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Prevalence of Personality Disorders at Midlife in a Community Sample: Disorders and Symptoms Reflected in Interview, Self, and Informant Reports

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Abstract

This report is concerned with the prevalence of symptoms of specific personality disorders in a representative community sample and draws attention to the importance of different sources of diagnostic information. We recruited a sample of 1,630 people between the ages of 55 and 64 to participate in a study regarding personality and health. Using careful recruitment methods, our participation rate was 43 %. Participants completed the SIDP-IV interview as well as a questionnaire (self-report MAPP). Informants completed the same questionnaire (informant MAPP), describing the participant's maladaptive personality characteristics. According to the diagnostic interview, 7 % of participants met criteria for exactly one PD, 1 % met criteria for 2 or 3 PDs, and 2 % met criteria for PD NOS (defined as 10 or more miscellaneous criteria). Avoidant and obsessive compulsive PDs were the most common types. Correlations between the three sources of information indicated significant agreement among these measurement methods, but they are not redundant. In comparison to interview and self-report data, informants reported more symptoms of personality pathology (except for avoidant PD). Symptoms of personality pathology are continuously distributed, and subthreshold features may have an important impact on health and social adjustment. In this community sample, rates of co-morbidity among PDs and the proportion of PDNOS diagnoses are substantially lower than reported from clinical samples. Future research must evaluate the validity of diagnostic thresholds and competing sources of diagnostic information in relation to important life outcomes.

Keywords

Personality disorders; Sample recruitment; Prevalence; Informant report

Personality disorders (PDs) are essential diagnostic constructs, but they remain poorly understood in comparison to other forms of mental disorder (Kendell 2002). Evidence regarding their prevalence is ambiguous, stemming largely from disagreements about how best to define and measure not only the symptoms of these disorders but also the detrimental impact that they have on people's lives (Paris 2010; Ro and Clark 2009). Epidemiological studies suggest that personality disorders are relatively common in community samples, with recent reports noting that approximately 10 % of adults would meet the diagnostic criteria for at least one specific PD (Jackson and Burgess 2004; Lenzenweger et al. 2007; Lewin et al. 2005; Newton-Howes et al. 2010). These numbers are typically based on self-report questionnaires or semi-structured diagnostic interviews that are used to collect information about the participants. Unfortunately, there is substantial reason to believe that these methods have important limitations; people with personality disorders are not always aware of the impact that their behavior has on other people or able to identify the presence of maladaptive traits (Huprich et al. 2011; Oltmanns and Turkheimer 2006). Serious questions remain about the prevalence and consequences of PDs in light of the limitations of self-report measures.

Another problem with most studies reporting the prevalence of PDs is that they rely on categorical diagnoses. Investigators typically report prevalence rates based on the number of people who qualify for a diagnosis, but these diagnostic thresholds are largely arbitrary. Contrary to this categorical method used in prevalence studies, the field seems to have reached a consensus that PDs are best viewed as dimensions rather than categories, regardless of whether they are defined on the basis of symptoms or personality traits (Zimmerman 2012). Several investigators have called for empirical efforts to identify the most meaningful thresholds for diagnosis of PDs (Clifton and Pilkonis 2007; Cooper and Balsis 2009). A comprehensive analysis of the prevalence of personality pathology requires data that report on the full distribution of PD symptoms in a community sample (e.g., how many people do not exhibit any symptoms of a disorder, how many exhibit one symptom, two symptoms, and so on). These descriptive data would more accurately portray the range of personality pathology in the community and could also help identify the potential negative consequences arising from sub-threshold levels of these disorders.

Longitudinal data that describe the course and outcomes of personality disorders provide another important basis for understanding these clinical problems. Many young adults who exhibit severe personality dysfunction experience significant improvement across the lifespan (Skodol 2008; Tackett et al. 2009). Serious questions about the trajectory of PDs remain unanswered, however, particularly with regard to middle age and later life (Oltmanns and Balsis 2011). Some clinicians and investigators have suggested that certain types of personality pathology "burn out" with age while others may become more evident (Engels et al. 2003; Paris 2003; Shea et al. 2009; Ullrich and Coid 2009). We do not know whether personality problems re-emerge later (with either similar or modified presentations).

Relationships between personality traits, personality disorders, and symptoms of other mental disorders (e.g., major depression) have not been studied prospectively in older adults.

The SPAN Study (St. Louis Personality and Aging Network) was designed to answer important questions about the prevalence and impact of personality pathology in later life (Oltmanns and Gleason 2011). The first phase of this study focused on the identification and recruitment of participants and completion of baseline assessments. The current paper is divided into two sections. In the first, we describe methods we used to recruit 1,630 participants and 1,484 informants from the community for a study regarding the impact of personality disorders in midlife, including a detailed breakdown of recruitment success rates at each stage of the process. In the second section, we report descriptive data and prevalence rates for personality disorders in our sample at baseline, as assessed by an interviewer, the participant (self-report questionnaire), and an informant identified by the participant.

We describe our recruitment process in considerable detail because participation rates have received relatively little attention in this literature (Galea and Tracy 2007). They are frequently taken for granted and are also widely misunderstood. Efforts to generalize from the findings of a particular investigation obviously depend heavily on the extent to which the researchers were able to recruit a representative sample of the population in question. Participation rates depend on many factors, including the amount of time and effort involved in the study and the number of similar requests made to everyone in the population.

Methods

Recruitment

Participants were recruited from the city of St. Louis and its surrounding suburban areas. Potential participants were offered \$60 to complete a 3-h assessment. St. Louis has always been known for its ethnic and racial diversity: With the city and adjacent county (suburbs) combined, 30 % of the population is African American, and 60 % is Caucasian. Only 2 % is Hispanic. The following protocol was used to contact possible participants.

Selection of Target Households and Initial Contact—Potential participants were identified using telephone records purchased from a private sampling firm. We used listed phone numbers for two reasons. First, listed phone numbers could be checked against census records to determine that someone living in the household was between the ages of 55 and 64. Although the age data were not expected to be flawless, this method insured that most of the households did include at least one potential participant.

The second reason for using listed phone numbers is that they are associated with a name and address, which allowed us to mail a personalized letter explaining the study prior to the initial phone call. Use of informative advance letters is known to increase response rates in survey research (Fowler 2002). This letter included a reply postcard, with which participants could indicate their interest in the study. Households that returned the postcard and indicated that they were not interested, or that they were not in the age range, were not contacted again. All other households received recruitment phone calls.

Recruitment Phone Calls—Staff members and student volunteers made the initial phone calls, which continued to be made to a household until someone answered. If contact with a connected phone number was not made after 12 attempts, a second letter was sent to the household. This was our last contact, unless they returned a postcard (sent with the second letter) to say they were interested in the study or wanted more information.

Phone Call Outcomes—When a contacted resident answered the phone, we asked how many people in the household were within our age range. If more than one person in the household was eligible to participate (e.g., both husband and wife), the Kish Method was used to select a target, sampling without replacement (Kish 1949). There were three possible outcomes from a phone conversation: no eligible target was identified, an eligible target was identified and agreed to participate, or an eligible target was identified but did not agree to participate. In the latter case, the phone caller coded the “refusal” into one of two ways: 1) “do not call back” (i.e., strong refusal, very specific and definite) or 2) “try one more time” (i.e., ambivalent response).

Refusal Converter Calls—If the initial phone contact was coded as “try one more time,” the target person was called again several weeks later and politely asked to reconsider. The use of such “refusal converter” calls is a standard procedure in survey research because many people decline participation if they were contacted at a busy or difficult time, and they may later reconsider their decision (Fowler 2002).

Follow-up Letters and Questionnaires—Follow-up letters were sent to all households with an identified eligible target who had not agreed to participate as well as all households we had not managed to contact over the phone, with two important exceptions: 1) those who had sent back the initial postcard indicating that they did not want to participate, and 2) those who were coded as “do not call back” by the initial phone caller. A total of 2,035 follow-up letters were sent. Of these, 180 households responded positively and were added back to the phone pool. In addition, a total of 1,859 follow-up personality questionnaires were sent to people who declined participation in an attempt to gather data on the characteristics of non-responders; a few recipients of this questionnaire volunteered to join the full study.

Recruitment Outcomes—Table 1 summarizes the outcome of the recruitment process for all 7,200 contacted households, divided into four broad categories. A total of 2,303 households (32 % of contacted households) were never reached by phone, and thus we never established whether an eligible target resided at the household. For a further 1,144 households (16 % of contacted households), we established that no eligible targets resided at that household.

The next category of households in Table 1 describes households with an eligible but unrecruited target (2,123 or 29 % of contacted households). In some cases, we identified the presence of an eligible target in the household but never made contact with this person (target unreachable). In other cases, we spoke to the target and that person declined to participate. Others were still considering participation when we stopped recruiting new participants. Finally, some targets had scheduled an appointment, but they did not show up.

New appointments were always scheduled if possible, and some people did complete the baseline assessment after cancelling or failing to attend multiple appointments.

The final category in Table 1 describes the pathways to recruitment of all the participants in our final cohort of 1,630. The most common pathway was the situation where a household did not respond to the initial letter, but a target did agree to participate during the phone call. Our final participation rate was 43 % of eligible households (proportion of eligible people who completed the baseline assessment).

Oversampling of African American Men—After the first 2 years of the project, African American men were somewhat under-represented among our early participants. Therefore, we purchased 300 phone numbers from sampling blocks in which at least 90 % of the residents were listed as African American. In this pool, we included only homes for which the phone was listed in a man's name. A new letter was crafted, describing the study and emphasizing our sincere interest in including African American participants in our study. We did not use the Kish Method with these households because we were targeting male participants. In all other respects, the recruitment procedures were identical to those used for other participants. This over-sampling procedure was quite successful, yielding the same participation rate in these specific sampling blocks that we obtained in the overall study (Spence and Oltmanns 2011).

Informants—Participants were asked to identify someone who knew them well and who would be able to provide us with an accurate description of their personality traits, and preferably lived with them. If that was not possible, we asked for “the person who knows you best.” In order to serve as an informant, the selected person and the participant had to talk at least once a month and see each other face-to-face at least once each year. On average, informants had known the target person for 30 years. Approximately half of the identified informants were spouses or partners; 25 % of the informants were other family members (e.g., an adult child of the target person); the rest were close friends. Participants who were unwilling or unable to provide an informant were still included in the study, but 91 % of our participants provided an informant who completed the baseline assessment.

Final Sample—The final sample consisted of 1,630 participants (55 % female) living in the St. Louis area (40 % within the city limits and 60 % in the adjoining county). All participants were between the ages of 55 and 64 when they entered the study (mean=59.6, SD=2.7 years). With regard to race and ethnic background, 65 % were Caucasian, 33 % were African American, and 2 % were from other groups (e.g., Asian, American Indian). Thirty people described themselves as Hispanic or Latino (just under the expected 2 %). Slightly more than half (54 %) were born in St. Louis, 43 % were born elsewhere in the United States, and 3 % were born outside of the U.S. Nearly all of the participants (92 %) had lived in St. Louis for at least 20 years.

Assessment

Our baseline assessment process began with a brief life narrative interview in which participants were asked to describe important aspects of their lives (McAdams 1993). This

procedure was used for several reasons: to facilitate the development of rapport with the participant, to collect information about the participant's life prior to the present time, and to provide an additional perspective on personality characteristics. In this part of the interview, participants were asked to imagine that their lives were a book divided into three or four chapters, which they were invited to name and describe. This information provided an overall context for the semi-structured diagnostic interview, which followed.

Personality Pathology—Every participant completed the Structured Interview for DSM-IV Personality (SIDP-IV) (Pfohl et al. 1997), a semi-structured diagnostic interview for personality disorders. Questions in this interview are arranged by themes rather than by disorders (e.g., work style, interpersonal relationships, emotions, interests and activities) to minimize the focus on personality pathology and to reduce interviewer bias. Interviews were conducted by carefully trained, full-time staff members and by graduate students in clinical psychology. They typically lasted between 45 and 90 min, depending on the number of problems described by the participant. The interviewer asked participants to answer questions based on what they were like when they were their usual selves during the past 5 years. Based on these answers, participants were rated for each of 7–9 criteria per disorder (paranoid, schizoid, schizotypal, antisocial, borderline, histrionic, narcissistic, avoidant, dependent, and obsessive-compulsive), on a 4-point scale from 0 (*not present*) to 3 (*strongly present*). A rating of 2 or 3 was taken to indicate the presence of a particular symptom. Because the SIDP-IV does not have a formal training or reference manual, we relied extensively on the manual for the Personality Disorder Interview-IV (Widiger et al. 1995) for rating purposes, because it provides detailed and thoughtful descriptions of personality disorders.

Almost all of the interviews were video-recorded (18 were only audio-recorded by request of the participants). Six participants agreed to be interviewed but did not consent to any type of recording. We randomly selected 265 of the video-recorded interviews to be rated again by an independent judge (another member of the team). The overall reliability (computed using intraclass correlations and the One-Way Random model) was .67. The reliabilities for specific DSM-IV PDs (treated as continuous scores) were: schizoid PD, .75; schizotypal PD, .68; paranoid PD, .53; antisocial PD, .69; borderline PD, .77; histrionic PD, .54; narcissistic PD, .75; avoidant PD, .86; dependent PD, .73; and obsessive compulsive PD, .62.

Mood Disorders and Psychosis—We used the Computerized Diagnostic Interview Schedule (C-DIS-IV) screener to identify lifetime and 12-month prevalence of major depression, dysthymia, mania and hypomania, and psychosis. The C-DIS-IV (Robins and Helzer 1994) is an assessment that was developed for non-clinicians to collect information that could be used to generate psychiatric diagnoses according to DSM-IV.

Substance Use Disorders—The MINI-International Neuropsychiatric Interview (M.I.N.I.) (Sheehan et al. 1998) is a brief, easy to administer structured interview to diagnose DSM-IV Axis I disorders. In our study, it was used to measure alcohol dependence and abuse as well as dependence and abuse associated with other drugs. In keeping with the aims of the study, the criteria for current alcohol dependence and abuse were expanded to

include problems experienced across the lifetime. We thus assessed alcohol and drug dependence and abuse over two time-periods: the past 12 months and across the lifetime.

Personality Pathology Questionnaire—The Multisource Assessment of Personality Pathology (MAPP) was also administered to participants and to informants (who were asked to provide answers with respect to the participant). It was used as a complementary measure of personality pathology. This questionnaire was developed from peer nomination procedures used in our previous study with military recruits (Oltmanns and Turkheimer 2006). The MAPP includes one item corresponding to each diagnostic feature for the 10 personality disorders listed in DSM-IV. Items were constructed by translating the DSM-IV criterion sets for PDs into language that avoids use of technical psychopathological terms and psychiatric jargon.

Treatment for Mental Health Problems—We also asked participants if they had ever “received treatment for a mental disorder or advice from a mental health professional on problems in life.” If they had received treatment, we asked them to indicate when and for how long they had been treated, what kind of treatment they had received, and for what kind of problem they had been treated.

Results

Demographic Variables

Education, Income, and Employment—Only 3 % of our participants had less than a high school education. Another 29 % listed a high school degree or its equivalent as their highest educational level. The others (68 %) all had some further education, with 26 % reporting a Bachelor’s degree, 19 % reporting a master’s degree, and 7 % reporting a doctoral degree as their highest level of educational achievement.

Our participants represented a wide range of income levels. At the lowest end, 12 % of our participants lived in households that earned less than \$20,000 per year (below the poverty line). Another 18 % earned between \$20,000 and \$39,999; 20 % earned between \$40,000 and \$59,999; 13 % earned between \$60,000 and \$79,000; 10 % earned between \$80,000 and \$99,999; 7 % earned between \$100,000 and \$119,999; 4 % earned between \$120,000 and \$139,999; and 11 % earned more than \$140,000 annually. Five percent of the participants did not report their income. Our sample, as a whole, had slightly higher incomes than the median household income in St. Louis, which was \$55,500 in 2008 according to the U.S. Census (note: our baseline assessments began in late 2007 and continued throughout the recession).

Two-thirds (66 %) of our participants were employed either part time or full time when they came in for their baseline assessment; 9 % were unemployed due to disability and a further 4 % were seeking employment. Thirty three percent of the participants had retired from at least one profession, but some of those had subsequently taken other employment.

Marital History—When asked to describe their current marital status, 48 % of the participants said that they were currently married, 28 % divorced, 2 % separated, 7 %

widowed, and 15 % were single. We also asked participants about their marital history: among the 794 participants who had ever been divorced, 73 % had been divorced only once, 21 % had been divorced twice, and 6 % had been divorced three to five times.

Prevalence of PDs

Personality disorders were assessed using three sources of information: the semi-structured diagnostic interview (administered to all 1,630 participants), a self-report questionnaire (1,608 participants), and the informant-report questionnaire (1,447 participants). We first discuss the prevalence of PDs identified by the clinical interview and then turn to comparisons among the three sources of data for the participants who provided enough data to examine prevalence from all perspectives.

According to the SIDP, 134 participants (8.2 %) met criteria for at least one personality disorder, and an additional 30 participants (1.8 %) qualified for a diagnosis of personality disorder not otherwise specified (PDNOS). We defined PDNOS as the presence of ten or more miscellaneous criteria across all of the PDs without meeting the specific threshold for a diagnosis of any one type of PD (Pagan et al. 2005; Verheul and Widiger 2004). In Table 2, we present the number of males and females in the sample who qualified for each personality disorder, as well as the number who fell one criterion short. Note that these numbers are not mutually exclusive because a small number of participants (16) qualified for two or three PDs. None qualified for more than three PDs. The most frequently observed types were avoidant PD (2.5 %) and obsessive compulsive PD (2.9 %). Another 3.7 % of the participants fell only one criterion short of qualifying for a diagnosis of OCPD. The least frequently observed types were schizotypal PD (0.1 %), dependent PD (0.1 %), and histrionic PD (0.2 %).

Our next aim was to compare the diagnostic properties of the SIDP interview with the self-report and informant-report MAPP. Table 3 presents the correlations between each of these three measures for every specific PD. Correlations were low to moderate, indicating that the SIDP, self-MAPP, and informant-MAPP identify some of the same symptoms, but they also provide unique information about individuals. The highest correlations were observed between the SIDP and the self-MAPP, and the lowest between the SIDP and the informant-MAPP. Avoidant PD and borderline PD showed the highest levels of concordance among the three sources of personality assessment (average correlations of .39 and .35 respectively).

Another way of reporting the prevalence of different PD types is to examine the specific numbers of symptoms (diagnostic criteria) that were exhibited by participants (see Table 4 and Fig. 1) according to each source of information. For the purposes of this comparison, we looked at the number of endorsed criteria for each PD based on the SIDP as compared with the self-MAPP and informant-MAPP. Criteria were considered to have been endorsed if one of the top two rating points was assigned to a given criterion on any of the questionnaires. For the SIDP, this means that the interviewer deemed the trait to be “present” or “strongly present” in the participant, and for the MAPP the participant or informant said the target person was “often” or “always” like this. With the notable exception of avoidant PD, we found that the informant MAPP was less conservative than the SIDP or the self-MAPP;

informants endorsed the presence of more symptoms across nine PD types. For schizoid and schizotypal PD, the self-MAPP was also less conservative than the SIDP interview.

Mood Disorders, Alcohol Dependence, and Mental Health Treatment

According to the C-DIS, 24.8 % of our participants (17.1 % males and 31.2 % females) met criteria for a lifetime diagnosis of major depressive disorder (MDD). Only 4.3 % of the participants (3.0 % males and 5.4 % females) met criteria for a diagnosis of MDD within the past 12 months. Mean age at onset was 35.3 years, mean age at most recent episode was 43.7, and mean number of episodes was 3.9. Regarding other mood disorders, 2.8 % met criteria for a lifetime diagnosis of bipolar disorder, and 3.4 % met criteria for a lifetime diagnosis of dysthymic disorder. The prevalence of alcohol dependence (AD), based on the M.I.N.I., was 2.7 % for the past 12 months and 15.9 % lifetime. Gender differences in AD were significant, as expected, with 8.8 % of females compared with 24.9 % of males meeting criteria for a lifetime history of AD according to DSM-IV. Similar differences were found for past 12-month diagnoses: 1.4 % for females and 4.3 % for males.

A substantial proportion of our sample (44 %) indicated that they had received professional treatment for a mental disorder at some point in their life. Table 5 presents these data in terms of the number of males and females who received treatment for various mental health issues. Twenty seven percent had received psychotherapy; 13 % psychiatric medication; 10 % medication plus psychotherapy; and 3 % other forms of treatment. Among those who had received individual treatment for some type of mental health issue, the mean time spent in treatment was 27 months. We also found that 39 % reported having received marital counseling or another form of help with relationships, and 10 % say they have belonged to a self-help group of some sort (e.g., Alcoholics Anonymous).

Discussion

Within certain methodological constraints (e.g., including only people who could speak and read English and people with an address and phone number so that they could participate in subsequent follow-ups), we did everything possible to recruit a representative sample of people living in St. Louis. Our 43 % participation rate is very good, particularly given the large demands placed on our participants' time and the request to provide data from an informant. It compares favorably to those obtained in other recent epidemiological studies (Galea and Tracy 2007). Reluctance to participate in research is caused by several factors, including dramatic increases in telemarketing in the U.S. as well as increased numbers of research requests that people receive. Our sampling procedure was conservative, using sampling without replacement (i.e., if the targeted person in a household was not willing to participate, we did not allow that person's partner to become the participant, even if they volunteered). Throughout the process, we aimed to be persistent and diligent while avoiding unnecessary coercion or harassment of potential participants. For all of these reasons, we are confident that our recruitment efforts were successful.

The participants in this study were generally representative of middle-aged adults living in the St. Louis area. Our data regarding education, income, and other demographic variables can be compared to those for the St. Louis community using publicly available census data

for the city (population 257,000 16 years and over) and its suburbs (population of St. Louis county 793,000 16 years and over) between 2007 and 2011. Mean levels of education for our participants were somewhat higher than expected for the population of St. Louis. For example, only 3 % of our participants had less than a high school education, while the comparable figures were 8 % in the suburbs and 18 % in the city. This is most likely a result of excluding potential participants who were unable to read, which was necessary in order to be sure that questionnaires were completed in a meaningful way.

Median household income in our sample was between \$40,000 and \$60,000 per year, and this figure matches closely with data from the metropolitan area. In the suburbs of St. Louis, median household income was approximately \$58,000 and in the city it was \$34,000 during the time that our baseline data were collected. Of course, there was a wide range of income among our participants, with 12 % having a total household income below \$20,000 and 26 % making more than \$100,000 annually. For the sake of comparison, the poverty line for a family of 4 in the U.S. was \$22,000. The U.S. census reported that between 2007 and 2011, 10 % of the residents of the suburbs of St. Louis lived in poverty, and 26 % of the residents of the city of St. Louis lived in poverty. At the other end of the distribution, 26 % of households in the St. Louis suburbs made more than \$100,000 per year and 11 % of households in the city made more than \$100,000 per year. Our sample is therefore fairly similar to the population of the combined St. Louis metropolitan area with regard to the distribution of income.

According to the C-DIS, 24.8 % of our participants (women 31.2 % and men 17.1 %) met criteria for a lifetime diagnosis of major depressive disorder (MDD). According to the M.I.N.I., 15.9 % of the participants met criteria for a lifetime diagnosis of alcohol dependence. These overall rates and the patterns of gender differences for depression and alcohol use disorders are similar to figures reported from previous epidemiological studies in the U.S. (Grant et al. 2006; Kessler et al. 2005). The lifetime prevalence rate for MDD was somewhat higher than has been reported in some studies, likely because the C-DIS screener we used does not include some rule-outs that are present in the full Diagnostic Interview Schedule (DIS).

Many of our participants had received mental health services. This aspect of our results serves to emphasize the important point that representative community samples do include people with significant mental health problems. Unfortunately, this point is sometimes lost in discussions regarding the value of different approaches to psychopathology research in general and personality disorders in particular. Community samples are sometimes called *non-clinical* samples. While that expression may be technically correct, in the sense that the participants are not all selected on the basis of being in treatment, the label should not be taken to mean that the sample is free of psychopathology. Samples of clinical patients do, in fact, provide useful information about the nature of personality disorders, but they have the drawback of providing data from people who may also suffer from an even higher proportion of co-morbid conditions, such as major depression and substance use disorders, which often provide the critical motivation for seeking professional treatment (Hopwood et al. 2008). In a large community sample like ours, it is possible to examine a variety of questions about the nature and impact of personality pathology that could not be answered in

a clinical sample. For example, we have examined the extent to which people who exhibit features of personality disorders are more (or less) likely than others to seek treatment from mental health professionals (Lawton and Oltmanns 2013).

The reliability of the SIDP-IV diagnostic interview was acceptable, with values for specific DSM-IV PDs (treated as continuous scores) ranging from .86 for avoidant PD to .53 for paranoid PD. These values compare favorably to reliability estimates for PD diagnoses in other studies (Zanarini et al. 2000). As expected, reliability was better for some types of personality disorders than for others. Several factors may be responsible for differences between diagnostic types. One important consideration is the frequency of various symptoms and disorders in the sample. A few diagnostic disagreements can have a more pronounced effect on reliability when the base rate of the disorder in the sample is either very low or high. Several additional factors may also have influenced the range of scores, such as the extent to which specific diagnostic criteria are subjectively defined or can be easily observed (Jane et al. 2006).

Because we examined three different perspectives on personality pathology (self, informant, and interviewer), our data provide unique insights regarding the prevalence of personality pathology in a representative sample of middle-aged community residents. If we focus exclusively on data provided from the semi-structured interview and adopt a DSM-IV categorical approach to the diagnosis of personality disorders, the prevalence rates found in our sample using the SIDP-IV (10 %) match fairly closely the rates that have been reported in previous community studies (Lenzenweger et al. 2007; Trull et al. 2010). However, while 7 % of our participants met criteria for exactly one type of PD, only 1 % met criteria for two or three disorders. The latter percentage is much lower than has been reported previously, especially in clinical samples, where rates of co-morbidity are surely inflated. The supposed high rate of co-morbidity has been one of the most important criticisms of the current DSM-IV system for diagnosing PDs (Zimmerman 2012). Our data suggest that the problem of co-morbidity may be somewhat exaggerated. We also found that only 2 % of the people in our sample qualified for a diagnosis of PDNOS. Critics of the DSM-IV classification system have argued that PDNOS is the most common type of personality pathology. Again, our data contradict that claim.

The most common PD types in our sample were avoidant and obsessive-compulsive. That finding is consistent with other community studies and was expected given the age of our sample. Evidence regarding the prevalence of specific personality disorders in later life comes from cross-sectional comparisons of younger and older people, using DSM-IV thresholds to decide whether or not each person qualifies for a specific personality disorder diagnosis. The evidence is not overwhelming, but several studies indicate that Cluster A disorders – paranoid and schizoid PD—and Cluster C disorders—obsessive-compulsive PD—are more prevalent among older people than younger people (Oltmanns and Balsis 2011; Ullrich and Coid 2009). We did find that Cluster C disorders were quite common in our sample, but we also found relatively low rates of Cluster A disorders (e.g., paranoid and schizoid PDs).

Our interview-based prevalence rates for borderline PD (0.4 %) and antisocial PD (0.6 %) were quite low compared to many previous reports for adults of all ages. For example, Trull's reanalysis of NESARC data found prevalence rates for antisocial PD of 5.7 % for men and 1.9 % for women, and they also found rates for borderline PD of 2.4 % for men and 3.0 % for women (Trull et al. 2010). The relatively low rates in our data were expected because these specific types of personality pathology are known to decrease in frequency over the lifespan (Paris 2003; Shea et al. 2009). This phenomenon is sometimes described as "burn out," and it implies recovery by a person who formerly exhibited symptoms of the disorder.

Viewed from a dimensional perspective, however, our data on symptoms indicate that substantial numbers of people exhibit at least some symptoms of personality pathology (Table 4). It has not been established that the arbitrary diagnostic thresholds listed in DSM-IV are, in fact, valid for this age group (or perhaps for any other). Our analyses do not hinge on the identification of specific cases, narrowly defined. As this prospective study unfolds over time, we will evaluate the extent to which various combinations and levels of symptoms are associated with social impairment and other forms of disturbance in these people's lives. This is, of course, exactly the kind of evidence that is needed to establish the validity of these diagnostic constructs (Kendell 2002). Our findings up to the present time indicate that symptoms of borderline PD are important in predicting various kinds of problems, including those associated with physical health (Powers and Oltmanns 2012), other mental disorders (Agrawal et al. 2013; Galione and Oltmanns 2013), marital relationships (Weinstein et al. 2012), and the onset of stressful life events (Gleason et al. 2012). This is perhaps somewhat surprising in light of the fact that relatively few people in the study showed enough symptoms of borderline PD to meet a full diagnosis for that disorder, suggesting that these effects must hold for people who exhibit sub-threshold levels of symptoms.

The pattern of correlations among different sources of information—interview, self, and informant—provide further confirmation that different assessment methods provide complementary data that are not redundant. The correlations are all statistically significant, suggesting a modest level of agreement with regard to the expression of various kinds of personality pathology. They also indicate, however, that none of these sources provides an image that is necessarily superior to the others. Some proponents of self-report measures have argued that, to whatever extent informants disagree with the self, it is because they are wrong. We would point out that there is now considerable reason to believe that, in certain circumstances and especially with regard to certain kinds of personality traits, informants may know us better than we know ourselves (Vazire and Carlson 2011). Informants seem to provide particularly useful information with regard to observable, evaluative traits such as those that are characteristic of the more dramatic PDs including borderline and antisocial PD (Carlson et al. 2013). To whatever extent prevalence estimates are based exclusively on the use of self-report questionnaires or diagnostic interviews, the evidence is almost surely incomplete.

The SIDP semi-structured diagnostic interview was fairly consistently the most conservative measure in comparison to self- and informant-reports (see Table 4). For most disorders and

across all levels of severity, informants identified more people who exhibited characteristics of personality pathology. This could mean that informants are over-reporting, but it also might suggest that they are more accurate. Another article from our research group used Item Response Theory analyses to examine the psychometric properties of item endorsements by self and others for narcissistic PD and found that informants reported higher raw scores relative to selves at lower levels of pathology (Cooper et al. 2012). The discrepancy between self and informant reports increased with the narcissistic PD (NPD) scale. Informants also reported NPD features that participants themselves often did not. The suggestion seems to be that informants are more sensitive to low levels of personality pathology.

Substantial evidence suggests that personality disorders are extremely important in terms of their impact on people's lives. They disrupt interpersonal relationships (Whisman and Schonbrun 2009), interfere with the treatment of other types of mental disorder (Fournier et al. 2008), and contribute to a variety of physical health problems (Frankenburg and Zanarini 2006). Nevertheless, PDs are controversial topics, in large part because of fundamental issues regarding their measurement. Findings from the baseline phase of our study indicate that, in a representative community sample of middle-aged participants, symptoms of personality disorders are evident in varying numbers depending on the source of information that is considered. The validity of these different measurement procedures and the utility of specific diagnostic thresholds will continue to be an important topic of investigation as this prospective study unfolds and further information is collected regarding the health and social adjustment of our participants.

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Oh behalf of all authors, the corresponding author states that there is no conflict of interest. This project was approved by the Washington University Institutional Review Board. All participants and informants provided written, informed consent prior to joining the baseline assessment procedure.

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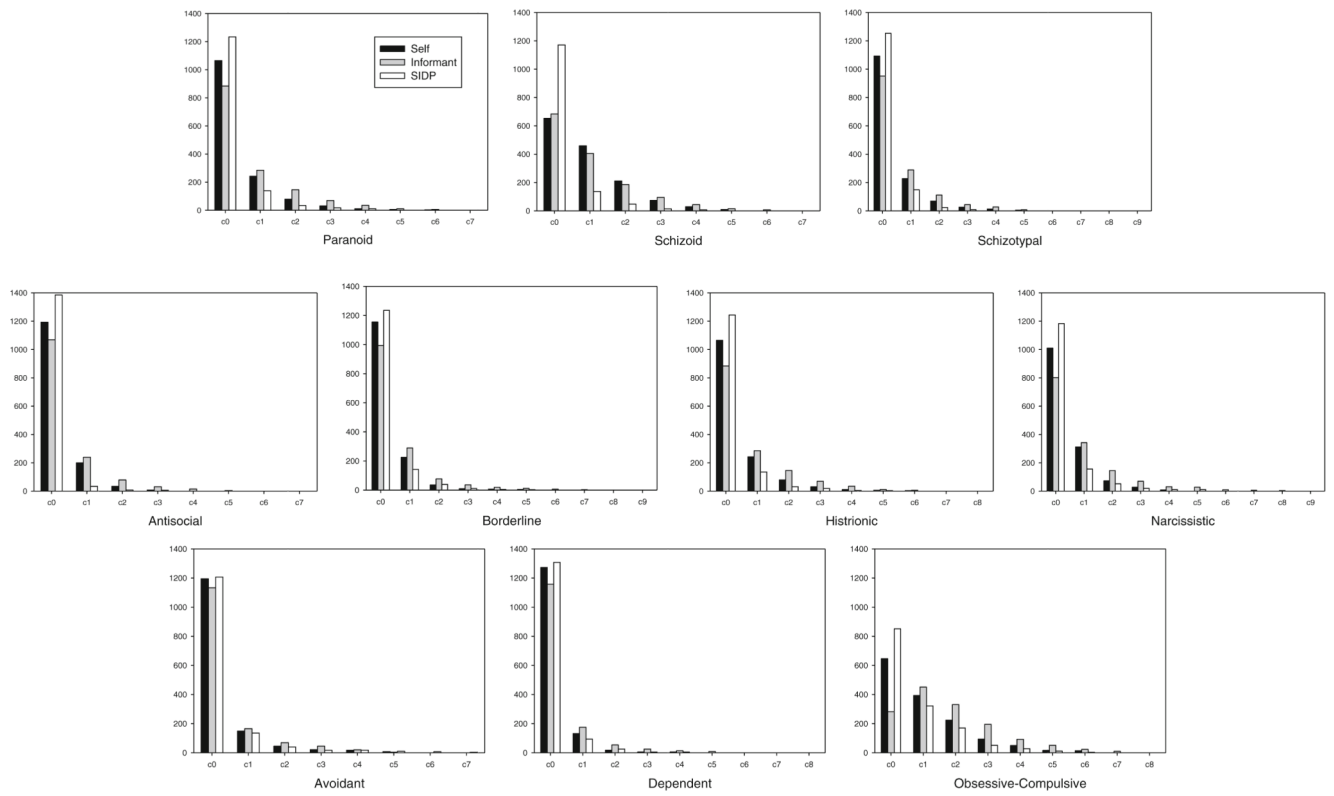


Fig. 1. Number of participants who exhibited specific numbers of diagnostic criteria for each type of personality disorder as a function of the source of information, i.e. self-report questionnaire, informant questionnaire, and diagnostic interview

Table 1

Recruitment outcomes for 7,200 contacted households

Total Number of Households Contacted	7200
Unknown Eligibility	2303
Answering machine/No answer	1287
Disconnected phone number	549
Returned postcard indicating "not interested"	279
Wrong phone number	188
Not Eligible	1144
Not in age range	749
Deceased	126
Moving out of area soon	66
Illness (including psychosis)	44
No males (in African American oversampling group)	42
Language/reading difficulties	30
Other miscellaneous conflicts	87
Eligible but Not Recruited	2123
Declined during phone call	1700
Target unreachable	242
Scheduled appointment(s) but did not show up	115
Still considering participation when recruitment ended	66
Eligible and Recruited	1630
Indicated interest on 1st postcard	658
Recruited during phone call	838
Refusal converter call	25
Indicated interest by returning 2nd postcard	92
Asked to participate after follow-up questionnaire	17

Number of participants meeting diagnostic criteria (and falling one criterion short of a diagnosis) for each type of personality disorder based on the diagnostic interview (SIDP-IV)

Table 2

	% of sample meeting criteria			% of sample falling one criterion short (sub-threshold)		
	Male (n =740)	Female (n =890)	Total (n =1630)	Male (n =740)	Female (n =890)	Total (n =1630)
Paranoid	6 (0.8 %)	7 (0.8 %)	13 (0.8 %)	6 (0.8 %)	12 (1.3 %)	18 (1.1 %)
Schizoid	10 (1.4 %)	1 (0.1 %)	11 (0.7 %)	11 (1.5 %)	9 (1.0 %)	20 (1.2 %)
Schizotypal	0	1 (0.1 %)	1 (0.1 %)	1 (0.1 %)	0	1 (0.1 %)
Antisocial	9 (1.2 %)	0	9 (0.6 %)	7 (0.9 %)	1 (0.1 %)	8 (0.5 %)
Borderline	3 (0.4 %)	4 (0.4 %)	7 (0.4 %)	2 (0.3 %)	2 (0.2 %)	4 (0.2 %)
Histrionic	1 (0.1 %)	2 (0.2 %)	3 (0.2 %)	2 (0.3 %)	3 (0.3 %)	5 (0.3 %)
Narcissistic	17 (2.3 %)	3 (0.3 %)	20 (1.2 %)	10 (1.4 %)	3 (0.3 %)	13 (0.8 %)
Avoidant	13 (1.8 %)	28 (3.1 %)	41 (2.5 %)	8 (1.1 %)	9 (1.0 %)	17 (1.0 %)
Dependent	1 (0.1 %)	1 (0.1 %)	2 (0.1 %)	3 (0.1 %)	3 (0.3 %)	6 (0.4 %)
Obsessive-compulsive	28 (3.8 %)	19 (2.1 %)	47 (2.9 %)	33 (2.9 %)	27 (3.0 %)	60 (3.7 %)

Correlations between sources of personality assessment for each of the 10 personality disorders (all significant at $p < .01$). These analyses are based on the 1,437 participants who provided sufficient data on the self-MAPP and informant-MAPP (i.e., no more than 2 questions per PD were omitted)

Table 3

	PND	SZD	SZT	ATS	BDL	HST	NAR	AVD	DEP	OCD	Average
SIDP-MAPP	.43	.35	.36	.28	.43	.34	.34	.61	.43	.35	.39
SIDP-IMAPP	.20	.22	.17	.21	.35	.20	.25	.29	.20	.19	.23
MAPP-IMAPP	.28	.24	.22	.22	.26	.22	.13	.28	.25	.19	.23
Average	.30	.27	.25	.24	.35	.25	.24	.39	.23	.24	.28

Table 4

Number of participants who exhibited specific numbers of diagnostic criteria for each type of personality disorder as a function of the source of information, i.e. self-report questionnaire, informant questionnaire, and diagnostic interview

	Paranoid			Schizoid			Schizotypal			Antisocial			Borderline		
	Self	Inf	SIDP	Self	Inf	SIDP	Self	Inf	SIDP	Self	Inf	SIDP	Self	Inf	SIDP
Number of Criteria	0	1065	884	1234	653	684	1171	1093	952	1253	1069	1385	1155	994	1235
	1	242	285	139	459	405	137	228	289	149	200	239	34	225	289
	2	79	146	34	211	186	48	69	112	24	34	79	8	35	77
	3	31	69	17	74	95	14	26	44	9	7	31	6	10	36
	4	<i>11</i>	35	<i>11</i>	29	44	7	13	28	1	2	<i>15</i>	1	7	19
	5	6	<i>11</i>	2	<i>10</i>	<i>15</i>	1	5	8	1	0	4	1	4	<i>12</i>
	6	3	6	0	0	7	2	2	2	0	0	0	2	0	7
	7	0	1	0	1	1	0	0	2	0	1	0	0	1	3
	8	n/a*	n/a	n/a	n/a	n/a	n/a	0	0	0	n/a	n/a	0	0	0
	9	n/a	n/a	n/a	n/a	n/a	n/a	1	0	0	n/a	n/a	0	0	0
	Histrionic														
	Narcissistic														
	Avoidant														
	Dependent														
	Obs-Comp														
Number of Criteria	0	1065	884	1244	1010	801	1183	1195	1133	1207	1273	1158	1307	646	282
	1	242	285	135	312	342	156	149	165	135	132	175	94	393	451
	2	79	146	31	73	145	52	45	69	40	18	54	25	224	331
	3	31	69	19	28	70	20	21	45	17	6	25	5	94	195
	4	11	35	5	9	31	11	17	20	18	6	14	5	50	92
	5	6	<i>11</i>	3	2	28	<i>11</i>	7	4	<i>10</i>	2	9	0	16	<i>51</i>
	6	3	6	0	2	<i>10</i>	2	1	1	7	0	1	1	14	23
	7	0	1	0	0	6	1	2	0	3	0	0	0	0	10
	8	0	0	0	1	4	1	n/a	n/a	n/a	0	1	0	0	2
	9	n/a	n/a	n/a	0	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

These data represent the 1,437 participants who provided sufficient data on the self-MAPP and informant-MAPP (i.e., no more than 2 questions per PD were omitted)

Italic values indicate presence of enough symptoms to meet the DSM-IV threshold for the disorder

n/a (not applicable) indicates that the DSM-IV definition for this disorder doesn't include this many features

Table 5

Number of participants reporting previous treatment for mental health problems

Mental health problem	Male (n =740)	Female (n =890)	Total (n =1630)
Depression/Bipolar	150 (20 %)	335 (38 %)	485 (30 %)
Life problems	95 (13 %)	232 (26 %)	327 (20 %)
Anxiety-related problems	60 (8.1 %)	74 (8.3 %)	134 (8.2 %)
Alcoholism/Addiction	73 (9.9 %)	17 (1.9 %)	90 (5.5 %)
Suicide attempt or thoughts	2 (0.3 %)	10 (1.1 %)	12 (0.7 %)
Weight-related problems	0	9 (1.0 %)	9 (0.6 %)
Behavioral problems	5 (0.7 %)	3 (0.3 %)	8 (0.5 %)
Sleep disorder	2 (0.3 %)	6 (0.7 %)	8 (0.5 %)
Schizophrenia	4 (0.6 %)	0	4 (0.2 %)
Other	24 (3.2 %)	24 (2.7 %)	48 (2.9 %)