health in mental retardation: Recent advances and practices* (pp. 67-78). New York: Cambridge University Press.

Richardson, R. J., Blundon, J. A., Bayazitov, I. T., & Zakharenko, S. S. (2009). Connectivity patterns revealed by mapping of active inputs on dendrites of

thalamorecipient neurons in the auditory cortex. *Journal of Neuroscience, 29*(20), 6406-6417.

Rodenburg, R., Benjamin, A., Meijer, A. M., & Jongeneel, R. (2009). Eye movement desensitization and reprocessing in an adolescent with epilepsy and mild intellectual disability. *Epilepsy & Behavior, 16*(1), 175-180.

Rojahn, J., Aman, M. G., Matson, J. L., & Mayville, E. (2003). The Aberrant Behavior Checklist and the Behavior Problems Inventory: Convergent and divergent validity. *Research in Developmental Disabilities, 24*(5), 391-404.

Rosenberg, S. D., Mueser, K. T., Friedman, M. J., Gorman, P. G., Drake, R. E., Vidaver, R. M., Jankowski, M. K. (2001). Developing effective treatments for posttraumatic disorders among people with severe mental illness. *Psychiatric Services, 52*(11), 1453-1461.

Roth, A., & Fonagy, P. (2005). *What works for whom: A critical review of psychotherapy research* (2nd ed.). New York, NY: Guilford.

Routh, D. K., & Schroeder, S. R. (2003). A history of psychological theory and research in mental retardation since World War II. In L. M. Glidden (Ed.), *International review of research in mental retardation* (Vol. 26, pp. 1-59): New York: Academic Press.

Russell, A., & Shah, B. (2003). Posttraumatic stress disorder and abuse. *Developmental Disabilities Digest, 30*(2), 1-8.

Ryan, R. (1994). Posttraumatic stress disorder in persons with developmental disabilities. *Community Mental Health Journal, 30*(1), 45-54.

Ryan, R. (2000). Post-traumatic stress disorder in persons with developmental disabilities. In A. Poindexter (Ed.), *Assessment and treatment of anxiety disorders in persons with mental retardation* (pp. 37-60). Kingston, NY: National Association of the Dually Diagnosed.

Sack, M., Lempa, W., Steinmetz, A., Lamprecht, F., & Hofmann, A. (2008). Alterations in autonomic tone during trauma exposure using eye movement desensitization and reprocessing (EMDR)--results of a preliminary investigation. *Journal of Anxiety Disorders, 22*(7), 1264-1271.

Sadeh, A. (2011). The role and validity of actigraphy in sleep medicine: An update. *Sleep Medicine Reviews, 15*(4), 259-267.

Sadeh, A., & Acebo, C. (2002). The role of actigraphy in sleep medicine. *Sleep Medicine Reviews, 6*(2), 113-124.

Saigh, P. (2004). *Children's PTSD inventory: A structured interview for diagnosing posttraumatic stress disorder*. San Antonio, TX: Harcourt Assessment.

Saklofske, D. H., Caravan, G., & Schwartz, C. (2000). Concurrent validity of the Wechsler Abbreviated Scale of Intelligence (WASI) with a sample of Canadian children. *Canadian Journal of School Psychology, 16*, 87-94.

Seubert, A. (2005). EMDR with clients with mental disability. In R. Shapiro (Ed.), *EMDR solutions: Pathways to healing* (pp. 293-311). New York, NY: W. W. Norton & Co.

Shapiro, F. (2001). *Eye movement desensitization and reprocessing: Basic principles, protocols, and procedures*. New York, NY: Guilford.

Shapiro, F. (2005). *EMDR Part 1 training manual*. Watsonville, CA: EMDR Institute.

Shapiro, F. (2005). *EMDR Part 2 training manual*. Watsonville, CA: EMDR Institute.

Shapiro, F. (2006). *New notes on adaptive information processing with case formulation principles, forms, scripts, and worksheets*. Hamden, CT: EMDR Humanitarian Assistance Programs.

Shapiro, F. (2012). EMDR therapy: An overview of current and future research. *European Review of Applied Psychology / Revue Europeenne de Psychologie Appliquee, 62*(4), 193-195.

Shapiro, F. (2014). The role of eye movement desensitization and reprocessing (EMDR) therapy in medicine: Addressing the psychological and physical symptoms stemming from adverse life experience. *Permanente Journal, 18*(1), 71-77.

Shapiro, F., & Forrest, M. S. (2004). *EMDR: The breakthrough therapy for overcoming anxiety, stress, and trauma*. New York, NY: Basic Books.

Shapiro, F., Kaslow, F. W., & Maxfield, L. (2007). *Handbook of EMDR and family therapy processes*. Hoboken, NJ: John Wiley & Sons.

Shapiro, F., & Laliotis, D. (2011). EMDR and the adaptive information processing model: Integrative treatment and case conceptualization. *Clinical Social Work Journal, 39*, 191-200.

Shapiro, F., & Maxfield, L. (2002). Eye movement desensitization and reprocessing (EMDR): Information processing in the treatment of trauma. *Journal of Clinical Psychology, 58*(8), 933-946.

Shapiro, R. (2005). *EMDR solutions: Pathways to healing*. New York, NY: W. W. Norton & Co.

Siegel, D. J. (2007). *The mindful brain: Reflection and attunement in the cultivation of well-being*. New York, NY: Norton.

Simonoff, E., Pickles, A., Chadwick, O., Gringras, P., Wood, N., Higgins, S., Moore, A. (2006). The Croydon Assessment of Learning Study: Prevalence and educational identification of mild mental retardation. *Journal of Child Psychology and Psychiatry, 47*(8), 828-839.

Smith, M. L., & Glass, G. V. (1977). Meta-analysis of psychotherapy outcome studies. *American Psychologist, 32*(9), 752-760.

Solomon, R., & Shapiro, F. (2008). EMDR and the adaptive information processing model: Potential mechanisms of change. *Journal of EMDR Practice and Research, 2*, 315 - 325.

Söndergaard, H. P., & Elofsson, U. (2008). Psychophysiological Studies of EMDR. *Journal of EMDR Practice & Research, 2*(4), 282-288.

Stano, J. E. (2004). Test review. *Rehabilitation Counseling Bulletin, 48*(1), 56-57.

Stickgold, R. (2008). Sleep-dependent memory processing and EMDR action. *Journal of EMDR Practice and Research, 2*(4), 289-299.

Sturmey, P. (2005). Against psychotherapy with people who have mental retardation. *Mental Retardation, 43*(1), 55-57.

Sturmey, P. (2005). *Mood disorders in people with mental retardation*. Kingston, NY: National Association for the Dually Diagnosed.

Sturmey, P. (2006). Against psychotherapy with people who have mental retardation: In response to the responses. *Mental Retardation, 44*(1), 71-74.

Sturmey, P. (2012). Treatment of psychopathology in people with intellectual and other disabilities. *Canadian Journal of Psychiatry, 57*(10), 593-600.

Suzuki, A., Josselyn, S. A., Frankland, P. W., Masushige, S., Silva, A. J., & Kida, S. (2004). Memory reconsolidation and extinction have distinct temporal and biochemical signatures. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience, 24*, 4787-4795.

Szymanski, L., & King, B. H. (1999). Practice parameters for the assessment and treatment of children, adolescents, and adults with mental retardation and comorbid mental disorders. *Journal of the American Academy of Child & Adolescent Psychiatry, 38*(12,Suppl), 5S-31S.

Taylor, J. L. (2005). In support of psychotherapy for people who have mental retardation. *Mental Retardation, 43*(6), 450-453.

Teasdale, J. D. (1997). The relationship between cognition and emotion: The mind-in-place in mood disorders. In D. M. Clark & C. G. Fairburn (Eds.), *Science and practice*. New York: Oxford University Press.

Teasdale, J. D., Moore, R. G., Hayhurst, H., Pope, M., Williams, S., & Segal, Z. (2002). Metacognitive awareness and prevention of relapse in depression: Empirical evidence. *Journal of Consulting and Clinical Psychology, 70*, 275 - 287.

Tharner, G. (2006). Over de toepassing van EMDR bij de behandeling van mensen met een lichte verstandelijke beperking. [About the application of EMDR in the treatment of people with a mild intellectual disability]. In R. Didden (Ed.), *In perspectief. Gedragsproblemen, psychiatrische stoornissen en lichte verstandelijke beperking* (pp. 145 -168). Bohn: Stafleu van Loghum.

Thomas, J., & Hersen, M. (2003). *Understanding research in clinical and counseling psychology*. Mahwah, NJ: Lawrence Erlbaum Associates.

Tredgold, A. F. (1908). *Mental Deficiency: Amentia*. New York, NY: Balliere.

Tulen, J. H., Boomsma, F., & Man in 't Veld, A. J. (1999). Cardiovascular control and plasma catecholamines during rest and mental stress: Effects of posture. *Clinical Science, 96*, 567-576.

Turk, J., Robbins, I., & Woodhead, M. (2005). Post-traumatic stress disorder in young people with intellectual disability. *Journal of Intellectual Disability Research, 49*(11), 872-875.

Tzan-Fu, S., Ching-Kuan, W., & Nien-Mu, C. (2004). Mindfulness meditation training combined with eye movement desensitization and reprocessing in psychotherapy of an elderly patient. *Chang Gung Medical Journal, 27*, 464-469.

van den Hout, M. A., Eidhof, M. B., Verboom, J., Littel, M., & Engelhard, I. M. (2013). Blurring of emotional and non-emotional memories by taxing working memory during recall. *Cognition & Emotion*.

van der Kolk, B., & Fisler, R. (1995). Dissociation and the fragmentary nature of traumatic memories: Overview and exploratory study. *Journal of Traumatic Stress, 8*, 505-525.

van der Kolk, B., Spinazzola, J., Blaustein, M. E., Hopper, J. W., Hopper, E. K., Korn, D. L., & Simpson, W. B. (2007). A randomized clinical trial of eye movement desensitization and reprocessing (EMDR), fluoxetine, and pill placebo in the treatment of posttraumatic stress disorder: Treatment effects and long-term maintenance. *Journal of Clinical Psychiatry, 68*(1), 37-46.

Wallander, J. L., Dekker, M. C., & Koot, H. M. (2003). Psychopathology in children and adolescents with intellectual disability: Measurement, prevalence, course, and risk. In L. M. Glidden (Ed.), *International review of research in mental retardation* (Vol. 26, pp. 93-134). New York: Academic Press.

Wechsler, D. (1999). *Wechsler Abbreviated Scale of Intelligence*. New York: Psychological Corporation: Harcourt Brace.

Weiss, D. S., & Marmar, C. R. (1997). The Impact of Event Scale-Revised. In J. P. Wilson & T. M. Keane (Eds.), *Assessing psychological trauma and PTSD: A practitioner's handbook* (2nd ed., pp. 168 - 189). New York, NY: Guilford.

Whitehouse, R. M., Tudway, J. A., Look, R., & Kroese, B. S. (2006). Adapting individual psychotherapy for adults with intellectual disabilities: A comparative review of the cognitive-behavioural and psychodynamic literature. *Journal of Applied Research in Intellectual Disabilities, 19*(1), 55-65.

Wieland, J., Wardenaar, K. J., Fontein, E., & Zitman, F. G. (2012). Utility of the Brief Symptom Inventory (BSI) in psychiatric outpatients with intellectual disabilities. *Journal of Intellectual Disability Research, 56*(9), 843-853.

Wilgosh, L. (1993). Sexual abuse of children with disabilities: Intervention and treatment issues for parents. *Developmental Disabilities Bulletin, 21*(2), 1-12.

Willner, P. (2005). The effectiveness of psychotherapeutic interventions for people with learning disabilities: A critical overview. *Journal of Intellectual Disability Research, 49*(1), 73-85.

Wilson, D. L., Silver, S. M., Covi, W. G., & Foster, S. (1996). Eye movement desensitization and reprocessing: Effectiveness and autonomic correlates. *Journal of Behavior Therapy and Experimental Psychiatry, 27*(3), 219-229.

World Health Organization. (2006). , 10th revision, version for 2006, Chapter V, from http://www3.who.int/icd/currentversion/fr-icd.htm

World Health Organization. (2013). *Guidelines for the management of conditions specifically related to stress*. Geneva: WHO.