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Functional Outcomes in Community-Based Adults with Borderline Personality Disorder

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Abstract

Many individuals in clinical samples with borderline personality disorder (BPD) experience high levels of functional impairment. However, little is known about the levels of functional impairment experienced by individuals with BPD in the general community. To address this issue, we compared overall and domain-specific (educational/occupational; social; recreational) functioning in a sample of community-based individuals with BPD ($n = 164$); community-based individuals without BPD ($n = 901$); and clinically-ascertained individuals with BPD ($n = 61$). BPD diagnoses and functional outcomes were based on well-accepted, semi-structured interviews. Community-based individuals with BPD were significantly less likely to experience good overall functioning (steady, consistent employment and 1 good relationship) compared to community-based individuals without BPD (BPD: 47.4%; Non-BPD: 74.5%; risk difference -27.1% ; $p < 0.001$), even when compared directly to their own non-BPD siblings (risk difference -35.5% ; $p < 0.001$). Community-based individuals with BPD versus those without BPD did not differ significantly on most domain-specific outcomes, but the former group experienced poorer educational/occupational performance and lower quality relationships with parents, partners, and friends. However, community-based individuals with BPD were significantly more likely to experience good overall functioning than clinically-based individuals with BPD (risk difference -35.2% ; $p < 0.001$), with the latter group more likely to experience reduced employment status, very poor quality relationships with partners, and social isolation. In conclusion, community-based individuals with BPD experienced marked functional impairment, especially in the social domain, but were less likely to experience the more extreme occupational and social impairments seen among patients with BPD.

Keywords

Borderline personality disorder; Functional outcomes; Functioning; Functional impairment

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Introduction

Increasingly, mental health interventions are evaluated based on their potential to improve real-world functioning alongside symptoms (Insel, 2014). The first step towards doing so is establishing the particular impairments associated with a given disorder. In that vein, numerous studies have examined functional impairments, as well as how those impairments change over time, in both treatment-seeking and community samples of individuals with psychotic disorders, depressive disorders, substance use disorders, and childhood mental health problems (Copeland et al., 2015; Keck Jr et al., 1998; McFarlane et al., 2015; Stirling, 2003; Sugarman et al., 2014).

However, little is known about functional impairments associated with borderline personality disorder (BPD) in the community since the vast majority of research on functioning in BPD has utilized clinically-ascertained samples (Gunderson et al., 2011a; Skodol et al., 2002, 2005, Zanarini et al., 2005a, 2010, 2012). These studies have found that BPD patients experience substantial occupational and social impairments, even relative to patients with other personality disorders or Axis I disorders such as depression (Skodol et al., 2002). Further, longitudinal follow-up studies of BPD patients demonstrate that these relative impairments persist over time (Gunderson et al., 2011a; Skodol et al., 2005; Zanarini et al., 2005a, 2010, 2012), although a substantial number of patients with BPD will attain good functioning (albeit perhaps temporarily) over the long-term (Zanarini et al., 2012).

The dearth of information from community-ascertained samples leaves a significant gap in our knowledge of BPD-associated impairments. More specifically, clinically-ascertained samples likely overestimate the association between BPD and functional impairment given that functional impairment can be an impetus for treatment. Thus far, the only rigorous community-based study to examine functioning in BPD is the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a nationally-representative, community-based sample of non-institutionalized, civilian adults 18 and older in the United States. Two recent reports (Grant et al., 2008; Tomko et al., 2014) using data from Waves 1 (Grant et al., 2003) and 2 (Grant et al., 2005) of the NESARC found that, when compared to individuals without BPD, individuals with a diagnosis of BPD had lower socioeconomic status, and lower educational achievement (in men but not women), and were also more likely to be separated/divorced and have serious difficulties with romantic partners, bosses, friends, neighbors and other relatives. However, BPD diagnoses in the NESARC are based on the Alcohol Disorders and Associated Disabilities Interview Schedule DSM-IV Version (AUDADIS-IV) (Grant et al., 2001, 2004), a fully structured diagnostic interview that is designed for lay interviewers and has not been validated, unlike well-accepted semi-structured diagnostic interviews for BPD, such as the Diagnostic Interview for DSM-IV Personality Disorders (Zanarini et al., 1996) or the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (First et al., 1994).

A further gap in our understanding is that no study, to our knowledge, has directly compared community and clinical samples with BPD to see whether community samples exhibit the same type or degree of functional impairment as clinical samples.

In order to provide further data bearing on functioning in individuals with BPD in the community, we investigated the association between BPD and functioning in a sample comprised of community- and clinically-based participants who underwent rigorous, semi-structured interviews for BPD and psychosocial functioning by clinically-experienced interviewers. These features of our sample allowed us to address two questions about functional impairments in BPD. First, we investigated whether BPD is associated with functional impairments in the community. To do so, we compared the functioning of community-based individuals with and without BPD. As a type of sensitivity analysis, we also compared functioning in a subset of community-based siblings with and without BPD. This approach enhances our ability to detect the causal effects of BPD on functioning since sibling comparisons effectively control for other differences between individuals, such as family background, that could account for differences in functioning (D'Onofrio et al., 2013). Second, we investigated whether BPD-associated functional impairments are indeed more severe in clinical populations, by comparing the functioning of clinically- and community-based individuals with BPD.

Methods

Participants

The data came from a family study of BPD that we conducted in the greater Boston area from August 2005 to August 2009 (Gunderson et al., 2011b). As described previously, we recruited 18–35 year old female probands from residential, partial hospital, and outpatient programs at McLean Hospital (a psychiatric hospital located in Belmont, MA and affiliated with Harvard Medical School), and we also used print, internet, and radio ads to recruit 18–35 year old female probands from the community.¹⁶ Once probands with and without BPD had been identified, we then interviewed all available siblings and parents ('relatives') of the probands. Probands recruited from McLean Hospital were considered to be 'clinically-based,' whereas probands recruited from the community and all relatives were considered to be 'community-based.' The study was approved by the McLean Hospital Institutional Review Board, and both probands and relatives gave written informed consent prior to participation.

Analyses were restricted to individuals less than 62 years old because many of the functional outcomes examined were less applicable to older participants due to retirement, widowhood, etc. The 'community sample,' which we used to investigate whether BPD is associated with functional impairments in the community, consisted of 1,066 participants (164 with BPD and 902 without BPD). The 'sibling-only subset' of the community sample included 189 participants (85 with BPD and 104 without BPD). Finally, the 'BPD sample,' which we used to investigate how functional impairment differs in community and clinical samples with BPD, included 225 participants with BPD (61 clinically-based and 164 community-based).

Table 1 presents demographic information for community-based participants without BPD, community-based participants with BPD, and clinically-based participants with BPD.

Procedures and Assessments

Clinically-experienced staff administered three semi-structured interviews to all probands and relatives: (1) the Diagnostic Interview for DSM-IV Personality Disorders (DIPD-IV) (Zanarini et al., 1996, 2000), which provided diagnoses of BPD and other DSM-IV (American Psychiatric Association, 1994) personality disorders, based on symptoms over the past two years; (2) the Revised Diagnostic Interview for Borderlines (DIB-R) (Zanarini et al., 1989, 2002), which yielded scores for affective, interpersonal, behavioral, and cognitive symptoms of BPD over the past two years, as well as a total BPD score used to identify BPD; and (3) the Background Information Schedule (BIS) (Zanarini et al., 2001), which provided demographic information as well as information on psychosocial functioning in educational/occupational, interpersonal, and recreational domains over the past two years. Individuals were diagnosed with BPD if they received both a DIPD-IV diagnosis and a DIB-R diagnosis. Inter-rater reliability for the BPD diagnosis was very high, with κ (based on 18 interviews) equal to 1.0 for both the DIPD-IV and the DIB-R. Likewise, the BIS has demonstrated very good inter-rater reliability on average: based on 45 interviews, κ (for categorical variables) ranged from 0.35 to 1.0, with a median value of 0.85, and intraclass correlation coefficients (for continuous variables) ranged from 0.35 to 1.0, with a median value of .90 (Zanarini et al., 2001). The BIS has also demonstrated high convergent validity with reports of psychosocial functioning from other informants (typically, a family member or close friend) using a modified version of the BIS: ρ values (based on interviews regarding 108 individuals) were 0.92 for educational/occupational variables, 0.83 for interpersonal variables, and 0.59 for recreational variables (Zanarini et al., 2005b).

Our primary outcome, ‘overall functioning,’ is a measure of global functioning used previously in the BPD literature (Zanarini et al., 2010). Good overall functioning is defined as being able to work competently and consistently over the past two years and having at least one good relationship with a close friend or spouse/partner. We also examined several secondary, domain-specific outcomes across educational/occupational, interpersonal, and recreational domains. Operational definitions for each outcome are provided in Supplemental Table 1.

Statistical Analyses

Data preparation was conducted with R version 3.2.0, and data analyses were performed using Stata version 12.1.

To investigate the association between BPD and functional outcomes in the community sample, we fit separate multinomial regression models to each outcome as a function of BPD status (BPD vs. non-BPD) and the covariates age, sex, and race/ethnicity. (Note that logistic regression is a special case of multinomial regression when the outcome has only two categories.) For the primary, overall functioning outcome, we also performed sensitivity analyses by fitting a conditional logistic regression model for that outcome as a function of BPD status and the covariates age and sex in the sibling-only subset of the community sample. We did not perform within-sibling comparisons for the secondary, domain-specific outcomes due to insufficient numbers of siblings discrepant on those outcomes. In all

models, we selected the ‘least desirable’ outcome category as the reference category. For the overall functioning outcome (which had two categories), we examined the risk difference, which is the probability of good overall functioning for BPD minus the probability of good overall functioning for non-BPD. Thus, a negative risk difference means that participants with BPD are less likely than participants without BPD to achieve good overall functioning. For domain-specific outcomes (most of which had more than two categories), we assessed the overall effect of BPD status on the outcome by examining the results of an omnibus Wald test (of the null hypothesis that all coefficients for BPD status equal 0). For domain-specific outcomes, we also assessed the effect of BPD status on each outcome category by examining the risk ratio for that category relative to the reference category. The risk ratio can be described as the multiplicative effect of BPD status on the relative risk, which is the probability of a given outcome category divided by the probability of the reference category. Thus, a risk ratio less than one means that participants with BPD are less likely than participants without BPD to achieve that category relative to the least desirable category.

We also explored the associations of the various BPD symptom sectors (e.g., affective, interpersonal, behavioral, and cognitive) with functional outcomes among community-based participants, by fitting separate multinomial regression models to each outcome as a function of each DIB-R sector score and the covariates age, sex, and race. For domain-specific outcomes, we assessed the overall effect of each sector on the outcome by examining the results of an omnibus Wald test (of the null hypothesis that all coefficients for that sector equal 0). If there was an overall effect, we also assessed the association of the sector with each outcome category by examining the risk ratio for that category relative to the reference category.

To investigate how functional outcomes compared for clinically-versus community-based individuals in the BPD sample, we fit multinomial regression models to each outcome as a function of clinical vs. community status and the covariates age, sex, and race. For the models of overall functioning, we examined the adjusted risk difference, which is the probability of good overall functioning for clinically-based BPD minus the probability of good overall functioning for community-based BPD. For the models of secondary outcomes, we assessed the overall effect of clinical vs. community status on the outcome by examining the results of an omnibus Wald test (of the null hypothesis that all coefficients for clinical vs. community status equal 0). We also assessed the effect of clinical vs. community status on each outcome category by examining risk ratios, which describe the multiplicative effect of clinical vs. community status on the relative risk of a given outcome category (relative to the reference outcome category).

In all analyses, participants’ data were weighted by their inverse probability of selection to address unequal selection probabilities since some individuals (e.g., those with BPD) were overrepresented in the data relative to the general population of the greater Boston area (e.g., because we oversampled BPD by virtue of our case-control sampling of probands) (Javaras et al., 2008, 2010). Under several commonly-made assumptions (see Discussion), the weighting procedure, which utilizes estimates developed specifically for case-control family samples (Javaras et al., 2010), effectively creates a pseudo-population with the same prevalence of BPD and its correlates as would be present in a random sample of the

underlying source population (Arnold et al., 2006; Gunderson et al., 2011b). Further, in all analyses, we used robust standard errors to address dependence between related participants. For some outcomes (specifically those in the Educational/Occupational domain), we excluded a small number of participants with missing outcome data (<4%) from those analyses.

We did not adjust results for multiple comparisons because there was only one primary outcome (i.e., overall functioning) and one primary predictor (i.e., BPD status, or clinical vs. community status), and comparisons of the secondary outcomes (or symptom sectors) were intended to illuminate any differences in overall functioning for the primary predictor. However, to reduce the risk of Type I errors, we only interpret category-specific differences for the secondary outcomes (or symptom sectors) if the p -value from the omnibus Wald Test was <0.05 .

Results

The overall functioning for participants with versus without BPD in the community sample, and in the sibling-only subset of the community sample, respectively, is depicted in Figures 1a and 1b. In the community sample, the estimated proportion of good overall functioning (steady, consistent employment and at least one good relationship) was 47.4% for community-based participants with BPD and 74.5% for community-based participants without BPD, yielding a risk difference of -27.1% (95% CI: $[-42.0\%, -12.1\%]$; $p < 0.001$). In the sibling-only subset of the community sample, the estimated prevalence of good overall functioning was 37.5% for participants with BPD and 73.1% for their siblings without BPD, yielding an risk difference of -35.5% (95% CI: $[-55.4\%, -15.7\%]$; $p < 0.001$). In addition to the association between BPD diagnosis and poorer overall functioning, each of the four DIB-R symptom sectors was significantly associated with lower odds of good overall functioning among community-based participants: for a one standard deviation increase in symptoms, the odds ratio was 1.59 (95% CI: $[1.31, 1.93]$; $p < 0.001$) for the affective sector, 1.96 (95% CI: $[1.55, 2.48]$; $p < 0.001$) for the interpersonal sector, 1.87 (95% CI: $[1.48, 2.37]$; $p < 0.001$) for the behavioral sector, and 1.81 (95% CI: $[1.48, 2.22]$; $p < 0.001$) for the cognitive sector.

The domain-specific measures of functioning for participants with versus without BPD in the community sample are presented in Table 2. In the educational/occupational domain, community-based participants with and without BPD did not differ significantly on educational status (i.e., highest level of education attained), occupational status (i.e., studying/working full-time, part-time, or not at all), or financial status (i.e., level of financial independence). However, the groups did differ significantly on educational/occupational functioning, with BPD participants significantly more likely to report somewhat troubled school/work performance and less likely to report steady or better performance, compared to non-BPD participants. In the interpersonal domain, community-based participants with and without BPD did not differ significantly with respect to partnership status (i.e., being in a married/cohabiting relationship, a steady but non-cohabiting relationship, or not being in a relationship), parenthood status (i.e., having one or more adopted or biological children or step-children), or number of close friends. However, the groups did differ with respect to

parental, partner, and friend relationship functioning, with BPD participants (versus non-BPD participants) significantly less likely to report good or very good relationships with living parents, their partner, or close friends. In the recreational domain, community-based participants with and without BPD did not differ significantly with respect to recreational participation or social isolation. Finally, the various DIB-R symptom sectors generally had comparable levels of association with the domain-specific functional outcomes, with the exception that only the behavioral and cognitive sectors were significantly associated with lower educational status (see Supplemental Table 2).

Differences in overall functioning for clinically-versus community-based participants are depicted in Figure 1c. The estimated proportion of good overall functioning was 2.8% for clinically-based participants with BPD and 38.0% for community-based participants with BPD, yielding a risk difference of -35.2% (95% CI: [-46.2%, -24.2%]; $p < 0.001$).

Results comparing domain-specific measures of functioning for clinically-versus community-based participants in the BPD sample are presented in Table 3. In the educational/occupational domain, clinically-and community-based participants with BPD did not differ significantly on educational status, but they did differ significantly on occupational and financial status, with clinically-based participants with BPD less likely to work full-time, and significantly less likely to be fully financially independent, compared to community-based participants with BPD. In the interpersonal domain, clinically-versus community-based participants with BPD did not differ significantly with respect to partnership status, parenthood status, or number of close friends. There were also no significant differences in relationship functioning with parents or friends, but clinically-(versus community-) based participants with BPD were significantly less likely to report good or very good relationships with their partners. Finally, in the recreational domain, although clinically- and community-based participants with BPD did not differ significantly on recreational participation, they did differ significantly on social isolation, with clinically-(versus community-) based participants with BPD more likely to spend the majority of their free time alone.

Discussion

This study extends the literature on real-world functioning in BPD, which, to date, has been almost exclusively focused on clinically-ascertained samples (Gunderson et al., 2011a; Skodol et al., 2002, 2005, Zanarini et al., 2005a, 2010, 2012), which likely have a higher level functional impairment than individuals with BPD in the community as a whole. More specifically, our study is the first to examine: (1) whether rigorously diagnosed BPD (i.e., BPD diagnosed by clinically-experienced interviewers using reliable and valid semi-structured interviews) is associated with impaired functioning in the community; (2) whether BPD is associated with impaired functioning even when community-based individuals with BPD are compared to their own (non-BPD) siblings; and (3) whether functional impairment differs for clinically-versus community-based samples of BPD.

Our results suggest that, in the community, individuals with BPD are considerably less likely to experience good overall functioning than those without BPD, even when the former are

compared to their own (non-BPD) siblings. In particular, less than one-half of community-based participants with BPD experienced good overall functioning (steady, consistent employment and at least one good relationship), in contrast to over three-quarters of community-based participants without BPD. Further, the association between BPD and poorer overall functioning was not driven by any particular sector of BPD psychopathology (affective, interpersonal, behavioral, or cognitive): each symptom sector had similar associations with overall functioning, not surprisingly given the substantial correlations between sector scores (e.g., almost 60% of the variance in interpersonal scores overlapped with the other sector scores). Although community-based BPD was not associated with differences in educational level, employment status, financial independence, (romantic) partnership status, parenthood status, number of friends, or recreational participation and social isolation, individuals with BPD in the community experienced poorer educational/occupational performance and lower quality of interpersonal relationships with parents, partners, and close friends, relative to those without BPD. In general, the various sectors of BPD psychopathology had comparable levels of association with the domain-specific outcomes associated with a BPD diagnosis, again not surprisingly given the substantial correlations between sector scores.

The above results are largely consistent with the limited literature on BPD-associated impairments in the community (Grant et al., 2008; Tomko et al., 2014). In the nationally-representative, community-based NESARC study, individuals with BPD diagnoses were significantly more likely than those without BPD to report problems with employers, with partners, and with friends, relatives, and neighbors (Tomko et al., 2014), and they endorsed significantly lower levels of social functioning (Grant et al., 2008; Tomko et al., 2014). Although BPD was also associated with slightly worse educational status (e.g., lower likelihood of completing high school) in the NESARC sample (Tomko et al., 2014), in particular among men (Grant et al., 2008), the difference in educational attainment was small and thus is of uncertain clinical significance. The NESARC study has many strengths, including its national representativeness and its oversampling of young adults (18–24 years) and Black and Hispanic individuals, groups often underrepresented in survey research. However, as noted in the Introduction, BPD diagnoses in the NESARC are based on the AUDADIS-IV (Grant et al., 2001, 2004), a fully structured diagnostic interview administered by lay interviewers, which likely does not achieve the high validity (Zanarini et al., 1989) and reliability (Zanarini et al., 2000, 2002) of the more detailed semi-structured DIPD-IV and DIB-R interviews administered by clinically-experienced interviewers that were used in our study. These limitations notwithstanding, results from the NESARC complement and reinforce findings from our own diagnostically rigorous, but smaller and locally-representative study.

Our results also suggest that the functional impairments associated with BPD are considerably less severe in community samples than clinical samples. Clinically-based participants with BPD were significantly less likely to achieve good overall functioning relative to community-based participants with BPD. More specifically, clinically-based participants with BPD were more likely than community-based participants with BPD to experience significant impairments in employment status and financial independence, perhaps not surprisingly given that some clinically-based participants were attending partial

hospital and residential treatment. Further, clinically-based participants with BPD generally experienced worse partner relationships and more social isolation than community-based participants. Although no prior study has directly compared functional impairment for clinical and community samples with BPD, the occupational and social impairments in our clinical BPD sample are comparable in severity to those observed in other clinical samples (Skodol et al., 2002). Further, the functional impairments in our community-based BPD sample are considerably less severe than similarly-measured impairments observed in other clinical BPD samples, even after a year of empirically supported treatment (McMain et al., 2009).

It is important to note several limitations of this study. First, our assessment of psychosocial functioning utilized information provided by the participant only, and their reports were not corroborated by additional informants, records (e.g., educational, occupational), or more objective measures. Second, interviewers were not blinded to the BPD status of the participant being interviewed, which may have biased their assessment of psychosocial functioning, possibly in the direction of exaggerating impairments in functioning among those with BPD. However, the effects of relying on participant report and non-blinded interviewers were likely mitigated by our use of interview-based assessment with clearly-defined operationalization of psychosocial functioning. Third, our operationalization of “good” outcomes, though standard, were generous (e.g., we adopted the federal definition of 32 hours/week as working full-time), which may have attenuated the differences in functioning between individuals with and without BPD. Fourth, the validity of our findings relies on the following assumptions surrounding case-control family sampling (Javaras et al., 2010): probands (e.g., BPD probands) are representative of population members (e.g., population members with BPD); sampled relatives are representative of all relatives; family size is not correlated with the BPD status of its members; and single ascertainment (i.e., the number of probands is sufficiently small relative to the population such that there is effectively zero probability of a family being selected via more than one proband). For example, if individuals with poorer psychosocial functioning were less likely to participate in the study, the levels of (absolute) psychosocial functioning reported in our study would be inflated, and (relative) differences between individuals with and without BPD could be attenuated. Finally, because we did not have information on participants’ current Axis I diagnoses, we could not examine how adjusting for co-occurring Axis I disorders affected results for the relationship between BPD and functional outcomes, as has been done in previous studies (e.g., Tomko et al., 2014).

These limitations aside, our results provide the first evidence that community-based individuals with BPD are less likely to experience good overall functioning relative to those without BPD, due to impairments in educational/occupational performance and the quality of interpersonal relationships among those with BPD. Interestingly, these BPD-associated impairments are present despite comparable levels of education; employment status and financial independence; and partnership and recreational involvement for individuals with and without BPD. Thus, BPD has detrimental effects on quality of life even among individuals in the community who appear to be ‘functioning well’ in terms of educational/occupational, social, and recreational participation. Notably, however, individuals with BPD in the community are less likely to experience the more extreme occupational and social

impairments seen in patients with BPD. Taken together, our results underscore the importance of assessing the quality of functioning, in addition to functional status, among individuals with BPD, and of offering a range of treatments that target functional outcomes in addition to symptoms of BPD.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1.

Estimated proportion with good overall functioning (steady, consistent employment and at least one good relationship) for: a) community-based individuals with borderline personality disorder (BPD) versus general community members without BPD, after adjustment for age, sex, and race/ethnicity ($n = 164$ and 902 , respectively); b) community-based individuals with BPD versus their own (community-based) siblings without BPD, after adjustment for age and sex ($n = 85$ and 104 , respectively); and c) clinically-based individuals with BPD versus community-based individuals with BPD, after adjustment for age, sex, and race/ethnicity ($n = 61$ and 164 , respectively). The cross-bars represent 95% CIs for the proportion with good overall functioning, and the p -value refers to a test of the null hypothesis that there are no between-group differences in the proportion with good overall functioning.

Table 1

Demographic Characteristics for Participants, by Group

Characteristics	Community-Based Non-BPD (<i>n</i> = 902)	Community-Based BPD (<i>n</i> = 164)	Clinically-Based BPD (<i>n</i> = 61)
Age, years			
Mean (SD)	36.9 (14.1)	28.9 (9.4)	22.5 (4.1)
Sex			
Male, <i>n</i> (%)	248 (27.5%)	19 (11.6%)	0 (0.0%)
Female, <i>n</i> (%)	654 (72.5%)	145 (88.4%)	61 (100.0%)
Race/Ethnicity			
Non-Hispanic White, <i>n</i> (%)	642 (71.1%)	82 (50.0%)	52 (85.2%)
Black, <i>n</i> (%)	115 (12.7%)	41 (25.0%)	2 (3.3%)
Hispanic, <i>n</i> (%)	122 (13.5%)	37 (22.6%)	6 (9.8%)
Other ^a , <i>n</i> (%)	23 (2.5%)	4 (2.4%)	1 (1.6%)

Abbreviations: BPD = borderline personality disorder; SD = standard deviation

^aThe Other Race/Ethnicity category includes participants who identified as Asian or Native American, or as another (unspecified) race/ethnicity.

Table 2

Functional Outcomes for Community-Based Participants With BPD Versus Without BPD^{a,b}

Outcome ^f	Omnibus Test ^e	Risk Ratio ^d	Estimated Category Proportions ^e			
	χ^2_{df} (p-value)	Estimate	95% CI	p-Value	BPD	Non-BPD
Educational/Occupational Domain:						
Educational Status (n = 1,066)						
College degree and beyond		0.62	(0.16, 2.42)	0.49	39.0%	48.7%
Some college		0.91	(0.29, 2.91)	0.88	38.8%	33.5%
High school degree, including GED		1.01	(0.32, 3.16)	0.99	19.0%	15.3%
No high school degree (R)		--	--	--	3.2%	2.6%
Overall	$\chi^2_3=1.11$ (p = 0.78)					
Occupational Status (n = 1,058)						
Consistent work - paid		1.16	(0.30, 4.58)	0.83	61.4%	62.8%
Consistent work - student/carer		1.37	(0.34, 5.51)	0.66	21.7%	20.0%
Some work/study		1.24	(0.31, 4.92)	0.76	13.1%	12.8%
No work/study (R)		--	--	--	3.8%	4.4%
Overall	$\chi^2_3=0.25$ (p = 0.97)					
Educational/Occupational Functioning ^g (n = 995)						
High or satisfactory level		0.15	(0.03, 0.81)	0.03	76.9%	91.5%
Mild impairment		0.49	(0.08, 2.83)	0.43	21.0%	8.1%
Moderate/severe impairment (R)		--	--	--	2.1%	1.9%
Overall	$\chi^2_2=11.50$ (p < 0.01)					
Financial Status (n = 1,049)						
Fully independent		0.81	(0.18, 0.16)	0.78	82.7%	87.0%
Partially dependent		1.18	(0.18, 7.75)	0.87	15.6%	11.6%
Fully dependent - illness, disability (R)		--	--	--	1.7%	1.5%
Overall	$\chi^2_2=1.12$ (p = 0.57)					

Outcome ^f	Omnibus Test ^c	Risk Ratio ^d		Estimated Category Proportions ^e		
	χ^2_{df} (p-value)	Estimate	95% CI	p-Value	BPD	Non-BPD
Interpersonal Domain:						
Parental Relationship Functioning ^h (n = 927)						
All relationships good/very good		0.21	(0.05, 0.85)	0.03	35.8%	56.3%
One good/very good, Other less than good		0.51	(0.12, 2.09)	0.35	36.4%	24.8%
One fair, Other fair or worse		0.44	(0.11, 1.75)	0.25	22.0%	17.0%
All relationships poor/very poor (R)		--	--	--	5.7%	1.9%
Overall	$\chi^2_3=7.37$ (p = 0.06)					
Partnership Status (n = 1,066)						
Cohabiting with partner		1.29	(0.53, 3.09)	0.58	45.9%	46.0%
Steady but non-cohabiting relationship		1.64	(0.61, 4.42)	0.33	33.1%	26.6%
Not in a steady relationship (R)		--	--	--	21.0%	27.4%
Overall	$\chi^2_2=0.97$ (p = 0.62)					
Partner Relationship Functioning ⁱ (n = 772)						
Very good/good relationship		0.07	(0.02, 0.27)	0.00	56.0%	79.3%
Fair relationship		0.16	(0.04, 0.65)	0.01	30.0%	19.2%
Poor/very poor relationship (R)		--	--	--	14.0%	1.4%
Overall	$\chi^2_2=15.42$ (p < 0.001)					
Parenthood Status (n = 1,066)						
Has children (biological, adopted, or step)		1.72	(0.88, 3.36)	0.12	54.5%	49.7%
No children (R)		--	--	--	45.5%	50.3%
Overall	$\chi^2_1=2.48$ (p = 0.12)					
Number of Close Friends (n = 1,066)						
Five or more friends		0.33	(0.10, 1.03)	0.06	38.6%	56.0%
Two to four friends		0.68	(0.27, 1.75)	0.43	49.7%	37.4%
Zero or one friend (R)		--	--	--	11.7%	6.6%

Outcome ^f	Omnibus Test ^c χ^2_{df} (p -value)	Risk Ratio ^d			Estimated Category Proportions ^e	
		Estimate	95% CI	p -Value	BPD	Non-BPD
Overall	$\chi^2_2 = 5.13$ ($p = 0.08$)					
Friend Relationship Functioning ⁱ ($n = 1,031$)						
Very good/good relationship		0.05	(0.01, 0.24)	0.00	75.1%	91.3%
Fair relationship		0.13	(0.02, 0.87)	0.04	18.6%	8.3%
Poor/very poor relationship (R)		--	--	--	6.3%	0.4%
Overall	$\chi^2_2 = 23.18$ ($p < 0.001$)					
Recreational Domain:						
Recreational Participation ($n = 1,066$)						
At least weekly participation		0.56	(0.25, 1.25)	0.16	16.1%	21.8%
Some participation, but less than weekly		0.50	(0.25, 1.01)	0.05	19.3%	28.9%
No participation (R)		--	--	--	64.5%	49.3%
Overall	$\chi^2_2 = 4.34$ ($p = 0.12$)					
Social Isolation ($n = 1,066$)						
Spends less than half of free time alone		0.70	(0.37, 1.34)	0.28	63.5%	71.2%
Spends half or more of free time alone (R)		--	--	--	36.5%	28.8%
Overall	$\chi^2_1 = 1.17$ ($p = 0.12$)					

Abbreviations: BPD = borderline personality disorder;

^aResults from multinomial regression models for outcome categories as a function of BPD status and covariates (age, sex, and race/ethnicity).

^bResult are for the 'community sample,' which includes $n = 164$ community-based participants with BPD and $n = 902$ community-based participants without BPD. For some outcomes, analyses excluded participants missing the outcome (<2%) or for whom the outcome was not relevant (e.g., Partner Relationship Functioning for participants without romantic partners); the actual sample size for each outcome is reported in the table.

^cOmnibus Wald test for the significance of BPD status as a predictor for the overall outcome variable (all categories).

^dRisk ratio refers to $[P(\text{Category } k / \text{BPD}) / P(\text{Reference category } / \text{BPD})] / [P(\text{Category } k / \text{non-BPD}) / P(\text{Reference category } / \text{non-BPD})]$

^eFitted values are model-based estimates of the proportions of individuals with BPD (or without BPD) falling into each outcome category, averaged over the observed values of the demographic covariates.

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f_j (R) is used to denote the reference category, typically the least desirable category.
 g_j Participants who had not worked in the past two years were excluded from the analyses for Educational/Occupational Functioning.
 h_j Participants without parents (e.g., both parents deceased) were excluded from the analyses for Parental Relationship Functioning.
 i_j Participants without a steady partner were excluded from the analyses for Partner Relationship Functioning.
 j_j Participants without close friends were excluded from the analyses for Friend Relationship Functioning.

Table 3

Functional Outcomes for Clinically-Versus Community-Based Participants With BPD^{a,b}

Outcome ^f	Omnibus Test ^c χ^2_{df} (p-value)	Risk Ratio ^d Estimate 95% CI	p-Value	Estimated Category Proportions ^e Clinical Community
Educational/Occupational Domain:				
Educational Status (<i>n</i> = 225)				
College degree and beyond		0.86 (0.10, 7.37)	0.90	24.5% 27.7%
Some college		0.77 (0.11, 5.53)	0.80	33.8% 43.2%
High school degree, including GED		1.59 (0.20, 12.48)	0.67	37.4% 24.7%
No high school degree (R)		-- --	--	4.3% 4.4%
Overall	$\chi^2_3 = 1.82$ (<i>p</i> = 0.61)			
Occupational Status (<i>n</i> = 224)				
Consistent work - paid		0.11 (0.00, 2.40)	0.16	19.1% 52.5%
Consistent work - student/carer		0.18 (0.01, 4.03)	0.28	14.7% 25.4%
Some work/study		1.27 (0.06, 28.2)	0.88	55.6% 18.4%
No work/study (R)		-- --	--	10.6% 3.6%
Overall	$\chi^2_3 = 21.9$ (<i>p</i> < 0.001)			
Educational/Occupational Functioning ^g (<i>n</i> = 209)				
High or satisfactory level		0.02 (0.00, 0.09)	0.00	21.4% 68.4%
Mild impairment		0.18 (0.04, 0.80)	0.03	65.0% 30.1%
Moderate/severe impairment (R)		-- --	--	13.6% 1.4%
Overall	$\chi^2_2 = 28.0$ (<i>p</i> = 0.00)			
Financial Status (<i>n</i> = 218)				
Fully independent		0.05 (0.01, 0.35)	< 0.01	67.6% 80.6%
Partially dependent		0.03 (0.00, 0.27)	< 0.01	10.7% 17.1%
Fully dependent - illness, disability (R)		-- --	--	21.7% 2.3%
Overall	$\chi^2_2 = 10.93$ (<i>p</i> = 0.0)			

Outcome ^f	Omnibus Test ^c	Risk Ratio ^d	Estimated Category Proportions ^e			
	χ^2_{df} (p-value)	Estimate	95% CI	p-Value	Clinical	Community
Interpersonal Domain:						
Parental Relationship Functioning ^h (n = 216)						
All relationships good/very good		.026	(0.03, 2.63)	0.26	24.7%	27.9%
One good/very good, Other less than good		0.18	(0.02, 1.70)	0.14	27.5%	43.6%
One fair, Other fair or worse		0.43	(0.05, 4.02)	0.47	37.6%	25.6%
All relationships poor/very poor (R)		--	--	--	10.2%	2.9%
Overall	$\chi^2_3=3.27$ (p = 0.36)					
Partnership Status (n = 225)						
Cohabiting with partner		0.49	(0.13, 1.93)	0.31	23.5%	34.2%
Steady but non-cohabiting relationship		0.92	(0.31, 2.76)	0.89	45.4%	39.4%
Not in a steady relationship (R)		--	--	--	31.2%	26.3%
Overall	$\chi^2_2=1.15$ (p = 0.57)					
Partner Relationship Functioning ⁱ (n = 157)						
Very good/good relationship		0.04	(0.00, 0.49)	0.02	11.3%	49.9%
Fair relationship		0.31	(0.03, 3.57)	0.35	57.2%	38.7%
Poor/very poor relationship (R)		--	--	--	31.6%	11.4%
Overall	$\chi^2_2=12.19$ (p < 0.01)					
Parenthood Status (n = 225)						
Has children (biological, adopted, or step)		0.67	(0.11, 4.01)	0.66	45.4%	48.6%
No children (R)		--	--	--	54.6%	51.4%
Overall	$\chi^2_1=0.20$ (p = 0.66)					
Number of Close Friends (n = 225)						
Five or more friends		0.61	(0.14, 2.56)	0.50	25.6%	30.6%
Two to four friends		0.77	(0.21, 2.81)	0.70	52.5%	52.2%
Zero or one friend (R)		--	--	--	21.9%	17.3%

Outcome ^f	Omnibus Test ^e χ^2_{df} (p-value)	Risk Ratio ^d			Estimated Category Proportions ^e		
		Estimate	95% CI	p-Value	Clinical	Community	
Overall	$\chi^2_2 = 0.48$ ($p = 0.79$)						
Friend Relationship Functioning ^j ($n = 212$)							
Very good/good relationship		0.18	(0.02, 1.56)	0.12	51.8%	67.1%	
Fair relationship		0.31	(0.04, 2.52)	0.28	31.2%	25.7%	
Poor/very poor relationship (R)		--	--	--	17.0%	7.3%	
Overall	$\chi^2_2 = 2.66$ ($p = 0.27$)						
Recreational Domain:							
Recreational Participation ($n = 225$)							
At least weekly participation		5.16	(1.38, 19.34)	0.02	42.7%	17.2%	
Some participation, but less than weekly		2.05	(0.64, 6.62)	0.29	21.4%	20.2%	
No participation (R)		--	--	--	35.9%	62.7%	
Overall	$\chi^2_2 = 6.29$ ($p = 0.05$)						
Social Isolation ($n = 225$)							
Spends less than half of free time alone		0.40	(0.16, 1.02)	0.06	40.5%	62.6%	
Spends half or more of free time alone (R)		--	--	--	59.5%	37.4%	
Overall	$\chi^2_1 = 3.69$ ($p = 0.06$)						

Abbreviations: BPD = borderline personality disorder;

^aResults from multinomial regression models for outcome categories as a function of clinical vs. community status and covariates (age, sex, and race/ethnicity).

^bResult are for the 'BPD sample,' which includes $n = 61$ clinically-based participants with BPD and $n = 164$ community-based participants with BPD. For some outcomes, analyses excluded participants missing the outcome ($<4\%$) or for whom the outcome was not relevant (e.g., Partner Relationship Functioning for participants without romantic partners); the actual sample size for each outcome is reported in the table.

^cOmnibus test for the significance of clinical vs. community status as a predictor for the overall outcome variable (all categories).

^dRisk ratio refers to $[P(\text{Category } k / \text{Clinical}) / P(\text{Reference category } / \text{Clinical})] / [P(\text{Category } k / \text{Community}) / P(\text{Reference category } / \text{Community})]$

^eFitted values are model-based estimates of the proportions of clinically-based (or community-based) individuals falling into each outcome category, averaged over the observed values of the demographic covariates.

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f_j (R) is used to denote the reference category, typically the least desirable category.
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