RESEARCH ARTICLE

The measurement of reflective function in adolescents with and without borderline traits

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ABSTRACT

Reflective function refers to the capacity to reflect on the mind of self and others in the context of the attachment relationship. Reflective function (and its conceptual neighbor, mentalizing) has been shown to be an important correlate of a variety of disorders, including borderline personality disorder. Current measures available to assess this construct in youths are either time- and/or labor-intensive or require experimental testing conditions; therefore, a self-report measure is needed for quick assessment of reflective function capacity in youths. The aim of the current study was to investigate whether the the newly adapted 46-item Reflective Function Questionnaire for Youths (RFQY; Sharp et al., 2009) could provide a reliable and valid assessment of reflective function in adolescents. A sample of inpatient adolescents aged 12–17 ($N = 146$) was recruited. Adequate internal consistency was established for the RFQY. Findings also demonstrated significant positive associations with a criterion measure of reflective function, with an experimental-based assessment of mentalization, and relations with empathy, supporting criterion and convergent validity of the RFQY. As expected, the RFQY also showed strong negative relations with borderline personality disorder features as

assessed by both self- and parent-report. In addition, adolescent patients who scored above clinical cut-off on self-reported BPD features were found to have significantly poorer reflective function compared to adolescents without BPD features. .These findings support the notion that reflective function can be validly and reliably assessed in adolescent populations.

Introduction

Borderline Personality Disorder (BPD) is characterized by deficits in multiple areas of functioning including cognitive, affective, and behavioral domains. BPD is common in clinical settings; 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), and lifetime prevalence estimated at around 6% (Grant et al., 2008). In adolescence, the disorder affects 11% of outpatients (Chanen et al., 2004) and reportedly 43–49% of inpatients (Grilo et al., 1998; Levy et al., 1999). Child and adolescent populations diagnosed with BPD, in comparison to other personality disorders, are reported to have increased rates of hospitalization due to suicidal ideation or attempts (Guilé & Greenfield, 2004), poor clinical and psychosocial functioning (Chanen, Jovev, & Jackson, 2007; Taylor, James, Reeves, & Kistner, 2009), and remain a challenging group to treat (Miller, Neft, & Golombeck, 2008). The prognosis for adolescents suffering from borderline symptoms is poor, and their ability to achieve certain milestones such as occupational attainment and partner involvement is negatively impacted (Winograd, Cohen, & Chen, 2008). Given the severity and prevalence of BPD in clinical populations, 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 or mentalization (Sharp & Fonagy, 2008). 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 & Luyten, 2009; Fonagy, Target, Gergely, Allen, & Bateman, 2003). Based on this theory, BPD is viewed as an attachment-related disorder and 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 and 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 (Frith, 1992; Morton, 1989).

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, Steele, Moran, Steele, & Higgitt, 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: (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 that measured by self-reports) or externally (when assessed by experimental tasks examining eye regions). Furthermore, mentalization is related to constructs of mindfulness, psychological mindedness, empathy, and affect

consciousness (Choi-Kain & Gunderson, 2008). Given the multidimensional nature of

mentalization, it is important to have adequate measures to assess mentalizing in

relation to various disorders (Sharp & Fonagy, 2008; Luyten, Fonagy, Lowyck, &

Vermote, 2012).

Several measures have been developed to assess mentalization capacity in

adults (Luyten et al., 2012). The Adult Reflective Function Scale (ARFS) was

developed by Fonagy and colleagues (Fonagy et al., 1998; Fonagy, Target, Steele, &

Steele, 1991), and is coded from transcripts generated from the Adult Attachment

Interview (AAI, Main & Goldwyn, 1985-1995). Adult BPD patients with a history of

abuse were shown to differentiate from patients without BPD with a history of abuse

(Fonagy et al., 1996, 1998) using the ARFS. In addition, a 46-item self-report measure,

the Reflective Function Questionnaire (RFQ), was developed by Fonagy and Ghinai

(unpublished manuscript) to assess mentalizing capacity in adults. Preliminary reports

demonstrate promising psychometric properties with good reliability and validity for this

measure (Perkins, 2010For assessment of mentalization capacity in youths, the Child

Reflective Function Scale (CRFS) was developed (Target, Oandasan, & Ensink, 2001)

and modeled from the ARFS (Fonagy et al., 1998). Scores for the CRFS are rated

using transcriptions from a semistructured interview, the Child Attachment Interview

(CAI; Shmueli-Goetz, Target, Fonagy, & Datta, 2008; Target, Fonagy, Shmueli-Goetz,

Datta, & Schneider, 1998). 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 AAI (George, Kaplan, & Main, 1985; Main, 1995) for use in youth

populations. The CAI contains 15 open-ended questions that elicit detailed information

on relationship episodes, tapping into a child's perspective of him/herself and of his/her primary attachment figures, 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 (Shmueli-Goetz et al, 2008; Target, Fonagy, & Shmueli-Goetz, 2003). The two scales derived from the CRFS are the self- and other-understanding scales. Good inter-rater reliability for the reflective function items has been reported, with intraclass coefficients (ICCs) ranging from 0.6 to 1.00 (Ensink, 2004).

Beyond the CRFS, and as reviewed by Sprung (2010), Midgley and Vrouva (2012), Sharp , Fonagy, and Goodyer (2008), and Luyten et al. (2012), several experimental measures have been developed to assess mentalizing in children and adolescents with clinical disorders. Since different aspects of mentalizing are uniquely associated with certain disorders (see Sharp & Venta, 2012 for a review), it is important to select relevant measures depending on the clinical population of interest, as well as the appropriate developmental stage. A well-used task in this regard is the "Child Eyes Test" (CET; Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001) adapted from its adult version. In this task, participants are presented with 28 different photos of the eye regions of people's faces. They are then instructed to pick one out of four choices of mental state words provided to describe what the person in the photo is thinking or feeling. The CET is a well-validated measure primarily used to assess for ToM or emotion-recognition deficits in children with autism (Baron-Cohen, Wheelwright, Scahill, Lawson, & Spong, 2001), and has been used in a sample of children with conduct problems (Sharp, 2008). Because the CET asks participants to focus on the eye region

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of the face, it is viewed as an explicit-controlled measure of theory of mind (Sharp et al., in press).

A recently developed experimental measure of mentalization is the Movie for the Assessment of Social Cognition (MASC; Dziobek et al., 2006). The MASC is a real-time, video-based assessment of ToM which measures accurate ToM (mentalizing) and dysfunctions in mentalizing including no ToM (no mentalizing), excessive ToM (hypermentalizing), and low ToM (undermentalizing; Dziobek et al., 2006). This measure has demonstrated dysfunction in ToM in several adult patient populations, such as Autism Spectrum Disorder (Dziobek et al, 2006), bipolar disorder (Montag et al., 2009), Narcissistic Personality Disorder (Ritter et al., 2011) and BPD (Preißler, Dziobek, Ritter, Heekeren, & Roepke, 2010). More recently, the measure has also demonstrated impaired mentalizing in adolescent patients with BPD (e.g. Sharp et al., 2011; Sharp et al., in press). The MASC is a broad assessment of mentalization which taps into implicit mentalizing.

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

In summary, reflective function (or mentalizing) appears to be an important correlate of a variety of disorders, including BPD. While a variety of measures have been developed to assess this and related constructs (as discussed above), they are time- and/or labor-intensive (e.g., the CRFS), or they require experimental testing

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conditions (e.g., the MASC or the CET). To address these limitations, an adolescent version of the 46-item adult RFQ (Fonagy & Ghinai, unpublished manuscript) has been adapted for use with adolescents (Reflective Function Questionnaire for Youth [RFQY]; Sharp et al., 2009). Like its adult counterpart, the RFQY asks adolescents to rate how much they agree or disagree with a statement of reflective function. The measure is scored on a 6-point Likert scale with responses ranging from "Strongly Disagree" to "Strongly Agree". In its adaptation from the adult version, 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". A total reflective function score is derived from summing recoded responses.

Against this background, the aim of the current study was to investigate whether reflective function could be validly assessed through this questionnaire-based measure, which is less time- and labor-intensive than the CRFS. We expected that the RFQY would correlate significantly with the CRFS and experimental measures of mentalizing (the MASC and the CET). Given the importance of reflective function (or mentalizing) for borderline pathology (see, e.g., Sharp et al., 2011), we also expected that the RFQY would correlate significantly with a dimensional measure of borderline features in adolescents, as reported by both adolescents and their parents. Finally, we expected that the patients who were above clinical cut-off on this measure would show lower reflective function capacity as measured by the RFQY. As such, this study provides

initial validation evidence for the RFQY by establishing its internal consistency and criterion, convergent, and construct validity.

Method

Participants

This study included a sample of 12–17-year-olds admitted to the adolescent unit of a private psychiatric hospital. Although all families were approached for consent and assent, some exclusion and inclusion criteria were established. Inclusions for study participation consisted of: (1) any adolescent patient between 12 and 17 years of age, and (2) sufficient fluency in English to complete all research. Exclusions for study participation comprised the following: (1) diagnosis of schizophrenia or any psychotic disorder, and/or (2) diagnosis of mental retardation. The dataset included a total of 276 consecutively admitted adolescents. Twenty-four patients and their families declined participation in the study, and two families revoked consent. Additionally, 14 adolescents were excluded for other reasons including active psychosis ($n = 6$), ineligibility for consent due to language barrier, or being wards of court ($n = 8$). Finally, an additional 36 adolescents were excluded because of missing CAI videos as a result of equipment errors, adolescent refusal, or incomplete assessments resulting from abrupt discharges. An additional 54 videos were not coded for reflective function, so were not used in the final analyses. After these exclusions, a total of 146 participants were used in subsequent analyses. The final dataset consisted of $N = 146$ adolescents admitted to the adolescent unit.

Measures

Self-report measure of reflective function. The Reflective Function Questionnaire for Youth (RFQY) is a 46-item self-report measure assessing adolescent reflective function. Responses are scored 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 consisted of a straightforward scoring where higher scores indicated higher reflective function. Scale B was formed of 23 items, 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 the scores for 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 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.

Criterion measure of reflective function. The Child Reflective Function Scale (CRFS; Target et al., 2001) was coded based on transcriptions from the Child Attachment Interview (CAI; Target et al., 1998). In the current study, trained clinical research staff and doctoral-level graduate students in clinical psychology conducted CAIs 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 (the third author).

Reflective function ratings were coded on an 11-point dimensional scale, ranging from -1 to 9, and anchored at six 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 of 4 or lower 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 were asked to provide three words to describe themselves, and then prompted to provide examples. For instance, an adolescent may have described 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 would be coded with a score of 6. An example of a high reflective function score (9) would be a response of "I feel intelligent when my big brother cannot complete 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 consisted 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 they are angry 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 used as criterion measure in addition to both scales of self- and other- understanding.

Other measures of mentalization. The Movie for Assessment of Social Cognition (MASC; Dziobek et al., 2006) was used to assess mentalizing in typical social situations involving peer and romantic relationships. The storyline of the movie involved four characters getting together, preparing dinner, and then playing a board game, with themes focused on peer and romantic relationships. In total, adolescents were presented with 46 video clips via slides on the computer, and were then asked to imagine what the characters thought or felt as soon as each scene ended (e.g., "What is Betty thinking?"). Answer choices were presented in a multiple-choice format with four response options. Each response was coded as hypermentalizing (e.g., "Angry, her friend forgot she doesn't like sardines"), undermentalizing (e.g., "Surprised, she didn't expect sardines"), no mentalizing (e.g., "Sardines are salty and slippery"), or accurate mentalizing (e.g., "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 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., 2011). In the current study, total mentalizing and all subscales, including no mentalizing, undermentalizing, and hypermentalizing were used in the analyses.

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

Empathy. The Basic Empathy Scale **(**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 1 = Strongly Disagree to 5 = Strongly Agree. Good convergent and divergent validity have been demonstrated for the BES (Jolliffe & Farrington, 2006). In addition, factor analyses revealed two underlying components of the scale, including cognitive and affective empathy (Jolliffe & Farrington, 2006). Eight items were reverse-scored before summing all items to yield a total score. Two subscales are also computed, with nine items measuring cognitive empathy and 11 measuring affective empathy. A higher

score indicated higher levels of empathy. For this study, only the total empathy score was used in the analyses. Internal reliability for this measure was good (α = .83) for this study.

Borderline personality disorder. The Borderline Personality Features Scale for Children (BPFSC; Crick, Murray-Close, & Woods, 2005) is a 24-item questionnaire measure that assesses borderline personality features in children aged 9 years and older, including adolescents. The measure was adapted from the borderline subscale of the Personality Assessment Inventory (PAI; Morey, 1991), which has been shown to be a valid and reliable measure. The BPFSC has the same four subscales as the PAI (Affective Instability, Identity Problems, Negative Relationships, and Self-harm), with six items per subscale. Responses are scored on a 5-point Likert scale, ranging from 1 (Not at all true) to 5 (Always true) with total scores indicating greater levels of borderline personality features. The measure was used in the present study both dimensionally and categorically. For the latter, adolescents were grouped into BPD versus non-BPD groups based on a cut-off score of 66, which was derived in previous work on the BPFSC (Chang, Sharp, & Ha, 2011). A parent-report version of the BPFS was adapted from the self-report version, with adequate parent–child concordance demonstrated (BPFSP; Sharp, Mosko, Chang, & Ha, 2010). A cut-off score of 72 was established for parent-reported borderline symptoms (Chang et al., 2011). In the present sample, internal consistency for both the self- and parent-report were good with Cronbach's alpha of .89 for the BPFSC and .91 for the BPFSP.

Adolescent clinical characteristics. The Diagnostic Interview Schedule for Children – Computerized version (NIMH DISC-IV; Shaffer, Fisher, Lucas, Dulcan, &

Schwab-Stone, 2000) was used to provide a description of the clinical characteristics of this sample. The DISC-IV is a highly structured clinical interview which assesses for Axis I disorders in children and adolescents aged 9–17 years. It is a well-established measure of Axis I psychopathology in youth and has good reliability and validity (Shaffer 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 on the basis of 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 1.5 to 2 hours.

To provide a description of clinical characteristics for this sample (Table 1), we used DISC-IV diagnoses for the past year. Diagnoses are assigned a code with no diagnosis scored as 0, intermediate diagnosis scored 1, or positive diagnosis scored 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: "Any Mood Disorder", "Any Eating Disorder", "Any Anxiety Disorder", and "Any Externalizing Disorder". "Any Mood Disorder", included patients who met a positive diagnosis for either Major Depressive Disorder, Hypomania, Mania, or Dysthymia in the past year. "Any Eating Disorder" included patients who met a positive diagnosis for either Anorexia or Bulimia. For the "Any Anxiety Disorder" category, if the patient met criteria for any of the anxiety disorders (Generalized Anxiety Disorder, Agoraphobia, Obsessive-Compulsive Disorder, Panic Disorder, Posttraumatic Stress Disorder, Social Phobia, or Specific Phobia), they were grouped in this category.

The "Any Externalizing Disorder" group included those with a diagnosis of either Attention Deficit Hyperactivity Disorder, Conduct Disorder, or Oppositional Defiant Disorder.

Procedures

This sample was recruited 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. Procedures and details of the research-based assessment protocol are provided in detail elsewhere (Sharp, et al., 2009).

Data Analytic Strategy

All analyses were performed using SPSS version 18.0 (SPSS, 2010). 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 consistency of the RFQY was examined using Cronbach's alpha for the total scale, and then separately for Scale A and Scale B. Correlational analyses were used to examine relations between RFQY scores and the criterion measure (CRFS), experimental measures (MASC and CET), empathy (BES), and borderline features (BPFSC). Separate independent sample t-tests were used to investigate whether patients above cut-off on the BPFSC or BPFSP would show lower reflective function on the RFQY.

Results

Preliminary Analyses

Descriptive data for main study variables are reported in Table 1 along with clinical characteristics of the full sample. The mean age for this sample was 15.75 (*SD* = 1.39) and the average IQ was 106.88 (*SD* = 13.84). Fifty percent of the sample had a previous psychiatric hospitalization, with 25% having two or more previous psychiatric hospitalizations. The mean reflective function score for this sample as determined by the RFQY was 6.49 (*SD* = 0.64) with a minimum of 3.35 and a maximum of 7.87. Sample means and ranges are reported in Table 1 for all other measures.

Next, normality assumptions were examined for the dependent variable. The Kolmogorov-Smirnov test was calculated for the RFQY total score, indicating a non-normal distribution (*KS* = .102, *df* = 146, *p* = .001). Therefore, non-parametric tests were used for all analyses.

[Table 1 here]

Internal Consistency

To assess the RFQY's internal consistency, Cronbach's alpha was computed. The internal consistency was *α* = .77 for the total summary score, *α* = .72 for Scale B, and *α* = .86 for Scale A. Internal consistency for the RFQY total scale was therefore in an acceptable range.

Criterion Validity

Spearman correlations revealed significant positive relations between RFQY total and CRFS global reflective function (*r* = .29, *p* < .001), CRFS Self-understanding (*r* = .26, *p* < .001), and CRFS Other-understanding (*r* = .26, *p* = .004). Correlations are shown in Table 2.

Convergent Validity

Convergent validity was investigated by examining associations between the RFQY total and experimental measures of mentalization (the CET and MASC), and as well as a measure of empathy (the BES). As expected, significant positive relations were found for RFQY total with empathy ($r = .21$, $p = .01$) and with total scores on the MASC ($r = .29$, $p < .001$). A significant negative correlation was found between RFQY total and the hypermentalizing subscale on the MASC ($r = -.32$, $p < .001$). However, no significant relationships were found for RFQY total score with the CET measure ($r = 0.05$, $p = .59$), or with MASC no-mentalizing ($r = -.06$, $p = .49$) and undermentalizing ($r = .04$, $p = .63$). Results from Spearman correlations are presented in Table 2.

[Table 2 here]

Construct Validity

Spearman's correlations revealed a significant inverse relationship between reflective function and borderline features as reported by parents ($r = -.21$, $p = .02$) and by adolescents ($r = -.47$, $p < .001$). Next, a Mann-Whitney test was conducted to examine whether group differences existed between adolescent patients with and without without BPD on reflective function using the RFQY. A significant difference was found for reflective function scores between patients with BPD and patients without BPD ($U = 1448.50$, $p < .001$, $r = -.35$) on self-reported symptoms of borderline features. Adolescents who scored above cut-off on the borderline features scale had significantly poorer reflective function ($Mdn = 6.35$) compared to adolescents who scored below the cut-off ($Mdn = 6.83$). Reflective function also differed significantly between patients with and without BPD ($U = 1802.50$, $p = .039$, $r = -.18$) on parent-reported symptoms of borderline features. Adolescents who scored above cut-off on the parent-reported

borderline symptoms had significantly lower scores on reflective function (*Mdn* = 6.50) compared with patients who scored below the cut-off on parent-reported borderline symptoms (*Mdn* = 6.83).

Discussion

Few measures of mentalizing or ToM have been developed for use in age groups older than 4 years (Sharp, 2008). Moreover, very few questionnaire measures of mentalizing or ToM 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). The current study is the first to examine whether reflective function can be validly assessed through this questionnaire-based measure, which is less time- and labor-intensive than other measures of reflective functioning or mentalizing. First, internal reliability was investigated for all 46 items on the RFQY using Cronbach's alpha. Adequate internal reliability was found for the RFQY. This supports the use of the RFQY as a reliable measure to assess adolescent mentalization capacity.

Criterion validity was investigated by examining the relation between the RFQY total score and CRFS global, self-, and other-understanding scales. Significant relations were found for RFQY total score with all three CRFS scales. Next, convergent validity was examined between the RFQY total and two experimental measures of mentalizing and a measure of empathy. Our findings support the convergent validity of the RFQY, which related significantly to the MASC total score and the empathy measure, as predicted. In addition, we found a significant inverse relation between

RFQY and the MASC hypermentalizing scale. In other words, a high score on hypermentalizing, or an overinterpretation of mental states, was related to low reflective function capacity. No significant relations were found between the RFQY and the MASC no-mentalizing or undermentalizing subscales. The RFQY and the MASC hypermentalizing subscale therefore tap into similar aspects of mentalizing, in contrast to the MASC no-mentalizing and undermentalizing subscales, which relate to mental states in the experimental stimuli rarely being reported by test subjects. For example, in one scene in the MASC, Sandra offers Cliff a drink, but when she gets to the kitchen, she finds out that the dessert was ruined. The scene stops and adolescents are asked "What is Sandra feeling?" The correct response option was: "She is frustrated about the burnt cake", while a no-mentalizing response was: "She forgot to bring the coke", and an undermentalizing response was: "She is sure that they will have no dessert". In contrast, the hypermentalizing response was "She is afraid that the others will laugh at her".

Furthermore, no significant relation was found between the RFQY total and CET. One explanation may be that these measures tap into different aspects of mentalization. The CET taps into external and others' mental states by asking adolescents to rate eye regions of the face, as opposed to the RFQY, which taps into internal aspects of both self and other mental states. The RFQY also examines broader aspects of mentalization including more complex interpretative forms of mentalizing, which overlaps with mentalization components assessed for in tasks like the MASC, but not with the CET, which assesses more narrow aspects of mentalization related to emotion

understanding or recognition. These findings support the discriminant validity of the RFQY with other measures of mentalizing.

As expected, empathy was found to correlate with the RFQY. While empathy is not a form of mentalizing, it relates to mentalizing in that the ability to empathize relies on an individual's capacity to respond emotionally to another's mental state, which therefore involves mentalization (Sharp, 2006). Empathy can be therefore seen as the emotional other-oriented end of mentalizing (Choi-Kain & Gunderson, 2008). The correlation found here between reflective function and empathy therefore further strengthens the validity of the construct of reflective function as measured by the RFQY.

Construct validity was examined using two approaches. Using a dimensional approach to measuring borderline symptoms, we showed that adolescents with higher self-reported and parent-reported borderline symptoms had lower reflective function. Additionally, when using a categorical approach to both self-reported and parent-reported borderline traits, a significant group difference emerged for BPD patients compared to patients without BPD, with the BPD group demonstrating poorer (lower) reflective function. This is consistent with adult research which has demonstrated poorer reflective function in individuals diagnosed with BPD (Fonagy et al., 1996, 1998; Perkins, 2009).

Taken together, our findings demonstrate that the RFQY is a promising self-report measure of mentalization in adolescent inpatients. The findings from this study must be interpreted with caution as there are several limitations. First, our sample was composed 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. Additionally, this study lacked the ability to demonstrate the clinical utility of the RFQY in identifying patients with poor reflective function due to the nature of the sample. Future studies should incorporate a community sample to establish a cut-off on the RFQY against CRFS for reflective function.

Despite these limitations, this study is the first to provide evidence in support of the reflective function construct in adolescents, as measured by the RFQY. The findings support the reliability and validity of the RFQY as a newly adapted measure of social cognition (mentalization) for adolescents. The RFQY has adequate internal consistency, and criterion, convergent, and construct validity, and shows promise as a useful tool for clinicians to quickly assess mentalization in inpatient adolescents, especially when time and financial constraints limit the use of additional measures. Additionally, although it is currently unknown whether the RFQY is sufficiently sensitive to assess change in reflective function, it may be useful to track treatment outcome in treatment settings that 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 impaired mentalization and BPD in adolescents, which will aid in improving interventions for patients suffering from this challenging disorder.

Table 1. Descriptive data and clinical characteristics of the full sample ($N = 146$).

Study variable	N	Mean (*SD*)	Minimum	Maximum
Age	146	15.57 (1.39)	12	17
IQ	113	106.88 (13.84)	71	149
Admit GAF	145	39.22 (7.03)	20	55
CRFS Global RF	146	3.15 (1.18)	1	8
RFQY total (self-report)	146	6.49 (.64)	3.35	7.87
Empathy (BES)	146	74.40 (10.13)	44	99
CET	139	20.34 (2.21)	14	25
MASC total	146	32.15 (5.05)	10	41
MASC hypermz	146	7.86 (4.04)	1	26
MASC undermz	146	3.30 (2.12)	0	10
MASC no mz	146	1.68 (1.61)	0	8
			N	**%**
History of medical problems			70	48

History of psychiatric problems	143	98
Any anxiety disorder	75	51
Any mood disorder	66	45
Any eating disorder	9	6
Any externalizing disorder	66	45
BPFSC	89	61
BPFSP	86	62

*Note: Axis I psychopathology was determined using DISC-IV diagnoses, and BPD was determined by the self- and parent-reported Borderline Personality Features Scale (BPFSC and BPFSP). Abbreviations: GAF = Global Adaptive Functioning, CRFS Global RF = Child Reflective Function Scale Global Reflective Function, RFQY = Reflective Function Questionnaire for Youths, BES = Basic Empathy Scale, CET = Child Eyes Test, MASC = Movie for Assessment of Social Cognition; hypermz = hypermentalizing, undermz = undermentalizing, no mz = no mentalizing.

Table 2. Spearman correlations for RFQY total with other mentalizing measures and empathy.

	1	2	3	4	5	6	7	8	9	10
1. RFQY Total (self-report)	--									
2. CRFS Global RF	.29**	--								
3. Self-understanding (CRFS)	.26**	.77**	--							
4. Other-understanding (CRFS)	.26*	.89**	.77* *	--						
5. Empathy (BES)	.21*	.17*	.12	.21*	--					
6. CET	.05	.02	-.05	.06	-.09	--				
7. MASC total	.29**	.35**	.32**	.23*	.05	.08	--			
8. MASC hypermz	-.32**	-.27**	-.28**	-.16	-.09	-.05	-.79**	--		
9. MASC undermz	.04	-.11	-.07	-.04	.03	.03	-.45**	-.02	--	
10. MASC no mz	-.06	-.17*	-.19*	-.17	.01	.001	-.36**	0.00	.10	--

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

Abbreviations: RFQY = Reflective Function Questionnaire for Youths, CRFS Global RF = Child Reflective Function Scale Global Reflective Function, BES = Basic Empathy Scale, CET = Child Eyes Test, MASC = Movie for Assessment of Social Cognition; hypermz = hypermentalizing, undermz = undermentalizing, no mz = no mentalizing.

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