

THE PSYCHOMETRIC PROPERTIES OF A NEWLY ADAPTED SOCIAL COGNITIVE MEASURE FOR
ADOLESCENTS: THE REFLECTIVE FUNCTION QUESTIONNAIRE FOR YOUTH

A Thesis

Presented to

The Faculty of the Department

of Psychology

University of Houston

In Partial Fulfillment

Of the Requirements for the Degree of

Master's

By

Carolyn Ha

May, 2012

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Abstract

Borderline Personality Disorder (BPD) is a challenging disorder characterized by difficulties in interpersonal relationships. To explain the etiology of BPD, Fonagy and colleagues (1991) have developed a social-cognitive (mentalization) based model. The model hypothesizes that secure attachment is the basis from which social-cognitive (mentalizing) capacities develop. According to this model, mentalizing capacity specifically involves the individual's ability to understand or reflect on the context of, or the causes of, self and others' thoughts and feelings and is therefore defined as Reflective Function (RF; Fonagy et al., 1991). Several measures have been developed for assessment of reflective function in adults, both interview-based and self-report questionnaires. The interview based measure of reflective function has been adapted for use in children and adolescents (Target, Oandasan, & Ensink, 2001), and a questionnaire based measure of reflective function was adapted by Sharp et al. (2009) for use in adolescents. However, the Reflective Function Questionnaire for Youths (RFQY) has not yet been validated.

The overall aim of the current study was to investigate the reliability and validity of the RFQY in consecutive admissions of inpatient adolescents ages 12-17 ($N = 100$). Results indicated low internal consistency on the RFQY with all 46 items, but supported both criterion and convergent validity. Discriminant validity analysis of the RFQY revealed significant differences between BPD patients and non-patients. However, follow-up ROC analyses revealed that the RFQY is not sensitive or specific in identifying cases of BPD in an inpatient setting. Overall, this study supports the use of the RFQY as a measure of mentalization for adolescents.

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Introduction

Borderline Personality Disorder (BPD) is characterized by deficits in multiple areas of functioning including cognitive, affective, and behavioral domains. The DSM-IV-TR requires that five out of nine clinical symptoms are present for a full diagnosis of BPD including fears of abandonment, identity disturbance, inappropriate and intense anger, suicidal ideation and gestures, impulsivity, feelings of emptiness, emotional instability, transient-stress related paranoid thoughts, and unstable interpersonal relationships (APA, 2000). Table 1 provides the full diagnostic criteria for BPD as outlined in the DSM-IV-TR.

Table 1. DSM-IV-TR Diagnostic Criteria for Borderline Personality Disorder (APA, 2000)

A pervasive pattern of instability of interpersonal relationships, self-image, and affects and marked impulsivity beginning by early adulthood and present in a variety of contexts as indicated by five (or more) of the following:

- 1) Frantic efforts to avoid real or imagined abandonment
- 2) A pattern of unstable and intense interpersonal relationships characterized by alternating between extremes of idealization and devaluation
- 3) Identity disturbance markedly and persistently unstable self-image or sense of self
- 4) Impulsivity in at least two areas that are potentially self-damaging (e.g. spending, sex, substance abuse, reckless driving, binge eating)
- 5) Recurrent suicidal behavior, gestures, or threats, or self-mutilating behavior
- 6) Affective instability due to a marked reactivity of mood (e.g. intense episodic dysphoria, irritability, or anxiety usually lasting a few hours and only rarely more than a few days)
- 7) Chronic feelings of emptiness

- 8) Inappropriate, intense anger or difficulty controlling anger (e.g.) frequent displays of temper, constant anger, recurrent physical fights)
 - 9) Transient, stress-related paranoid ideation or severe dissociative symptoms
-

BPD is common, with an estimated 10% of adult psychiatric outpatients and 20% of inpatients having a diagnosis of BPD (Swartz, Blazer, George, & Winfield, 1990; Widiger & Weissman, 1991), including a lifetime prevalence estimated around 6% (Grant et. al., 2008). Studies have demonstrated stability for BPD over time (Deschamps & Vreugdenhil, 2008) in adults. Compared to other personality disorders, BPD is associated with high comorbidity with other Axis I and II disorders (Grant et al., 2008; Zanirini et al., 1998; Eaton et al., 2011). Gunderson et al. (1975) have found that individuals suffering from BPD function at a similar level to those with schizophrenia. Furthermore, patients afflicted with the disorder have increased risk for suicide completion (Paris, 2009) and continue to place a staggering burden on the medical and mental health communities, causing a significant drain on these resources. Poor outcomes have also been demonstrated in nonclinical populations of young adults with borderline features (Trull, Ueda, Conforti, & Doan, 1997).

Given the severity and prevalence of BPD in adult inpatients, it is essential to investigate the developmental pathways that lead to the disorder so that early interventions may be developed to prevent the relatively stable trajectory usually associated with borderline pathology. One such pathway is through the mechanism of social-cognitive functioning (Sharp & Fonagy, 2008). However, few measures of social-cognitive functioning have been developed that may discriminate adolescents with BPD from adolescents without BPD. The aim of the

proposed study was to provide validation evidence for a newly adapted social-cognitive measure that may be sensitive for identifying adolescents with BPD. In the remainder of this document, the issues surrounding a diagnosis of BPD in adolescence will first be presented, then etiological models of BPD will be described with a specific goal of introducing a social-cognitive model of BPD. Next, existing social-cognitive measures in adults and adolescents are discussed, with specific aims and methods outlined for the current study. Finally, results and conclusions are reported.

Diagnosis of BPD in Adolescence

There has been ongoing debate surrounding the diagnosis of adolescents with BPD and whether it is a valid and reliable construct in this age group (Sharp & Bleiberg, 2007; Paris, 2003; Behar & Stewart, 1987; Gualtieri & Van Bourgondien, 1987). Hesitation in diagnosing adolescents with BPD is due to a variety of factors including negative consequences of stigmatizing youth with a lifelong disorder (Hinshaw & Cicchetti, 2000). Hesitation is also due to the issues with whether BPD symptoms such as mood dysregulation, aggressive behaviors, and impulsivity, are unique to BPD rather than common of adolescent development more generally. Historically, it has been argued that the BPD diagnosis in adolescents lack stability. However, increasing evidence has demonstrated reliability and stability of the diagnosis in this age group (see Bondurant et al, 2004 for a review; Crick, Murray-Close, & Woods, 2005; Chanen, Jovev, & Jackson, 2007; Westin, Shedler, Durrett, Glass & Martens, 2003; Miller, Muehlenkamp, & Jacobson, 2008; Sharp & Romero, 2007; DeClercq, Van Leeuwen, Noortgate, DeBolle, & DeFtuyt, 2009). For example, Gratz et al., (2009) found support for BPD traits including problems in affect regulation, and dishibition in children and adolescents between

ages 9-13 with BPD symptoms. Furthermore, prospective longitudinal studies have found support for early disturbances in genes and environment contributing to BPD symptoms in adulthood (Cralson, Egeland, & Srouge, 2009; Bornovalova, Hicks, Iacono, & McGuie, 2009). Taken together, these findings contribute further evidence toward the reliability and validity of the BPD construct in adolescence.

In adolescence, the disorder affects 11% of outpatients (Chanen, et al., 2004) and reportedly, 43% to 49% of inpatients (Grilo et al, 1998; Levy et al., 1999). In comparison to other personality disorders, child and adolescent populations diagnosed with BPD are reported to have increased rates of hospitalization due to suicidal ideation or attempts (Marc Guile & Greenfield, 2004), poor clinical and psychosocial functioning (Taylor et al, 2008; Chanen Jovev, & Jackson, 2007), and remain a challenging group to treat (Miller, Neft, & Golombeck, 2008). The prognosis for adolescents suffering from borderline symptoms is poor, negatively impacting their ability to achieve certain milestones such as occupational attainment and partner involvement (Winograd, Cohen, & Chen, 2008). It is therefore important to intervene early with youth at risk for BPD.

Etiological Models of BPD

A complex interplay between genes and environment, and risk and protective factors all contribute to the etiology of BPD (Bornovalova, et al., 2009; Torgerson et al., 2000; Cole, LLera, & Pemberton, 2009; Crawford, Cohen, Chen, Anglin, & Ehrensaft, 2009). The core characteristics of BPD including emotion dysregulation, impulsivity, and disturbances in interpersonal functioning have been linked to different theoretical models (Linehan, 1993; Zanarini, 1993; Fonagy, Target, & Gergely, 2000). Attachment theory has been applied to

explain the interpersonal dysfunctions in patients with BPD (Hill et al., 2008; Sharp & Fonagy, 2008; Choi-Kain, Fitzmaurice, Zanarini, Laveriere, & Gunderson, 2009). Several studies have provided empirical support for this notion. For example, Macfie & Swan (2009) found that children who have mothers with BPD have more dysfunctional parent-child relationships when compared to a normative sample, even after controlling for depression. Bradley (1979) found that, compared to a psychiatric sample, youth diagnosed with BPD had significantly more disruptions in parental bonding early in life. In addition, a longitudinal study in a community sample of children found an interaction between maternal over-involvement and inconsistency in predicting BPD (Bezirgianian, Cohen, and Brook, 1993).

A mentalization-based model of BPD. The above findings demonstrate disruptions in attachment relations in individuals with BPD, which fits well with Fonagy et al.'s (1991) developmental model of BPD. This model focuses on the development of social-cognitive processes (mentalizing) that are at the core of interpersonal interactions in an attachment context (Bateman & Fonagy, 2004; Fonagy & Bateman, 2008; Fonagy, Gergely, Jurist, & Target, 2002; Fonagy, Target, Gergely, Allen, & Bateman, 2003; Fonagy & Luyten, 2009). The model hypothesizes that secure attachment is the basis from which mentalizing capacities develop. Based on this theory, BPD is viewed as an attachment-related disorder and disorganized (insecure) attachments are associated with social-cognitive deficits (Sharp & Fonagy, 2008; Fonagy & Luyten, 2009), particularly related to Theory of Mind (ToM) or mentalizing. The term 'theory of mind' was coined by Premack & Woodruff (1978) to refer to an individual's capacity to interpret and understand the behaviors of others within a mental state framework and has

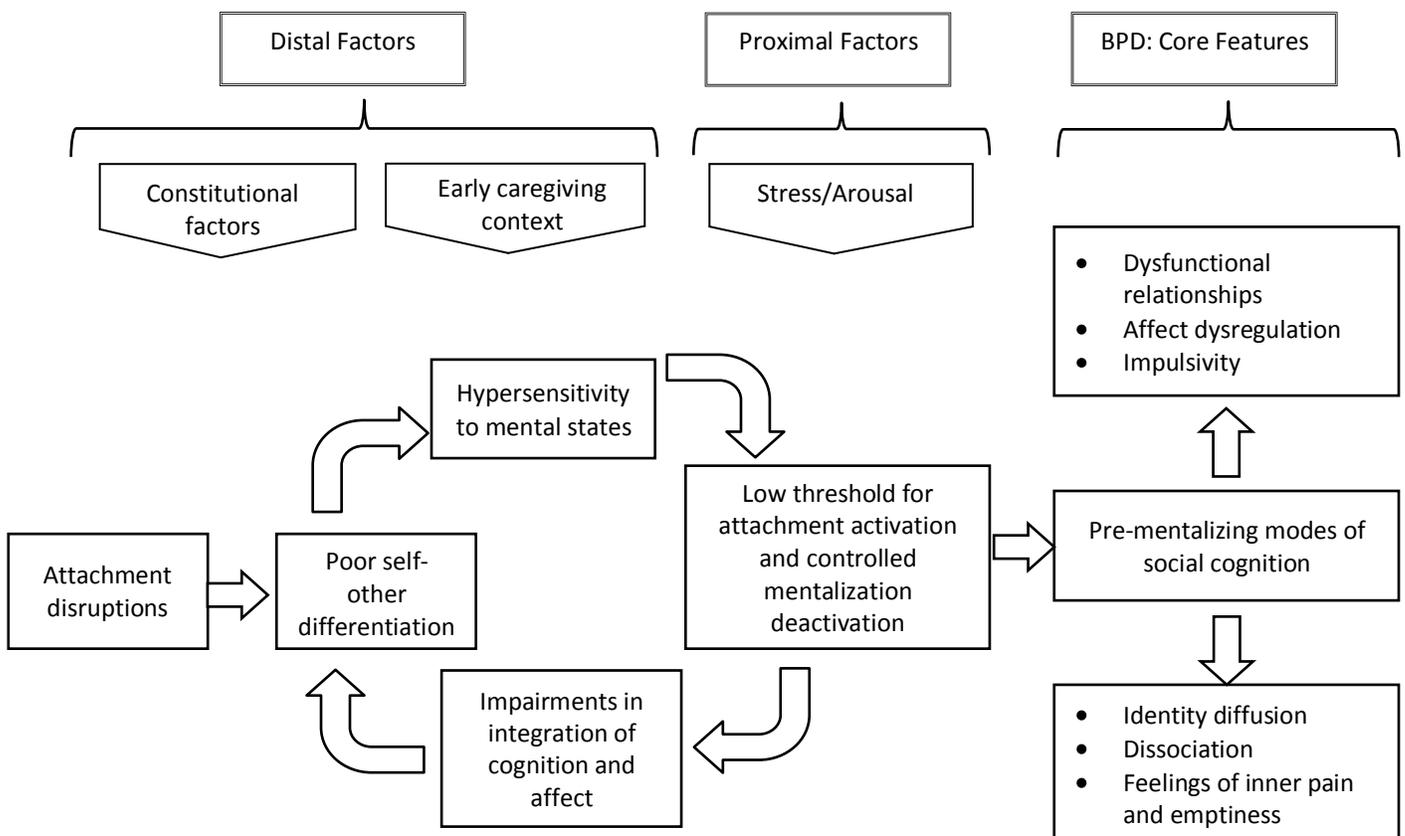
been used interchangeably with the term “mentalizing” in more recent years in both the developmental and neuroscience literature (Morton, 1989; Frith, 1992).

Similar to ToM, the construct of mentalizing is defined as an individual’s ability to understand or reflect on the context of, or the causes of, self and others’ thoughts and feelings (Fonagy et al., 1991). Mentalizing provides an individual with the ability to attribute mental states (cognitions and emotions) to self and others and to take on various perspectives in understanding the thoughts, feelings, and intentions of others. In other words, it is the person’s capacity to think about and reflect on his/her own experiences and formulate interpretations about their own and others’ behavior. Mentalization can be conceptualized as having three dimensions including: 1) implicit or explicit method of functioning, 2) in relation to self or other, and 3) in cognitive or affective aspects (Choi-Kain & Gunderson, 2008). Implicit mentalization is an automatic process while explicit mentalization is a controlled process. Mentalization can also occur internally (such as measured by self-reports) or externally (when assessed by experimental tasks examining eye regions). These dimensions demonstrate the multidimensional nature of mentalization. Furthermore, mentalization is related to constructs of mindfulness, psychological mindedness, empathy, and affect consciousness (Choi-Kain & Gunderson, 2008).

Dysfunction in different aspects of mentalization is associated with different disorders as reviewed in Fonagy & Sharp (2008), Sharp and Venta (in press), and Sharp (2006). For example, while individuals with autism appear to have deficits in mentalizing (Baron-Cohen, Golan, Chakrabarti, & Belmonte, 2008; Blair, 2008), those with depression, anxiety, and conduct problems appear to engage in distorted or biased mentalizing of self and others (Kyte &

Goodyer, 2008; Banerjee, 2008; Sharp, Croudace, & Goodyer, 2007; Ha, Sharp, & Goodyer, 2011). In schizophrenia, it has been demonstrated that these individuals suffer from inaccurate mentalization of self and others (Sprong, Schothorst, Vos, Hox, & Van Engeland, 2007; Fonagy & Sharp, 2008). Studies examining children whom have experienced maltreatment in comparison to non-maltreated children have shown that maltreated children have poorer social-cognitive abilities (Cicchetti et al., 2003; Pears and Fisher, 2005). It appears that in individuals with BPD, social-cognitive or mentalizing problems occur during highly charged emotional situations (Fonagy & Sharp, 2008). More specifically, individuals with BPD fail to mentalize appropriately when they are in aroused or stressed states. In individuals with BPD, stressful situations activate the attachment system and lead to an inability to execute controlled or explicit mentalization (Fonagy & Luyten, 2009). This dynamic model of BPD is replicated in Figure 1,

Figure 1. A dynamic mentalization model of BPD (replicated from Fonagy & Luyten, 2009)



demonstrating a pathway by which distal (environmental and biological) and proximal factors (stress or arousal) interact to result in the core features of BPD (Fonagy & Luyten, 2009).

Recently, a link between hypermentalizing and emerging BPD was demonstrated in an inpatient sample of adolescents (Sharp, Pane, Ha, Venta, Patel, et al., 2011) and adults (Preißler, Dziobek, Ritter, Heekeren, & Roepke, 2010). Interestingly, Sharp et al. (2011) showed that adolescents with BPD tend to over-interpret mental states in social situations, which resulted in inaccurate mentalizing. These findings bolster mentalization dysfunction as a central issue in both adults and adolescents with BPD.

The assessment of mentalizing in adults and adolescents

Fonagy and colleagues (1998) have operationalized mentalizing through the construct of reflective function. This is an individual's capacity to organize or makes sense of his/her own experiences and the behaviors of others in terms of mental states (i.e. emotions, beliefs, desires). To assess the construct of reflective function in adults, Fonagy and colleagues developed a reflective function scale (Fonagy, Target, Steele, & Steele, 1998), which has been shown to differentiate BPD patients who have a history of abuse from patients without BPD who have a history of abuse (Fonagy et al., 1996; Fonagy et al., 1998). This measure is called the Adult Reflective Function Scale (ARFS, Fonagy et al., 1998), and is coded from transcripts generated from the Adult Attachment Interview (AAI, Main & Goldwyn, 1985-1995). In addition to the reflective function coding based on AAI interviews, a questionnaire-based measure has been developed to measure mentalizing capacity in adults by Fonagy and Ghinai (unpublished manuscript) called the Reflective Function Questionnaire (RFQ). Preliminary reports demonstrate promising psychometric properties with good reliability and validity for this

measure (Perkins, 2010). Factor analyses on the RFQ also revealed a two factor structure of RF including an Internal-Self and Internal-Other (Perkins, 2009).

The Child Reflective Function Scale (CRFS) was developed and adapted by Mary Target and colleagues (Target et al., 2001) from the Adult Reflective Function Scale (ARFS; Fonagy et al., 1998). The CRFS is coded based on transcriptions from a semi-structured interview called the Child Attachment Interview (CAI, Target et al., 1998; Shmueli-Goetz et al., 2008). The CAI is an interview-based assessment designed to assess a child's attachment styles with his/her primary caregivers. The interview was modeled from the Adult Attachment Interview (AAI; George et al, 1985; Main, 1995) for use in youth populations. The CAI contains 15 open-ended questions which elicits detailed relationship episodes, tapping into a child's perspective of him/herself, perspective of his/her primary attachment figures (AF), and reactions in response to upsetting events involving separation and loss. Studies have found the CAI to be a reliable and valid measure for assessing attachment in youths (Target, Fonagy, & Shmueli-Goetz, 2003; Shmueli-Goetz, Target, Fonagy, & Datta, 2008). Because the CRFS is coded from the CAI, it is analogous to its adult counterpart, and therefore the criterion measure for assessment of mentalization in children.

The two scales derived from the CRFS are self- and other-understanding scales. Good inter-rater reliability for the reflective function items have been reported with intraclass coefficients (ICC's) ranging from .6 to 1.00 (Ensink, 2004). Disadvantages in utilizing the gold standard measures such as the CRFS are the cost and time involved in administration and coding. Therefore, it is important to develop adequate cost-effective and time limited

assessment tools to further validate the construct of mentalization and its relation to BPD in adolescents.

Recently, the RFQ has been adapted for use with adolescents in the U.S. (RFQY; Sharp et al., 2009) from the 46-item adult Reflective Function Questionnaire (RFQ; Fonagy & Ghinai, unpublished manuscript). Several items were reworded for a more appropriate developmental level and modified for use with U.S. populations. For example, “People’s thoughts are a mystery to me” was modified to “People’s thoughts are a secret to me” and “My intuition about a person is hardly ever wrong” was replaced with “My feelings about a person are hardly ever wrong”. This questionnaire-based measure asks adolescents to rate how much they agree or disagree with each statement of reflective function. The measure is scored on a 6-point Likert scale with responses ranging from “Strongly Disagree” to “Strongly Agree”. A total reflective function score is derived from summing recoded responses.

Other Mentalizing Measures in Adults and Adolescents

As reviewed by Sprung (2010) and Sharp et al. (2008), several measurements currently exist to assess mentalizing in both adults and children with clinical disorders brought on by different disturbances in the various aspects of mentalizing. Since different aspects of mentalizing are associated with certain disorders, it’s important to select relevant measures depending on the clinical population of interest, as well as the appropriate developmental stage. Despite the available measures to assess mentalizing in children and adults, there is currently a lack of adequate measurements to assess these dysfunctions in adolescent populations. Many of the mentalizing measures have ceiling effects for older children and adolescents (Sharp, 2006), and while more advanced mentalizing measures have been

developed, they have been primarily used in adult populations (Bateman & Fonagy, 2001; Bateman & Fonagy, 2008; Fonagy and Bateman, 2006).

Baron-Cohen and colleagues (1997) developed a widely used task to assess for ToM in adults called the “Reading the Mind in the Eyes Test”. Not only has this task been used in populations with autism spectrum disorders (Baron-Cohen et al., 1997), but also with other psychiatric disorders. For example, adult researchers have examined ToM in forensic samples (Richell, Mitchell, Newman, Leonard, Baron-Cohen, et al., 2003; Dolan & Fullam, 2004), establishing the link between ToM deficits and psychopathy. A downward extension of the task was adapted for children called “Child Eyes Test”(Baron-Cohen, Wheelwright, Scahill, Lawson, & Spong, 2001) which was used to demonstrate poor ToM in children with conduct problems even when controlling for covariates of IQ, sex, and age (Sharp, 2008). While the Eyes Test has demonstrated impairment in mentalizing in relation to various forms of psychopathology in both adult and child populations, it focuses on the cognitive and explicit aspects of mentalizing.

The Movie for the Assessment of Social Cognition (MASC; Dziobek et al., 2006) is another newly developed measure of mentalizing. It is a naturalistic, video-based assessment of ToM which measures accurate ToM (mentalizing) and dysfunctions in mentalizing including no ToM (mentalizing), excessive ToM (hypermentalizing), and low ToM (undermentalizing) (Dziobek et al., 2006). This measure has demonstrated dysfunction in ToM in several adult patient populations ranging from Autism Spectrum Disorder (Dziobek et al, 2006), bipolar disorder (Montag et al., 2009), Narcissistic Personality Disorder (Ritter, Dziobek, Preißler, Rütter, Vater, Fydrichm et al., 2011) and BPD (Preißler, Dziobek, Ritter, Heekeren, & Roepke, 2010). Most recently the task has been used in adolescent inpatients with BPD features (Sharp

et al., 2011) and was shown to be sensitive in discriminating adolescent patients with and without BPD features.

The above measures are well-established assessments in measuring different aspects of mentalization and were therefore used in the current study to examine the RFQY's convergent validity.

Current Study

The current study aimed to examine various psychometric properties of the RFQY in a sample of 100 consecutive admissions to an adolescent (12 – 17 year olds) inpatient facility. First, the *internal reliability* of the RFQY was investigated. Next, *criterion validity* was determined by examining the relationship between the RFQY and the gold standard measure of reflective function, the CRFS as coded from the CAI. A ROC analysis was also employed to determine the RFQY's efficiency as a measure of reflective function with dichotomous CRFS scores as outcome. Then, *convergent and discriminant validity* were investigated by examining the relationship between the RFQY and two experimental tasks measuring mentalizing, the Movie for Assessment of Social Cognition (MASC; Dziobek et al., 2006), and the Children's Eyes Test (CET; Baron-Cohen et al., 2001). The relationship between reflective function and self-reported empathy was also investigated to further establish *convergent validity*. Finally, *construct validity* was ascertained by investigating group differences for BPD and non-BPD patients in RFQY total scores. Then, the RFQY's sensitivity and specificity in identifying patients with BPD was examined using ROC analyses.

Hypotheses

- 1) It was expected that the RFQY would have adequate internal reliability.

- 2) It was anticipated that the RFQY would have adequate criterion validity for predicting RF as measured by the CRFS as evidenced by:
 - a. Significant positive correlations between the RFQY and the CRFS self- and other- understanding scales.
 - b. Significant positive relationship between the RFQY and CRFS self- and other- understanding scales even when partialling the effects of IQ, sex, and age.
 - c. Significant area under the curve (AUC) in RFQY predicting CRFS dichotomous scores (high and low reflective function). An AUC of .70 to .90 suggests moderate accuracy (Swets & Pickett, 1982).

- 3) It was anticipated that adequate convergent and discriminant validity would be found for the RFQY in relation to other measures of mentalizing and empathy.
 - a. This would be demonstrated by moderately significant positive correlations between the CET total ToM score and total ToM (accurate mentalizing) on the MASC.
 - b. Moderate significant negative correlations were expected for the different scales of maladaptive mentalizing including hypermentalizing and undermentalizing.
 - c. It was hypothesized that there would be little to no correlation between the non-mentalizing scale on the MASC and the RFQY, supporting the discriminant validity.

- d. In relation to empathy scores, it was predicted that the RFQY would significantly positively relate to total empathy scores on a self-report measure of empathy.
- 4) It was expected that the RFQY would have adequate construct validity in identifying clinical cases of BPD as demonstrated by:
- a. Significant group differences in RFQY scores between BPD patients and non-BPD patients.
 - b. The RFQY's sensitivity and specificity in identifying patients with BPD will be investigated by employing a ROC analyses. The area under the curve (AUC) is predicted around 0.70, which suggests moderate diagnostic accuracy.

Method

Participants

This study was part of a larger study on treatment outcomes in a sample of 12-17 year old adolescent inpatients from the Menninger Clinic. Since April 2009, the Adolescent Treatment Program (ATP) at the Menninger Clinic began consenting new admissions (consecutively) for participation in a treatment outcomes study. Enrollment in the study is currently ongoing. Although all families are approached for consent and assent, some exclusion and inclusion criteria have been established. Inclusions for study participation consist of: (1) any adolescent patient between 12 to 17 years of age, and (2) sufficient fluency in English to complete all research. Exclusions for study participation comprise of the following: (1) diagnosis of schizophrenia or any psychotic disorder, and/or (2) diagnosis of mental retardation. The current study examined data on 100 consecutively admitted adolescents to the ATP.

Measures

Reflective Function Questionnaire for Youth (RFQY). The RFQY is a 46-item self-report measure assessing adolescent reflective function. Responses are coded on a 6-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree” with two subscales computed after eight items were reverse-scored. The first scale, “Scale B” was a straightforward scoring where higher scores indicated higher reflective function. There were 23 items that formed Scale B, which were averaged to form an overall score for that subscale. The eight reverse scored items were on this scale. Adolescents with optimal reflective function would receive a maximum averaged score of 6 on this scale.

To achieve an optimal mentalizing score, the other subscale, “Scale A”, was scored on a median scale, with higher reflective function toward the midpoint of the scale and extreme scores reflecting low reflective function. After recoding these items so that (1) = strongly disagree *or* strongly agree, (2) = disagree *or* agree, (3) = disagree somewhat *or* agree somewhat, the 23 items that formed “Scale A” were then averaged to compute the overall subscale score. Adolescents with optimal reflective function would receive a maximum averaged score of 3 on this scale. Finally, a total RFQY score was derived by summing both scales A and B, with high scores indicating a high capacity for reflective function. The maximum optimal reflective function score for the total scale would be a 9.

Since items on Scales A and B were not substantially different in terms of the content of reflective function (i.e. self and other), a total score was used. Furthermore, analyses conducted with the adult RFQ have supported the use of a combined total score (Perkins,

2009), therefore only the total RFQY was used in the final analyses. A copy of this measure along with the scoring instructions was provided in the Appendix.

Child Reflective Function Scale (CRFS). The CRFS was coded based off CAI transcriptions. In the current study, trained clinical research staff and doctoral level graduate students in clinical psychology conducted CAI's with patients. Adolescent reflective function was then coded by a team of trained coders who were directly trained on the coding system by the developer of the CRFS.

Reflective function ratings are coded on an 11-point dimensional scale, ranging from -1 to 9, and anchored at 6 points in terms of ability to reflect on self and others in mental state terms. In other words, a score between 5 and 6 reflects an overall average level of reflective function, with scores of 7 or higher indicating high reflective function, and scores below 4 indicating low to impaired reflective function. The self-understanding scale was computed from four items on the CAI that elicit self-descriptions and reactions in upsetting situations. On the CAI, adolescents are asked to provide three words to describe themselves, and then prompted to provide examples. For instance, an adolescent may describe him/herself using the word "intelligent". An example of an average reflective function response would be "My teacher says I'm intelligent because I made an A on the math exam", which is coded with a six. An example of a high reflective function score (9) would be a response of "I feel intelligent when my big brother can't do a math problem and I help him figure it out. That makes me feel intelligent". An example of a response that would be coded with a (-1), would be one that clearly is attacking the interviewer, such as "I did not say that I'm intelligent. Why are you asking so many questions? Is this interview over yet?". The other-understanding scale was

comprised of the sum of nine items tapping into the child's relationships with his/her attachment figure and a description of the attachment figure's reactions when upset or when they argue. A global reflective function score was assigned to the interview as a whole.

In this study, the global CRFS scale was examined in addition to both scales of self- and other- understanding scales.

Movie for Assessment of Social Cognition (MASC). The MASC was used to assess mentalizing in typical social situations involving peer and romantic relationships. The story line for the movie shows four characters getting together for a dinner gathering, with themes centering on peer and romantic relationships. A total of 46 video clips were presented via slides on the computer, and participants are asked to imagine what the characters are thinking or feeling as soon as each scene ends (i.e. "What is Betty thinking?"). Answers are provided in a multiple choice format where four choices are provided. Each response was coded as hypermentalizing (i.e. "Angry, her friend forgot she doesn't like sardines"), undermentalizing (i.e. "Surprised, she didn't expect sardines"), no mentalizing (i.e. "Sardines are salty and slippery"), or accurate mentalizing (i.e. "Repelled, she doesn't like sardines"). A total mentalizing score was derived from summing the total correct responses. Additionally, three separate scales were computed for the extent to which incorrect mentalization has occurred including hypermentalizing, undermentalizing, and no mentalizing by summing total responses for each subscale.

Adequate psychometric properties have been established for the MASC (Dziobek et al., 2006) and it has been shown to be sensitive in discriminating patients with BPD from individuals without the disorder (Preißler, et al., 2010; Sharp et al., in press). In the current study, total

mentalizing and all subscales, including no mentalizing, undermentalizing, and hypermentalizing were used in the analyses.

Child's Eyes Test (CET). Baron-Cohen et al (2001) developed a self-report measure to assess for mentalizing. Adolescents were presented with 28 pictures of the eye region of the face and were instructed to examine each photo carefully to determine which word best fit what the person in the photo seemed to be thinking or feeling. Four words were provided for adolescents to choose from; reflecting what feelings the person in the photo may be experiencing (i.e. jealous, scared, relaxed, hate). A total score was derived from a sum of the correct items. In the current study, the continuous total score were examined in all analyses.

Basic Empathy Scale (BES). Empathy is a closely related construct to mentalizing. It is the capacity to experience and/or understand another individual's emotions (Bryant, 1982; Hogan, 1969; Decety & Jackson, 2004). Similar to mentalization, empathy is multidimensional and can function implicitly or explicitly, and has self and other aspects (Choi-Kain & Gunderson, 2008).

The BES is a self-report measure developed to assess the multidimensional aspects of empathy (Jolliffe & Farrington, 2006). Adolescents were asked to rate 40-items on a 5-point Likert scale, ranging from (0) = Strongly disagree to (5) = Strongly agree. Good convergent and divergent validity have been demonstrated for the BES (Joillife & Farrington, 2006). In addition, factor analyses revealed two underlying components of the scale, including cognitive and affective empathy (Joillife & Farrington, 2006). Eight items were reverse scored before summing all items to yield a total score. Two subscales are also computed, with 9 items

measuring cognitive empathy and 11 measuring affective empathy. A higher score indicates higher levels of empathy. For this study, only the total empathy score was used in the analyses. Internal reliability for this measure was good ($\alpha = .84$) for this study.

Childhood Interview for DSM-IV Borderline Personality Disorder (CI-BPD). The CI-BPD is a semi-structured interview developed by Zanirini to assess for Borderline Personality Disorder in youths (Zanirini, 2003). This interview was modified from the adult version of the BPD module in the Diagnostic Interview for Personality Disorders (DIPD; Zanarini, Frankenburg, Sickel, & Yong, 1996). Nine clinical symptoms reflecting DSM-IV diagnoses of BPD (Table 1) are assessed for just as in the adult criteria. Each clinical symptom is rated as absent (0), probably present (1), or definitely present (2). A minimum of 5 symptoms must be rated as 'definitely present' (with a score of 2) to receive an overall total score of 2, indicating a full diagnosis of BPD. If four symptoms are endorsed at the definitely present criteria, then an overall score of 1 is given, indicating a diagnosis of borderline personality features or traits. Adequate inter-rater reliability has been demonstrated for this measure (Zanarini, 2003) and a significant relationship to clinician discharge diagnosis has been reported ($Kappa = .47; p < .001$) in a recent study with an inpatient sample of adolescents (Sharp, et al., 2011). Full analyses on the psychometric properties have supported the validity and a unidimensional factor structure of the scale (Sharp et al., in press).

In this study, dichotomous scores for BPD were used in the analyses, with no diagnosis or features grouped as '0', and a full diagnosis of BPD grouped as '1'. The internal reliability of the CI-BPD was good ($\alpha = .87$) for this study. A full copy of the measure was attached in the Appendix.

Diagnostic Interview Schedule for Children – Computerized version (NIMH-DISC-IV; Schaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). The NIMH-DISC-IV is a highly structured clinical interview which assesses for Axis I disorders in children and adolescents ages 9 to 17. It is a well established measure of Axis I psychopathology in youth and has good reliability and validity (Schaffer et al., 2000). Diagnoses over the past year and current diagnoses over the past month are determined in this interview. The DISC-IV was designed for lay interviewers to administer, with questions read aloud to patients from a computer screen and a response selected based on the answer the youth provided. In this study, interviews were administered individually and in private by trained research staff and ranged in length of about one and a half to two hours.

For the current study, DISC-IV diagnoses were used for analyses of clinical characteristics of patients with any Axis I diagnoses over the past year. Diagnoses are assigned a code with no diagnosis scored as “0”, intermediate diagnosis scored with a “1”, or positive diagnosis scored with a “2”. These were recoded so no or intermediate diagnoses were assigned a score of “0” and positive diagnoses were assigned a score of “1”. Axis I diagnoses were then separated into four categories including “any Mood Disorder”, “Any Eating Disorder”, “Any Anxiety Disorder”, and “Any Externalizing Disorder”. For the “Any Mood Disorder”, if a patient met a positive diagnosis in either Major Depressive Disorder, Hypomania, Mania, or Dysthymia, this placed them in the category of having “Any Mood Disorder” in the past year. In selecting cases for “Any Eating Disorder”, if the patient met positive diagnosis for either Anorexia or Bulimia, they were placed in this group. For the “Any Anxiety Disorder” variable, if the patient met criteria in any of the anxiety disorders (Generalized Anxiety Disorder, Agoraphobia, Obsessive Compulsive

Disorder, Panic Disorder, Post-traumatic stress Disorder, Social Phobia, or Specific Phobia), they were grouped in this category. The “Any Externalizing Disorder” group included a diagnosis of either Attention Deficit Hyperactivity Disorder, Conduct Disorder, or Oppositional Defiant Disorder.

Procedures

This sample comes from a private tertiary care inpatient psychiatric hospital specializing in the assessment and stabilization of adolescents who have failed to respond to previous treatments. All admissions received a comprehensive psychiatric evaluation at intake. The clinic accepts patients with a range of psychiatric disorders.

A research based assessment protocol was developed, piloted, and implemented on the adolescent unit in October 2008 (Sharp, Williams, Ha, Baumgardner, Michonski, et al., 2009). All new admissions received a full battery of assessments, ranging from self and parent-reports of psychopathology, to semi-structured interview-based assessments administered by trained clinical research staff. Clinicians are provided with reports from these assessments to integrate into their diagnostic case formulations.

Beginning April 2009, IRB approval for an outcomes-based research protocol was attained. This remains an active protocol, and consecutive admissions are consented and assented for participation in the research at intake. Following IRB guidelines, adolescents and parents may opt out of any part of the assessment.

At intake, adolescents and parents meet with research staff and are given an overview of the research team’s role in the assessments along with information on how the assessments are integrated into the diagnostic conference. Then once the parent or legal guardian consent

for research participation is obtained, assent is also obtained from the adolescent. Adolescents complete a battery of self-report and interview-based assessments throughout their stay at the clinic. Doctoral level clinical psychology students, licensed clinicians, and/or trained clinical research coordinators under the direct supervision of the principal investigator (PI) conduct diagnostic interviews independently and in private with adolescents. Monthly meetings are held in the presence of the PI to ensure reliability for diagnostic interviews.

The hospital's Information Technology department in collaboration with research staff developed and implemented an in-house survey software to collect self- and parent-reports. This system provides electronic data management, and automatic scoring of measures, which is integral to immediate feedback to the clinicians. All questionnaire-based measures are collected via this electronic method. Assessments with adolescents typically took place within the first two weeks following intake. The average length of stay was 5 to 7 weeks.

Data Analytic Strategy

Preliminary Analyses

All analyses were performed using SPSS version 18.0 (Chicago, IL, 2010). Exploratory analyses were first conducted to assess for outliers and to test for normality of distributions for all study variables. To confirm normal distributions for the variables of interest, a Kolomogorov-Smirnov test was conducted (Field, 2005). Assuming normally distributed data, homogeneity of variance, and statistical independence, parametric tests would be used. If violations of normality are found, then non-parametric tests would be utilized.

An association has been demonstrated with mentalization and sex (Baron-Cohen, et al., 1997; Bosacki, 2000), and with mentalization and verbal ability (Sharp & Fonagy, 2008). In

addition, there is evidence of developmental changes in adolescent self-representation across early, middle, and late adolescence (Harter, 1999a). Therefore, possible covariates in relation to reflective function were assessed through correlational analyses with age and IQ in relation to the total score on the RFQY. Then to determine whether sex differences existed between males and females on RFQY total score, an independent samples t-test was performed.

Descriptive statistics were examined on the final sample including sex, age, IQ, ethnicity, and clinical demographics such as psychiatric history, medical history, Global Adaptive Functioning scores, and Axis I diagnoses.

Internal reliability was examined using Cronbach's alpha for the total scale, and then separately for Scale A and Scale B. Criterion validity was first examined using correlational analyses, then followed up with a ROC analyses to determine if RFQY total scores would predict CRFS global scores. Then convergent validity was investigated using correlational analyses to examine the relationships between RFQY and other measures of mentalizing and empathy. Finally, discriminant validity was investigated at the bivariate level by running an independent samples t-test on RFQY total score with BPD and non-BPD cases. These analyses were followed up with a ROC analyses to determine the RFQY's sensitivity and specificity in identifying cases of adolescent BPD.

Results

Preliminary Analyses

The dataset included a total of 152 consecutively admitted adolescents. Thirty-three patients and their families declined participation in the study. Four exclusions were made in this study, including patients who had active psychosis, adolescents who were a ward of the

court, or if English was not the family’s native language. Additionally, fifteen adolescents were excluded from the final analyses due to missing CAI videos because of technical error, adolescent refusal, or incomplete assessments due to abrupt discharges. After exclusions, a total of 100 participants were used for subsequent analyses.

First, analyses on missing data was conducted to examine whether group differences existed in those who had complete CRFS data ($n = 74$) compared to those who did not ($n = 26$). Subjects were grouped into completers and non-completers. Individual samples t-tests were run with age, IQ, and all main study variables (CET, BES, MASC, and RFQY). There were no significant differences between groups on any of these continuous variables between completers and non-completers. Furthermore, chi-square analyses revealed no significant differences between completers and non-completers on dichotomous variables such as sex ($\chi^2 = .585, df = 1, p = .444$) and BPD status ($\chi^2 = .016, df = 1, p = .901$).

Descriptive data for main study variables are reported in Table 2 along with clinical characteristics of the full sample. Thirty-one percent of our sample had a previous psychiatric hospitalization, with 21% having two or more previous psychiatric hospitalizations.

Table 2. Descriptive data and clinical characteristics of the full sample ($N = 100$).

Study Variable	N	Mean (SD)	Minimum	Maximum
Age	100	15.59 (1.37)	12	17
IQ	81	106.88 (13.95)	78	149
Admit GAF	98	41.36 (6.41)	20	55

*Note: Axis I psychopathology was determined using DISC-IV diagnoses, and BPD was determined by the CI-BPD. Abbreviations: RF = Reflective Function, GAF = Global Adaptive Functioning, CET = Child Eyes Test

Next, normality assumptions were checked for all variables. The Kolomogorov-Smirnov test was calculated for main study variables, indicating normality for CRFS other- understanding ($KS = .084, df = 43, p = .20$) and BES ($KS = .055, df = 100, p = .20$). Non-normal distributions were found for all other variables including RFQY total score ($KS = .109, df = 100, p = .005$), CET ($KS = .106, df = 100, p = .008$), CRFS global scale ($KS = .212, df = 74, p < .001$), CRFS self- scale ($KS = .132, df = 57, p = .015$), MASC total ($KS = .109, df = 100, p = .006$), MASC undermentalizing scale ($KS = .191, df = 100, p < .001$), MASC no mentalizing scale ($KS = .232, df = 100, p < .001$), and for the MASC hypermentalizing scale ($KS = .138, df = 100, p < .001$). Therefore, non-parametric tests were used for all analyses.

Possible covariates with the RFQY total scores were examined with sex, age, and IQ. Independent samples t-test revealed no significant differences in gender on the RFQY total score ($t = .279, df = 98, p = .78$) and no significant correlations with age ($r = .126, p = .21$) or IQ ($r = .128, p = .25$). Therefore, no covariates were examined in further analyses.

Internal Reliability

To assess the RFQY's internal consistency, Cronbach's alpha was computed. The reliability was lower than expected ($\alpha = .60$) for the total summary score. Reliability was calculated separately for Scale A ($\alpha = .59$) and Scale B ($\alpha = .69$), which also demonstrated weak reliability. Inspection of items revealed that items 1, 8, 12, 24, and 28 on Scale A had low inter-item total correlations as shown in table 3. Removal of these items increased alpha to an

acceptable range ($\alpha = .77$) for Scale A. Inspection of items on Scale B revealed that items 3 and 21 had low inter-item correlations. These items were removed from Scale B and reliability improved ($\alpha = .73$). The reliability for the total summary score of the RFQY was examined after removal of the 7 items, and improved with an alpha of .66. Since removal of the items did not improve internal consistency in the RFQY total score beyond an acceptable alpha (.70), all items were retained in further analyses.

Table 3. RFQY item statistics for specific items with low inter-item correlations within Scale A and Scale B.

Item Total Statistics	Corrected Item Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
1. People's thoughts are a secret to me.	-.048	.313	.609
3. My pictures of my parents change as I change.	-.032	.282	.700
8. I always know what I feel.	-.268	.667	.635
12. I believe there's no point trying to guess what's on someone else's mind.	-.245	.482	.632
21. I believe that there is no RIGHT way of seeing any situation.	-.141	.312	.715
24. I am better guided by reason than by my gut.	-.158	.268	.621
28. I trust my feelings.	-.335	.444	.641

Criterion Validity

Spearman correlations revealed significant positive relationships between RFQY total with CRFS global reflective function ($r = .28, p = .02$), and CRFS Other- understanding ($r = .297, p = .05$), but not with the CRFS Self- understanding scale ($r = .162, p = .23$). Correlations are also displayed in Table 3.

A ROC (Receiver Operating Characteristic) analysis was then employed to examine the RFQY's efficiency in identifying reflective function, with the CRFS global scale used as the criterion. The most commonly used index of accuracy is called the area under the curve (AUC; Hanley & McNeil, 1982; Fawcett, 2006). The AUC for the RFQY will be estimated using the ROC test in SPSS (Chicago, IL, 2010). Several studies have used this index of accuracy to establish criterion validity (Fombonne, 1991; Thapar & McGuffin, 1998). The AUC value will always fall between 0 and 1.0 since it is a portion of the area of the unit square (Fawcett, 2006). An AUC $\geq .90$ will suggest high diagnostic accuracy, .70 to .90 will suggest moderate accuracy, while $< .70$ low accuracy (Swets & Pickett, 1982). An optimal cut-point was then identified in the RFQY where certain scores above the cut-off would identify cases of high reflective function and those below the cut-off would identify low reflective function cases.

The CRFS global scale was transformed into a dichotomous variable with scores of 5 or higher indicating ordinary to high reflective function, while scores 4 and below were grouped as '0', indicating low to impaired reflective function. ROC analyses revealed moderate accuracy for RFQY predicting CRFS scores with an AUC of .71 (SE = .08, $p = .045$). The ROC curve for the RFQY is shown in Figure 2. Twenty-six patients were missing CRFS total scores. There were 21 cases above cut-off for high reflective function, and 29 cases below cut-off of low reflective

function. We wanted to select a cut-off score that was both sensitive to identifying true cases of optimal mentalizing and to have specificity to detect cases of optimal mentalizing to identify only adolescents with good mentalizing without selecting false positives (i.e. selecting adolescents with high reflective when they actually do not have it). To obtain a balanced mentalizing cut-off, sensitivity and specificity scores were plotted against different cut-off scores on the RFQY in reference to reflective function scored on the CRFS. An optimal cut-off score for reflective function on the RFQY was determined by the intersection of the sensitivity and specificity lines. When plotting sensitivity and specificity at different cut-off scores (Figure 3) on the RFQY, an optimal cut-off score of 6.63 (sensitivity = .667, specificity = .600) was established.

Figure 2. Receiver Operating Characteristic curve for the RFQY.

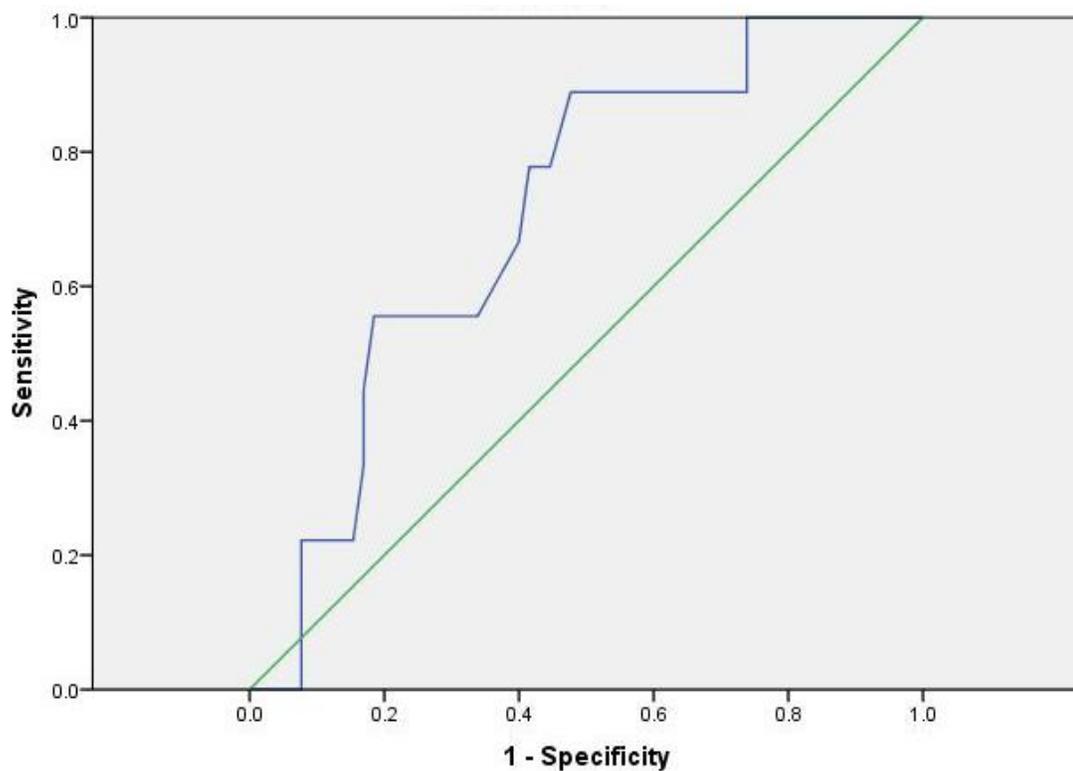
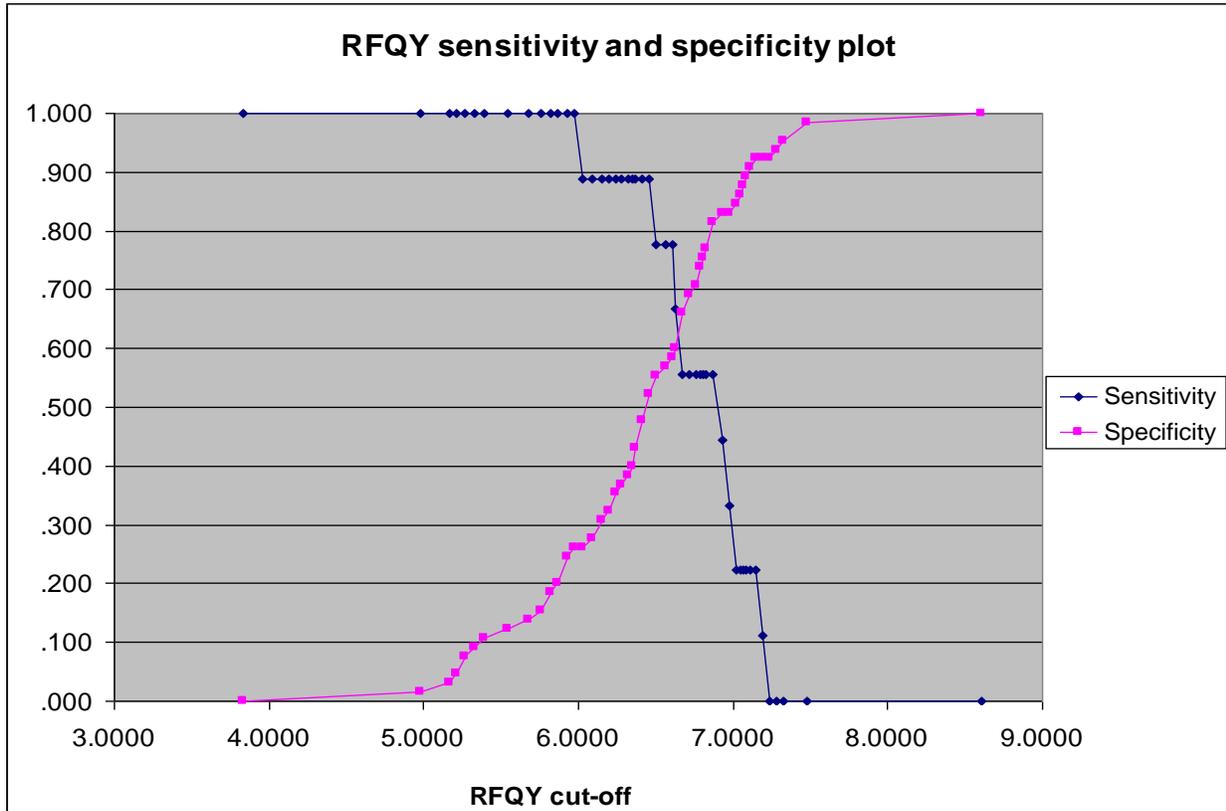


Figure 3. RFQY sensitivity and specificity cut-off scores plotted.



Convergent Validity

Convergent validity was investigated by examining relationships between RFQY total and other measures related to mentalizing including empathy using the BES, CET, and MASC scores. As expected, significant positive relationships were found for RFQY total with empathy ($r = .209, p = .04$), MASC total ($r = .196, p = .05$). A significant negative correlation was found for RFQY total and the hypermentalizing subscale on the MASC ($r = -.28, p = .005$). However, no significant relationships were found for RFQY total score with the CET measure ($r = 0.05, p = .61$), or with MASC no mentalizing ($r = .018, p = .86$) and undermentalizing ($r = .117, p = .248$). Results from Spearman correlations are also presented in Table 3.

Table 3. Spearman correlations for RFQY total with other mentalizing measures and empathy.

	1	2	3	4	5	6	7	8	9	10
1. Total RF (self-report)	--									
2. Global RF (ratings)	.28*	--								
3. Self-Understanding (CRFS)	.16	.72**	--							
4. Other- Understanding (CRFS)	.30*	.91**	.69**	--						
5. Empathy	.21*	.01	.14	.12	--					
6. Theory of Mind	.05	.02	-.18	-.06	-.11	--				
7. Total Mentalizing	.20*	.37**	.31*	.26	-.14	.07	--			
8. Hypermentalizing	-.28*	-.22	-.25	-.16	.11	-.08	-.79**	--		
9. Undermentalizing	.12	-.22	-.15	-.11	.10	.07	-.48**	.04	--	
10. No Mentalizing	.02	-.18	-.18	-.33*	0	.06	-.28*	-.04	-.02	--

* $p < .05$, ** $p < .001$

Construct Validity

To examine discriminant validity, two approaches were used. First, an independent samples t-test was conducted to examine whether group differences existed between BPD patients and non-BPD patients on RFQY total. A significant difference was found for reflective function scores between patients with BPD and patients without BPD ($t = 2.94$, $df = 98$, $p = .004$). As expected, patients with BPD had significantly poorer reflective function ($M = 6.18$, $SD = .59$) than non-BPD's ($M = 6.58$, $SD = .59$).

Next, a ROC analysis was employed to establish the scale's sensitivity and specificity in selecting BPD cases. The AUC for the RFQY in detecting cases of BPD was poor (AUC = .298, SE = .054), therefore no cut-off points were calculated.

Discussion

Few measures of mentalizing or theory of mind have been developed for use in age groups older than four (Sharp, 2008). Moreover, very few questionnaire measures of mentalizing or theory of mind exist for use in any age group. For this reason, Fonagy and colleagues developed the RFQ for use in adults (Fonagy & Ghinai, unpublished manuscript). Previously, we adapted the adult RFQ for use in adolescents (Sharp et al., 2009). As yet, the psychometric properties of this measure for use in adolescents remain unknown.

Against this background, the current study sought to examine various psychometric properties of a newly adapted measure of mentalizing (an aspect of social cognition) for adolescents. First, internal reliability was investigated for all 46 items on the RFQY using Cronbach's alpha. Findings suggest that seven of the items had poor reliability, with Scale A demonstrating lower internal consistency than Scale B. However, removal of items did not increase reliability to an acceptable range, so all analyses were conducted with the full 46 items. There are several potential explanations for why items 1, 3, 8, 12, 21, 24, and 28 did not demonstrate strong item-total correlations. The most promising explanation is that these items do not load onto the underlying factors of the RFQ. Indeed, with research conducted on the adult version of the RFQ, the RFQ46 was reduced to 15 items with a two-factor structure including internal factors of self and other (Perkins, 2009). Six out of 7 RFQY items identified as having low reliability in the current study were excluded from the RFQ46 because they did not load significantly on the underlying factors of self and other in the adult RFQ. However, item 8 "I always know what I feel", loaded significantly onto the "internal-self" factor in the adult RFQ (Perkins, 2009). A possible reason for why this item still demonstrated poor reliability in the current study may be due to developmental effects. An optimal mentalizing response on this

item would be indicated by endorsement of 3 or 4 on the 6-point scale. However, given the fact that adolescence is associated with greater uncertainty in the identification of feelings (Harter, 1998; 1999b; Steinberg & Morris, 2001; Yurgelun-Todd, 2007) responses may be skewed on this item, thereby reducing its association with the construct of reflective function.

Criterion validity was investigated by examining the relationship between the RFQY total with CRFS global, self-, and other- understanding scales. Significant relationships were found only for RFQY total with CRFS global and other- understanding scales, but not with the self- understanding scale. This may be due to different methods in assessing reflective function between the RFQY and the CRFS. In the CRFS, self- understanding is rated by an independent coder based off the CAI self- items including self descriptions, and it may be that rating another individual's understanding of him/herself may be more difficult than asking the person to report on their own self-understanding. Perhaps assessing self-reflection is unique and more internal and implicit than measuring reflection of others' mental states. Furthermore, the self- understanding scale of the CRFS is the adolescent's view of the self-rated within an interpersonal context (with attachment figures), while the items in the RFQY asks about the self in the context of relationships in general. Each measure may tap into different aspects of self-reflection. Additionally, a ROC analyses demonstrated that the RFQY is a moderately efficient measure in predicting reflective function as determined by the criterion, CRFS, with a cut-off score of 6.63 on the RFQY indicating "good" mentalizing according to the CRFS. Taken together, these findings support the criterion validity of the RFQY, with modest specificity and sensitivity in predicting reflective function.

Next convergent validity was examined in comparison of the RFQY total to other measures of mentalizing and a measure of empathy. Our findings support the convergent validity of the RFQY, which related significantly to scores on the MASC total and the empathy measure as predicted, although the relations were modest. This is expected because the MASC total is a sum of accurate mentalizing responses, and empathy is a closely related construct to mentalization. There was a significant inverse relationship between RFQY and the MASC hypermentalizing scale. In other words, high scores on hypermentalizing, or an over interpretation of mental states was related to low reflective function capacity. No significant relationships were found between the RFQY and MASC no mentalizing scale, or MASC undermentalizing scale. The RFQY and the MASC hypermentalizing subscale therefore tap into similar aspects of mentalizing, which stands in contrast to the MASC no mentalizing and undermentalizing subscales, which rarely refer to mental states in its experimental stimuli. For example, after a scene with two characters talking on the phone, the question “What does Michael think Cliff is laughing about?” was presented, and a no mentalizing response would be: “Cliff will go to the art exhibit”, while an undermentalizing response would be: “the empty frame”. In contrast, the hypermentalizing response was “Michael is a womanizer”.

Furthermore, no significant relation was found for the RFQY total and CET. One explanation may be that each measure taps into different aspects of mentalization. The CET taps into external and others’ mental states by asking adolescents to rate eye regions as opposed to internal and both self- and other- mental states that the self-report RFQY taps into. Taken together, the findings on the convergent analyses conducted in this study support the

validity of the RFQY as demonstrated by its relationship with other measures of mentalization and empathy.

Discriminant validity was examined using two approaches. Significant group differences were found for BPD patients compared to patients without BPD, with the BPD group demonstrating poorer (lower) reflective function . This is consistent with adult research which have demonstrated poorer reflective function in individuals diagnosed with BPD (Fonagy et al., 1996; Fonagy et al., 1998; Perkins, 2009).

The second approach to discriminant validity aimed to determine whether the RFQY would be a sensitive and specific measure in predicting clinical cases of BPD. ROC analyses revealed that the measure does not have high sensitivity or specificity in identifying clinical cases of BPD in adolescent inpatient settings. However, our data examined whether BPD cases could be selected from other psychiatric controls. Perhaps the RFQY is sensitive to detecting psychiatric caseness in general (and not BPD specifically) and future studies should investigate this in BPD vs. healthy adolescent populations.

Taken together, our findings demonstrate that the RFQY is an adequate self-report measure of mentalization in adolescent inpatients. Findings from this study must be interpreted with caution as there are several limitations. First, our sample was comprised primarily of predominantly Caucasian adolescents (91%) from well-educated and financially stable environments. These findings may not generalize to other adolescent populations including community and outpatient samples from diverse backgrounds.

Another limitation was the poor internal reliability of the measure. Future studies conducted in a community sample would provide larger variance to determine how individual

items function in this measure which will help to reduce items on the RFQY. In the adult version, the internal self- factor better distinguished BPD from a non-clinical sample (Perkins, 2011) with BPD patients having poorer self-mentalizing. Therefore, factor analyses should be performed to determine the underlying factor structure of the RFQY – that is, whether the RFQY has a 2-factor structure similar to the adult RFQ with an internal self- and other- factor. Once the underlying factor structure has been identified, the ability of the RFQY to discriminate between BPD and non-BPD's can be examined.

A further limitation to this study was that the RFQY had poor sensitivity and specificity in identifying cases of adolescent BPD, which could be due to lack of a non-clinical group for comparison. As mentioned previously, perhaps this is because the RFQY does not discriminate the BPD diagnosis from other psychiatric disorders, but it may be a better screen for psychiatric disorders in general. Replication of these findings should be conducted with healthy controls to confirm the measure's sensitivity in detecting clinical and non-clinical cases. It also may be likely that in patients with BPD, the attachment system must be activated prior to assessing reflective function to adequately discriminate BPD patients from those without BPD, as Fonagy's model hypothesize that it is the failure of appropriate mentalization during significant arousal that patients with BPD struggle with. Finally, mentalization is a multi-dimensional construct and all aspects of this construct cannot be assessed fully with one self-report measure.

Despite these limitations, this study supports the validity of the RFQY as a newly adapted measure of social cognition (mentalization) for adolescents. The RFQY has adequate criterion, convergent, and discriminant validity and is a useful tool for clinicians to quickly

assess mentalization in inpatient adolescents. Moreover, this study has demonstrated the clinical utility of the RFQY in identifying adolescent inpatients with poor mentalization by providing a clinical cut-off. The RFQY can be used as a quick screen to assess for poor reflective function in adolescent inpatients when time and financial constraints limit the use of additional measures. Additionally, although it is currently unknown whether the RFQY is sensitive to assess change in reflective function, it may be useful to track treatment outcome in treatment settings which use social-cognitive interventions. It is important for clinicians to have brief, but adequate measures to effectively assess mentalizing in adolescent patients so that specific interventions may be developed to target problematic mentalizing in various treatment settings. The current findings also help to further reinforce the link between mentalization and BPD in adolescents, which will aid in improving interventions for patients suffering from this challenging disorder.

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APPENDIX

Appendix I: Reflective Function Questionnaire for Youth (Sharp et al., 2009)

Instructions: Please read each statement and circle the one response that you feel describes you most clearly. Do not think too much about it - your first responses are usually the best. Thank you.

- | | | | | | |
|---|----------|----------|----------|-------|----------------|
| 1. People's thoughts are a secret to me | | | | | |
| strongly disagree | disagree | disagree | agree | agree | strongly agree |
| | | somewhat | somewhat | | |
| 2. I worry a lot about what people are thinking and feeling | | | | | |
| strongly disagree | disagree | disagree | agree | agree | strongly agree |
| | | somewhat | somewhat | | |
| 3. My picture of my parents changes as I change | | | | | |
| strongly disagree | disagree | disagree | agree | agree | strongly agree |
| | | somewhat | somewhat | | |
| 4. I realize that I can sometimes misunderstand my best friends' reactions | | | | | |
| strongly disagree | disagree | disagree | agree | agree | strongly agree |
| | | somewhat | somewhat | | |
| 5. I believe that my parents' behavior towards me should not be explained by how they were raised | | | | | |
| strongly disagree | disagree | disagree | agree | agree | strongly agree |
| | | somewhat | somewhat | | |
| 6. Other people tell me I'm a good listener | | | | | |
| strongly disagree | disagree | disagree | agree | agree | strongly agree |
| | | somewhat | somewhat | | |
| 7. I often have to force people to do what I want them to do | | | | | |
| strongly disagree | disagree | disagree | agree | agree | strongly agree |
| | | somewhat | somewhat | | |
| 8. I always know what I feel | | | | | |
| strongly disagree | disagree | disagree | agree | agree | strongly agree |
| | | somewhat | somewhat | | |
| 9. I feel that, if I am not careful, I could get in the way of another person's life | | | | | |
| strongly disagree | disagree | disagree | agree | agree | strongly agree |
| | | somewhat | somewhat | | |
| 10. I often get confused about what I am feeling | | | | | |
| strongly disagree | disagree | disagree | agree | agree | strongly agree |
| | | somewhat | somewhat | | |

11. I believe that people can see a situation very differently based on their own beliefs and experiences	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree
12. I believe there's no point trying to guess what's on someone else's mind	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree
13. I get confused when people talk about their feelings	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree
14. I believe other people are too confusing to bother figuring out	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree
15. I find it difficult to see other people's points of view	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree
16. I am a good mind reader	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree
17. I don't always know why I do what I do	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree
18. I pay attention to my feelings	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree
19. In an argument, I keep the other person's point of view in mind	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree
20. Understanding the reasons for people's actions helps me to forgive them	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree
21. I believe that there is no RIGHT way of seeing any situation	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree
22. When I get angry I say things without really knowing why I am saying them	strongly disagree	disagree	disagree	agree	agree	strongly agree
	disagree		somewhat	somewhat		agree

23. Those close to me often seem to find it difficult to understand why I do things	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree
24. I am better guided by reason than by my gut	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree
25. I usually know exactly what other people are thinking	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree
26. I can't remember much about when I was a child	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree
27. Strong feelings often cloud my thinking	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree
28. I trust my feelings	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree
29. When I get angry I say things that I later regret	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree
30. My feelings about a person is hardly ever wrong	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree
31. For me actions speak louder than words	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree
32. I frequently feel that my mind is empty	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree
33. I predict that my feelings might change even about something I feel strongly about	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree
34. I like to think about the reasons behind my actions	strongly disagree	disagree	disagree somewhat	agree somewhat	agree	strongly agree

35. If I feel unsure of myself, I can behave in ways that offend others
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat agree agree
36. Sometimes I do things without really knowing why
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat somewhat agree agree
37. I can tell how someone is feeling by looking at their eyes
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat somewhat agree agree
38. Sometimes I find myself saying things and I have no idea why I said them
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat somewhat agree agree
39. In order to know exactly how someone is feeling, I have found that I need to ask them
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat somewhat agree agree
40. I can mostly predict what someone else will do
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat somewhat agree agree
41. I'm often curious about the meaning behind others' actions
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat somewhat agree agree
42. I have noticed that people often give advice to others that they actually wish to follow themselves
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat somewhat agree agree
43. I wonder what my dreams mean
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat somewhat agree agree
44. How I feel can easily affect how I understand someone else's behavior
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat somewhat agree agree
45. I pay attention to the impact of my actions on others' feelings
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat somewhat agree agree
46. I know exactly what my close friends are thinking
 strongly disagree disagree disagree agree agree strongly
 disagree somewhat somewhat somewhat somewhat agree agree

Scoring of the Reflective Function Questionnaire for Youth

Items: 1, 2, 5, 8, 9, 10, 12, 16, 17, 22, 24, 25, 27, 28, 29, 30, 31, 33, 35, 36, 37, 40, 46

1 = strongly disagree, 2 = disagree, 3 = disagree somewhat, 3 = agree somewhat, 2 = agree,
1 = strongly agree

Items: 3, 4, 6, 11, 18, 19, 20, 21, 34, 39, 41, 42, 43, 44, 45

1 = strongly disagree, 2 = disagree, 3 = disagree somewhat, 4 = agree somewhat, 5 = agree,
6 = strongly agree

Reverse Code Items: 7, 13, 14, 15, 23, 26, 32, 38

6 = strongly disagree, 5 = disagree, 4 = disagree somewhat, 3 = agree somewhat, 2 = agree,
1 = strongly agree

For *each* scale (A & B), calculate the sum of items and take the average:

Scale B = (23 items; straightforward items): 7, 13, 14, 15, 23, 26, 32, 38, 3, 4, 6, 11, 18, 19, 20, 21, 34, 39, 41, 42, 43, 44, 45

Scale A = (23 items; higher MZ toward midpoint of scale) 1, 2, 5, 8, 9, 10, 12, 16, 17, 22, 24, 25, 27, 28, 29, 30, 31, 33, 35, 36, 37, 40, 46

RFQ Total Score = Scale A + Scale B

Appendix II: Childhood Interview for DSM-IV Borderline Personality Disorder (CI-BPD; Zanarini, 2003)

Date: _____

Interviewer Initials: _____

Subject ID# : _____

CHILDHOOD INTERVIEW FOR DSM-IV BORDERLINE PERSONALITY DISORDER (CI-BPD)

Mary C. Zanarini, Ed.D.

McLean Hospital and Harvard Medical School

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Background Questions

1. How old are you? _____
2. What grade are you in? _____
3. Are your parents still together? _____
4. Do you have any brothers or sisters? _____
5. (IF YES) How many? _____
6. Do you have any close friends? _____
7. (IF YES) How many? _____
8. How often do you see him/her/them? _____
9. Are you close to any other relatives? _____
10. (IF YES) Who? _____
11. Are you close to anyone else (e.g., a teacher, coach, or neighbor)? _____
12. (IF YES) Who? _____
13. Who do you live with? _____
14. (IF LEAVES OUT OTHER LIKELY PEOPLE, ASK) Anyone else? _____

Before we begin, I want to point out that the questions in this interview concern the past two years of your life or the period since you were (APPROPRIATE AGE) and were in the (APPROPRIATE YEAR IN SCHOOL) grade. I also want to point out that I'm mainly interested in learning about feelings, thoughts, and behaviors that have been typical for you during this two-year period. However, I will be asking you a number of questions about specific things that you may have done only when you were particularly upset.

BORDERLINE PERSONALITY DISORDER

During the past two years, have you ...

1. ... felt very angry a lot of the time?

How about often felt really angry inside but managed to hide it so that other people didn't know about it?

Frequently behaved in an angry manner (e.g., often teased people or said mean things, frequently yelled at people, repeatedly broken things)?

How about become very angry and gotten into physical fights with someone you're close to?

(Inappropriate, intense anger or difficulty controlling anger, e.g., frequent displays of temper, constant anger, recurrent physical fights: 2=definitely present, 1=probably present, 0=absent)

2. ... often found that your mood has changed suddenly (e.g., from feeling OK to feeling really sad or very angry or extremely nervous, fearful, or scared)?

How about from feeling OK to feeling enraged, panicked, or totally hopeless?

Had a lot of mood changes?

Been told that you're a moody person?

(IF YES TO ANY OF ABOVE) Do these mood changes typically last only a few hours to a few days?

(Affective instability due to a marked reactivity of mood [e.g., intense episodic dysphoria, irritability, or anxiety usually lasting a few hours and only rarely more than a few days]: 2=definitely present, 1=probably present, 0=absent)

3. ... felt empty a lot of the time?

How about that you had no feelings inside?

That there was nothing inside?

(Chronic feelings of emptiness: 2=definitely present, 1=probably present, 0=absent)

4. ... often been unsure of what kind of person you are?

Frequently gone from feeling sort of OK about yourself to feeling that you're bad or even evil?

Often felt that you had no consistent or steady sense of yourself?

How about that you had no identity?

That you had no idea of who you are or what you believe in?

That you don't even exist?

(Identity disturbance: markedly and persistently unstable self-image or sense of self: 2=definitely present, 1=probably present, 0=absent)

5. ... often felt very distrustful or suspicious of other people?

How about believed that they were taking advantage of you or blaming you for things that weren't your fault?

Were staring at you, talking about you behind your back, or laughing at you?

Frequently felt as if you were physically separated from your feelings or as though you were viewing yourself from a distance?

Often felt as if you were in a dream or as though something like a window was between you and the world?

Repeatedly had times when you felt spaced out or numb?

How about when you felt emotionally dead?

(IF YES TO ANY OF ABOVE) Did these feelings come and go or were they almost always there?

Did they only occur when you were under stress?

How about get worse when you were under a lot of stress?

(Transient stress-related paranoid ideation or severe dissociative symptoms: 2=definitely present, 1=probably present, 0=absent)

6. ... frequently tried to avoid feeling completely alone or abandoned (e.g., often called someone you're close to because you were feeling totally alone or scared)?

How about tried to avoid being left alone or abandoned (e.g., pleaded with people not to leave you, clung to them physically, refused to leave their home or office)?

(Frantic efforts to avoid real or imagined abandonment [do not include suicidal or self-mutilating behavior covered elsewhere]: 2=definitely present, 1=probably present, 0=absent)

7. ... deliberately hurt yourself without meaning to kill yourself (e.g., cut yourself, burned yourself, punched yourself, put your hand through windows, punched walls, banged your head)? (IF YES) How many times?

Threatened to kill yourself? (IF NO) How about told someone that you're going to kill yourself to let them know you're in pain? To see if they care? (IF YES TO ANY OF ABOVE) How many times?

Actually tried to kill yourself? (IF YES) How many times?

(Recurrent suicidal behavior, gestures, or threats, or self-mutilating behavior: 2=definite pattern of self-mutilation or suicidal efforts [two or more times], 1=probable pattern of self-mutilation or suicidal efforts [one time], 0=no pattern of self-mutilation or suicidal efforts [no times])

8. ... gotten really drunk? (IF YES) How many times? (2=5 times or more,

1=3-4 times, 0=0-2 times)

High on prescription or street drugs? (IF YES) How many times?
(2=5 times or more, 1=3-4 times, 0=0-2 times)

Impulsively gotten sexually involved with anyone or had any
brief affairs? (IF YES) How many times? (2=five times or more,
1=3-4 times, 0=0-2 times)

Had times where you ate so much food that you were in a lot of pain or had to force
yourself to throw up? (IF YES) How many times? (2=5 times or more, 1=3-4
times, 0=0-2 times)

Spent all of your money as soon as you got it? (IF YES) How many times?
(2=5 times or more, 1=3-4 times, 0=0-2 times)

Lost your temper and really shouted, yelled, or screamed at anyone?
(IF YES) How many times? (2=5 times or more, 1=3-4 times, 0=0-2 times)

Threatened to physically harm anyone (e.g., told someone that you would punch him, stab him, or kill
him)? (IF YES) How many times? (2=5 times or more, 1=3-4 times, 0=0-2 times)

Shoved, slapped, punched, or kicked someone)? (IF YES) How many times? (2=5 times or more,
1=3-4 times, 0=0-2 times)

Been in any fistfights? (IF YES) How many? (2=5 times or more, 1=3-4 times, 0=0-2 times)

Deliberately damaged property (e.g., smashed dishes, broken furniture, destroyed some of your own
things)? (IF YES) How many times? (2=5 times or more, 1=3-4 times, 0=0-2 times)

Driven far too fast or while you were under the influence of alcohol
or drugs? (IF YES) How many times? (2=five times or more, 1=3-4
times, 0=0-2 times)

Done anything that's against the law (e.g., shoplifted, sold drugs, destroyed public property)? (IF
YES) How many times? (2=5 times or more, 1=3-4 times, 0=0-2 times)

**(Impulsivity in at least two areas that are potentially self-damaging
[do not include suicidal or self-mutilating behavior covered elsewhere]:
2=definite impulsiveness in two areas [two areas given a rating of 2],
1=probable impulsiveness in two areas, 0=not impulsive in two areas)**

9. ... often gone from loving and admiring someone to feeling that you can't stand him or her?

Often gone from feeling like you couldn't live without someone to needing to get away from him or
her?

Had any stormy relationships or relationships with a lot of ups and downs?

Any relationships with a lot of very intense arguments?

How about times when you stopped talking to one another or seeing one another? (IF YES) And
then got back together again?

(A pattern of unstable and intense interpersonal relationships characterized by alternating between extremes of idealization and devaluation: 2=definitely present, 1=probably present, 0=absent)

- 10. THE PATIENT MEETS THE DSM-IV CRITERIA FOR BORDERLINE PERSONALITY DISORDER. (2=meets five or more criteria at 2-level, 1=meets four criteria at 2-level, 0=meets three or fewer criteria at 2-level)**