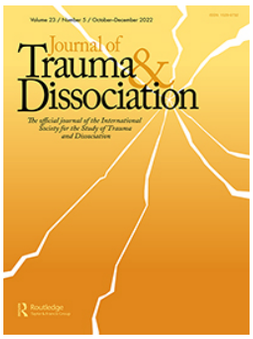

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Pathological Dissociation in The National Comorbidity Survey Replication (NCS-R): Prevalence, Morbidity, Comorbidity, and Childhood Maltreatment

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ABSTRACT

Our aim was to examine U.S. national prevalence of pathological dissociation (PD) likely indicative of dissociative disorder, and associated morbidity, comorbidity, and childhood maltreatment. PD was assessed in 6,644 participants in the National Comorbidity Survey Replication, a nationally representative adult survey. Seven of the eight pathological dissociation taxon items were inquired about over the past month and scored on a 4-point scale. A conservative PD cutoff score was applied, with 100% specificity against healthy individuals and 84% sensitivity for Depersonalization Disorder which lies at the less severe end of the dissociative disorder spectrum; it yielded a national PD prevalence of 4.1%. The PD group had diminished physical and mental health, marked comorbidity with most major psychiatric disorders, and high likelihood of psychiatric hospitalization. Over half of PD members had attempted suicide, significantly more than individuals with lifetime major depression. Childhood maltreatment was quantified for physical abuse, witnessing domestic violence, physical neglect, emotional abuse, and emotional neglect. Total childhood trauma significantly positively predicted PD severity, as well as severity of all three pathological dissociative experiences (amnesia, depersonalization / derealization, identity alteration). Furthermore, each childhood trauma category significantly predicted PD severity uniquely and additively. Childhood maltreatment in the PD group was significantly greater than in lifetime major depression, except for similar emotional neglect, and was comparable to lifetime PTSD. The study reinforces the validity of prior PD findings across clinical and community samples, and highlights the need for increased attention toward diagnosing and treating these quite common and highly morbid disorders and their traumatic antecedents.

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dissociation; pathological dissociation; amnesia; depersonalization/derealization; identity alteration; dissociative disorders; childhood trauma; epidemiology; prevalence; suicide; comorbidity; morbidity

Introduction

Unlike many major psychiatric disorders, the prevalence of dissociative disorders has not been as definitely investigated, especially in a U.S. representative national sample. To this end, questions were included in the National Comorbidity Survey Replication (NCS-R) aimed at assessing the one-month

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prevalence of pathological dissociation. Pathological dissociation is indicative of dissociative psychopathology and likely presence of dissociative disorder (Waller et al., 1996). The three most common and well-known dissociative disorders are Dissociative Identity Disorder (DID; no name change from the DSM-IV (American Psychiatric Association, 1994) to the DSM-5 (American Psychiatric Association, 2013)), DSM-IV Depersonalization Disorder (DDD; renamed Depersonalization / Derealization Disorder in the DSM-5 without substantive changes in diagnostic criteria), and Dissociative Amnesia (DA; into which the DSM-5 incorporated DSM-IV Dissociative Fugue). Dissociative disorders are characterized by a "disruption of and/or discontinuity in the normal integration of consciousness, memory, identity, emotion, perception, body representation, motor control, and behavior," and dissociative symptoms have the potential to give rise to marked psychopathology and to disrupt every area of psychological functioning (DSM-5). Additionally, dissociative pathology is strongly predicted by childhood maltreatment (Dalenberg et al., 2012; Loewenstein, 2018; Simeon et al., 2001). Whereas normative dissociation, commonly referred to as absorption, is widely distributed in the general population, the three core pathological dissociation symptoms of amnesia, depersonalization /derealization, and identity alteration are much less common and comprise the foundation of dissociative psychopathology and disorders (Waller et al., 1996). This study is the first to investigate the prevalence of pathological dissociation in a representative U.S. national sample, applying well-established methodology and rigorous criteria. Associated morbidity, comorbidity, and relationships to childhood maltreatment were also investigated.

Methods

We used 45 variables selected from the National Comorbidity Survey Replication (NCS-R) database. The NCS-R was a U.S. face-to-face household survey of adult English-speakers conducted from 2001 to 2003 in a multistage clustered area probability sample of the U.S. population (Kessler & Merikangas, 2004). The primary sampling areas, metropolitan and non-metropolitan counties, were selected with stratification to guarantee representativeness of the U.S. population on a wide range of geographic and sociodemographic characteristics. Recruitment within clustered probability samples of households within sampling areas began with an advance letter and study brochure followed by in-person interviewer visits to explain study goals and procedures and randomly select a household respondent. Response rate was 71%; a probability subsample of non-responders completed a follow-up survey, and the sample was weighted to adjust for differential probabilities of selection and non-response biases. The study was approved by the human subject committees of Harvard Medical School and the University of Michigan.

The seven NCS-R items inquiring about pathological dissociation were extracted verbatim from the 28-item Dissociative Experiences Scale (DES), the most widely used and well-established scale for the assessment of dissociative symptoms (Bernstein-Carlson & Putnam, 1993). Taxometric analysis of DES databases has yielded a valid and reliable pathological dissociation "taxon" consisting of 8 DES items (Waller et al., 1996); the NCS-R used 7 of the items (Table 1A). Reliable cutoff scores have been developed when using the taxon to detect high likelihood of dissociative disorders (Simeon et al., 2003a; Waller et al., 1996). However, while the original DES employed a 0–100% scale scored in 10% increments, the NCS-R used a 4-point scale (never, rarely, sometimes, often), and whereas the DES rates how often dissociative experiences occur without specifying a time frame, the NCS-R questions were applied to the past month. Therefore, we had to derive a cutoff score for pathological dissociation, as measured by the NCS-R, that would provide high sensitivity and high specificity for the detection of dissociative disorders.

To obtain a valid and conservative NCS-R cutoff score, we used two reference samples from prior study samples reliably diagnosed with structured interviews, a sample of 54 psychiatrically healthy individuals without lifetime DSM-IV Axis I or Axis II disorders (Simeon et al., 2007), and a sample of 117 individuals with DSM-IV DDD (Simeon et al., 2003b). The rationale for using a DDD sample to establish the cutoff is that DDD is well known to lie at the low end of the dissociative disorder severity spectrum, so that individuals with DDD score considerably lower on the taxon compared to individuals with more "severe" dissociative disorders such as DID (Simeon et al., 2003a). To this end, we

Table 1. A. Dissociative Experiences Scale (DES) pathological dissociation taxon items in the NCS-R survey. B. Score conversion from DES to NCS-R.

A.

"How often did this happen to you in the past 30 days?"
NDS4a. (DES5) "Some people have the experience of finding new things among their belongings that they do not remember buying."
NSD4b. (DES7) "Some people sometimes have the experience of feeling as though they are standing next to themselves or watching themselves do something and they actually see themselves as if they were looking at another person."
NSD4c. (DES8) "Some people are told that they sometimes do not recognize friends or family members."
NSD4d. (DES12) "Some people have the experience of feeling that other people, objects, and the world around them are not real."
NSD4e. (DES13) "Some people have the experience of feeling that their body does not seem to belong to them."
NSD4f. (DES22) "Some people find that in one situation they may act so differently compared with another situation that they feel almost as if they were two different people."
NSD4g. (DES27) "Some people sometimes find that they can hear voices inside their head that tell them to do things or comment on things that they are doing."
[taxon DES3, finding self in a place and not knowing how got there, not included in NCS-R]

B.

NCS-R Response	NCS-R Item Score	DES Item Score
Never	4 (converted to 0)	0–9
Rarely	3 (converted to 1)	10–19
Sometimes	2 (converted to 2)	20–29
Often	1 (converted to 3)	30 +

transformed the DES data from the two samples into NCS-R scores using a conservative approximation (Table 1B), and then used the sum of the 7 NCS-R-converted scores to determine the frequency distribution of NCS-R pathological dissociation score (PD) in the two samples. Our main criterion in assigning a cutoff score was to minimize false positives, assuring that only NCS-R participants with substantial dissociative symptomatology likely indicative of dissociative disorder would be included.

Subsequently, we applied the cutoff to the NCS-R database to calculate the one-month national prevalence of pathological dissociation (PD) and likely dissociative disorder. Since the DES assesses "trait" dissociation, application of the cutoff to NCS-R's one-month only assessment inherently introduced a conservative standard. We delineated the NCS-R subsample meeting the criterion and designated it as the PD group. We then examined in more detail the dissociative experiences in this group, as well as demographic characteristics; health and morbidity indexes; lifetime comorbidity with major psychiatric disorders; and relationships to childhood maltreatment.

Demographic, health, morbidity, and comorbidity variables were readily extracted from the database. To quantify childhood maltreatment by category, we used the following NCS-R variables. Emotional abuse was calculated as the mean of two items, being made to do difficult/dangerous and age-inappropriate chores; and the female caretaker stopping the child from doing things other children of similar age were allowed to do. Physical abuse was a single item inquiring about being pushed, grabbed, or shoved; thrown something; or slapped or hit, when growing up. Witnessing domestic violence was a single item inquiring about the same physical incidents occurring between parents when growing up. Physical neglect was calculated as the mean of four items inquiring about being left unsupervised at too early an age; going without needed things due to parents' spending on themselves; going hungry/parents not providing meals; and parents failing to get medical treatment when the child was sick or hurt. Emotional neglect was calculated as the mean of three items, assessed separately for the female and male caretaker: emotional closeness when growing up; how much love was given; and amount of effort put into the child's upbringing. All trauma variables were scored from 1 to 4, with reversed severity for all but emotional neglect. Of note, though the NCS-R contained questions assessing rape, other sexual assault, and verbal abuse toward the child and between parents, these variables were not included in the database available to us.

Statistical analyses were conducted with SPSS version 24 and employed two-tailed comparisons with a probability significance value of .05.

Results

Derivation of the NCS-R pathological dissociation cutoff score

Table 2 presents NCS-R-converted PD scores in the healthy control and DDD samples. Frequency distributions were examined to determine a cutoff score minimizing false negatives while retaining relatively high sensitivity. A cutoff score of 5 or above yielded 84% sensitivity and 100% specificity.

Prevalence

Table 3 presents the PD score frequency distribution in the 6,644 NCS-R participants. Application of the cutoff yielded a one-month prevalence of 4.1% (PD group, 271 members). PD distribution was highly skewed and kurtotic (M = 0.74, SD = 1.77, skewness 3.87, kurtosis 20.56), with 72.1% of completers scoring 0; 87% of PD members scoring between 5 and 10; and 35 PD members in the right tail scoring higher than 10. No individuals scored 20 or 21, indicating no ceiling effect. PD members had a mean PD score of 7.65 (SD 2.79).

We examined the types of pathological dissociative experiences endorsed by the PD group. DES 5 is a hallmark amnesia symptom; DES 7, 12, and 13 are hallmark depersonalization / derealization symptoms; DES 22 is an identity alteration symptom; while DES 8 and 27 have somewhat lower specificity and can be endorsed by individuals with various dissociative disorders though more commonly by DID. Mean (SD) scores for the 7 items, in respective order,

Table 2. Pathological dissociation scores in a Healthy Control (HC) and depersonalization disorder (DDD) sample.

	HC (n = 54)	%	cumulative %	DDD (n = 117)	%	cumulative %
0	44	83.02	83.02	0	0.00	0.00
1	6	11.32	94.34	1	0.85	0.85
2	0	0.00	94.34	2	1.71	2.56
3	2	3.77	98.11	6	5.13	7.69
4	1	1.89	100	8	6.84	14.53
5	0	0	100	5	4.27	18.80
6	0	0	100	17	14.53	33.33
7	0	0	100	12	10.26	43.59
8	0	0	100	9	7.69	51.28
9	0	0	100	14	11.97	63.25
10	0	0	100	8	6.84	70.09
11	0	0	100	7	5.98	76.07
12	0	0	100	8	6.84	82.91
13	0	0	100	3	2.56	85.47
14	0	0	100	6	5.13	90.60
15	0	0	100	3	2.56	93.16
16	0	0	100	2	1.71	94.87
17	0	0	100	2	1.71	96.58
18	0	0	100	3	2.56	99.15
19	0	0	100	1	0.85	100

cutoff row in bold

Table 3. Pathological dissociation scores in the NCS-R national sample (n = 6,644).

	Frequency	%	cumulative %
0	4791	72.11	72.11
1	783	11.79	83.90
2	466	7.01	90.91
3	199	3.00	93.90
4	134	2.02	95.92
5	71	1.07	96.99
6	49	0.74	97.73
7	36	0.54	98.27
8	37	0.56	98.83
9	20	0.30	99.13
10	23	0.35	99.47
11	7	0.11	99.58
12	7	0.11	99.68
13	7	0.11	99.79
14	6	0.09	99.88
15	4	0.06	99.94
16	1	0.02	99.95
17	1	0.02	99.97
18	0	0.00	99.97
19	2	0.03	100.0
20	0	0.00	100.0
21	0	0.00	100.0

cutoff row in bold

were 1.03 (1.01), 1.23 (1.02), 1.00 (1.02), 1.05 (1.07), 1.50 (1.03), 0.74 (0.96), and 1.10 (1.09). A principal component factor analysis yielded a one-factor solution with loadings from .40 (DES 5) to .73 (DES 12) accounting for 39.3% of the variance, supporting the taxon construct.

We then conducted an exploratory analysis of the seven DES items aimed at approximating the distribution of DID-, DDD-, and DA-like presentations within the PD group. Based on the symptomatology of these disorders and their well-established DES profiles, we made the following assumptions to derive three mutually exclusive subgroups. For the DID-like phenotype, we required an amnesia (DES 5) score of at least 2 combined with an identity alteration (DES 22) score of at least 1, or an amnesia score of at least 1 combined with an identity alteration score of at least 2; we did not restrict depersonalization / derealization severity as this is commonly present in DID. For the DDD-like phenotype, we required an amnesia score of 0 and a score of at least 2 on at least one of the three depersonalization / derealization items (DES 7, 12, 13). For the DA-like phenotype, we required an amnesia score of at least 2 combined with an identity alteration score of 0; we did not restrict depersonalization / derealization severity as this is not uncommon in DA. Using this algorithm, we derived 98 DID-like cases (36.2%), 85 DDD-like cases (31.4%), and 32 DA-like cases (11.8%), together accounting for the large majority (79.3%) of the PD group. Overall NCS-R prevalence of these phenotypes was 1.5%, 1.3%, and 0.5%, respectively. Table 4 presents item scores and comparisons for the three phenotypes.

Table 4. Pathological dissociation item and total scores in the DID-like, DDD-like and DA-like phenotypes.

	DID-like (n = 98) M (SD)	DDD-like (n = 85) M (SD)	DA-like (n = 32) M (SD)	F(2,212)	p
DES5	1.69 (0.66)	0.00 (0.00)	2.47 (0.51)	411.24	< .001
DES7	1.15 (0.97)	1.54 (1.08)	1.19 (1.15)	3.45	.034
DES8	0.82 (0.98)	0.51 (0.87)	0.78 (1.07)	2.61	.076
DES12	0.98 (1.07)	1.27 (1.10)	0.72 (0.92)	3.63	.028
DES13	1.20 (1.12)	1.22 (1.14)	0.81 (1.09)	1.74	.178
DES22	2.08 (0.64)	1.68 (1.08)	0.00 (0.00)	80.93	< .001
DES27	1.24 (1.18)	0.96 (1.05)	0.53 (0.92)	5.38	.005
total	9.17 (3.47)	7.19 (2.02)	6.50 (1.52)	17.61	< .001

Morbidity

The PD group was significantly younger than the remaining sample (M = 38.6, SD = 15.3 vs M = 44.1, SD = 16.6, t(6642) = 5.46, p < .001). PD members were significant more likely to be female than in the remaining sample (66.4% vs 56.1%, χ^2(1) = 11.28, p < .001). The PD group rated overall health as significantly worse than the remaining sample (inversely scored – physical health: M = 3.0, SD = 1.1 vs M = 2.7, SD = 1.0, t(1360) = 2.43, p = .015; mental health M = 3.0, SD = 1.1 vs M = 2.3, SD = 1.0, t (1360) = 5.33, p < .001). Of 271 PD members, 76 (28%) endorsed psychiatric hospitalizations, the majority of whom had been hospitalized more than once, with 15 individuals hospitalized five or more times. Almost half of PD members (n = 122, 45%) endorsed a history of medication treatment for mental health issues.

Of the 101 PD members who responded to the question of ever having attempted suicide, more than half (53 vs 48, 52.5%) had done so at least once. Of the 1,046 responders to the question in the remaining sample, a significantly smaller portion (32.0%) had attempted (χ^2(1) = 17.21, p < .001). Compared to the PD group, suicide attempt rate was 32.9% (χ^2 (1) = 13.58, p < .001) in the 435 responders with lifetime major depressive disorder (MDD) after excluding PD members (34% with PD included), and 44.8% (χ^2(1) = 1.60, p = .223) in the 201 responders with lifetime PTSD after excluding PD members (49.2% with PD included).

Comorbidity

Table 5 presents comorbidity with lifetime major Axis I disorders. Except for anorexia and psychotic disorders, all disorders were significantly more common in the PD group as compared to the remainder of the NCS-R sample. PD membership was endorsed by 6.1% of individuals with lifetime MDD, 11.4% of the individuals with lifetime PTSD, and 13.4% of the individuals with lifetime panic disorder.

Table 5. Pathological dissociation (PD) lifetime comorbidity with DSM-IV Axis I disorders.

	PD (n = 271)	non-PD (n = 6,373)	χ^2	p
Alcohol Abuse	75 (27.7%)	951 (14.9%)	32.38	< .001
Alcohol Dependence	45 (16.6%)	397 (6.2%)	45.06	< .001
Anorexia	1 (0.4%)	20 (0.3%)	0.03	.583
Bipolar I Disorder	24 (8.9%)	77 (1.2%)	101.56	< .001
Bipolar II Disorder	20 (7.4%)	84 (1.3%)	37.97	< .001
Bulimia	11 (4.1%)	42 (0.7%)	37.97	< .001
Drug Abuse	61 (22.5%)	587 (9.2%)	52.23	< .001
Drug Dependence	34 (12.5%)	213 (3.3%)	61.52	< .001
Dysthymia	57 (21.0%)	322 (5.1%)	123.42	< .001
Generalized Anxiety Disorder	65 (24.0%)	681 (10.7%)	46.13	< .001
Major Depressive Disorder	95 (35.1%)	1456 (22.8%)	21.65	< .001
Panic Disorder	60 (22.1%)	389 (6.1%)	106.09	< .001
Posttraumatic Stress Disorder	68 (25.1%)	531 (8.3%)	89.02	< .001
Psychotic Disorders*	7 (0.3%)	26 (0.4%)	1.89	.757
Social Phobia	102 (37.6%)	1015 (15.9%)	87.62	< .001

*coded as "psychotic diagnosis – 1st mention"
Obsessive-Compulsive Disorder not included in database

Table 6. Childhood trauma in pathological dissociation (PD) and in the remainder NCS-R sample.

	PD (n 241–270)	non-PD (n 5911–6309)	t	p
Emotional Abuse+	2.74 (0.75)	3.02 (0.66)	6.09	< .001
Physical Abuse+	2.88 (1.19)	3.26 (0.98)	4.96	<.001
Witnessing Domestic Violence+	3.26 (1.14)	3.64 (0.79)	5.46	<.001
Physical Neglect+	3.65 (0.60)	3.84 (0.42)	5.19	< .001
Emotional Neglect–female caretaker	1.52 (0.73)	1.36 (0.58)	3.38	<.001
Emotional Neglect–male caretaker	1.78 (0.88)	1.67 (0.76)	1.79	.075

+severity reversed

Childhood maltreatment

Table 6 reveals that all categories of childhood maltreatment were significantly elevated in the PD group compared to the remaining sample, except for emotional neglect by the male caregiver. We also compared childhood trauma between the PD group and two major psychiatric disorders known to have strong associations with childhood trauma, after removing from these two groups the small minority of PD members (6.1–11.4%). Compared to lifetime MDD (n = 1,662, n = 1546–1648 with completed trauma items), the PD group had significantly greater physical abuse (t = 2.34, p = .012), witnessing domestic violence (t = 3.20, p = .002), physical neglect (t = 2.60, p = .010), and emotional abuse (t = 4.48, p < .001) while not differing in emotional neglect by female or male caregivers. Compared to the PTSD group (n = 531, n = 484–529 with completed trauma items), the PD group did not significantly differ on any childhood trauma variables except for greater emotional neglect by the male caregiver in PTSD (t = 2.51, p = .012).

Linear regression analysis applied to the entire NCS-R sample revealed that all childhood maltreatment variables entered together significantly predicted PD severity (F(6,6012) = 25.38, p < .001). Entered stepwise, witnessing

domestic violence (F-change = 87.60, B = −.16, p < .001), emotional abuse (F-change = 35.78, B = −.16, p < .001), physical abuse (F-change = 13.67, B = −.07, p = .007), emotional neglect by the female caregiver (F-change = 8.85, B = .10, p = .029), and physical neglect (F-change = 4.55, B = −.14, p = .033), in decreasing order of magnitude, made a unique significant positive contribution (all scores but emotional neglect are inverse) to the prediction of PD severity; only emotional neglect by the male caregiver did not contribute. Likewise, childhood trauma variables entered together significantly predicted amnesia severity (DES 5: F(6,6019) = 3.82, p < .001); depersonalization/derealization severity (DES 7 + DES 12+ DES 13: F(6,6018) = 20.51, p < .001); and identity alteration severity (DES 22: F(6,6020) = 20.09, p < .001).

Discussion

The one-month prevalence of pathological dissociation likely indicative of dissociative disorder was 4.1% in a representative national U.S. sample, using conservative transformation and cutoff criteria. The PD group had diminished physical and mental health, marked comorbidity with major psychiatric disorders, and a high likelihood of psychiatric hospitalization and psychotropic medication treatment. More than half had attempted suicide, greater than in a lifetime of major depression. Childhood maltreatment significantly positively predicted all three pathological dissociative experiences (amnesia, depersonalization / derealization and identity alteration), and each childhood trauma category positively predicted pathological dissociation severity uniquely and additively. Childhood trauma in the PD group was greater than in lifetime major depression (except for similar emotional neglect), and comparable to PTSD.

The national PD prevalence rate of 4.1%, likely indicative of dissociative disorder, overall approximates rates previously reported for dissociative disorders in community samples from and outside of the United States. Though the NCS-R only measured one-month prevalence, two major dissociative disorders, DID, and DDD, are typically chronic, DA being less so (Loewenstein, 2018; Simeon et al., 2003b). Additionally, the conservative cutoff used to ensure specificity is likely to have missed disorder cases with milder symptomatology, especially among less "severe" dissociative disorders such as DDD. In fact, the cutoff excluded 16% of individuals diagnosed with DDD by semi-structured interviewing in the sample used to derive the cutoff. Similarly, Simeon et al. (2003a) reported that 1/3 of all individuals with diagnosed DDD had a less than 10% probability of belonging to the taxon. The cutoff score was much less likely to miss DID cases, as these individuals typically score markedly higher on the taxon.

Regarding DID, a U.S. community-based study reported a 1-year prevalence of 1.5% (Johnson et al., 2006); lifetime prevalence was 3.1% in a central Canadian city (Ross, 1991) and 1.1% in a representative female sample from

a central Turkish city (Sar et al., 2007). The lifetime prevalence of DDD has been estimated at 2% (Hunter et al., 2004); the U.S. community study reported a 0.8% 1-year DDD prevalence (Johnson et al., 2006), and the Turkish study reported a 1.4% lifetime DDD prevalence (Sar et al., 2007). DA had a 1.8% 1-year prevalence in the U.S. community study (Johnson et al., 2006), with a lifetime prevalence of 7.0% in the Canadian study (Ross, 1991) and 7.3% in the Turkish study (Sar et al., 2007). The above prevalence ranges for the three major dissociative disorders approximate the prevalence projections by this survey for the DID-like phenotype (1.5%) and the DDD-like phenotype (1.3%), consistent with the high chronicity of these disorders. The lower 0.5% one-month prevalence of the DA-like phenotype is consistent with the cited 1-year and lifetime rates, as DA frequently occurs in response to acute adulthood stressors and may not be chronic.

Regarding the overall prevalence of dissociative disorders, lifetime prevalence was 11.2% in the Canadian study (Ross, 1991) and 18.3% in the Turkish study (Sar et al., 2007). The U.S. community study reported a 1-year prevalence of 9.5% (Johnson et al., 2006). Comparably, a meta-analysis of 92 DES studies and 12 diagnostic studies in approximately 32,000 college students yielded an 11.4% dissociative disorder prevalence (Kate et al., 2020), supporting the validity of approximating disorder prevalence using well-defined DES parameters.

The current findings are also quite consistent with two existing epidemiological studies of pathological dissociation. A prospective Finnish regional study, of approximately 2,000 participants extracted from a stratified national sample, employed a taxon cutoff score of 20 and yielded a 3.4% prevalence for pathological dissociation (Maaranen et al., 2005). At 3-year follow-up, the prevalence was 3.7%, with a 28.6% group membership retention (Maaranen et al., 2008). The NCS-R-converted cutoff score of 5 corresponds to a taxon score of 23.8 ((5/7) x 33.33), slightly higher than the Finnish study; regardless, prevalence was very similar and supports a reliable cross-national estimate. A Puerto Rico study examined pathological dissociation in a community probabilistic sample of 891 adolescents, using the eight Adolescent DES pathological dissociation items (Martinez-Taboas et al., 2006). A prevalence of 4.9% was found, nicely approximating the 4.1% prevalence in the current study; the somewhat higher prevalence might be accounted for by the use of a lower cutoff score of 3 (versus 5) in the adolescent study.

The morbidity associated with dissociative disorders has been well documented in clinical and community settings (Johnson et al., 2006; Loewenstein, 2018; Mueller-Pfeiffer et al., 2012; Simeon et al., 2003b). Although suicidal behavior is uncommon in DDD, it is very common in DID, estimated at 70% of the adults with the disorder, often with multiple attempts (Foote et al., 2008; Putnam et al., 1986). Irrespective of comorbidity, dissociative disorder comprises an independent risk factor for multiple suicide attempts (Foote et al.,

2008). Furthermore, greater dissociation severity is associated with higher frequency of suicide attempts (Calati et al., 2017; Webermann et al., 2016). Suicidal behaviors are also common in DA (Loewenstein, 2018). The 54% suicide attempt occurrence in the national PD group is consistent with the above findings, given the phenotypic mix, and establishes that these strikingly high rates are not artifacts of clinical settings. The greater suicide attempt occurrence in PD compared to major depression is noteworthy and draws attention to the importance of carefully assessing childhood trauma and dissociative symptoms in patients with mood disorders, especially when treatment-resistant (Lippard & Nemeroff, 2020).

The very high comorbidity of PD with most major psychiatric disorders substantiates the elevated comorbidities reported in clinical and community samples. In a clinical sample of 117 individuals with DDD, lifetime comorbidity was 19% to 67% for mood and anxiety disorders, 15% for alcohol dependence, 7% for bulimia, and 3.4% for PTSD (Simeon et al., 2003b). In DID, the majority have comorbid PTSD; additional highly comorbid disorders are depressive disorders, substance use disorders, and eating disorders (Loewenstein, 2018). A U.S. community-based study reported an odds ratio of 11.4 for comorbidity with any anxiety, eating, mood, personality, or substance use disorder (Johnson et al., 2006). The sevenfold higher prevalence of bipolar I and II disorders in the NSC-R PD group was striking, and despite hypomanic and manic symptom inquiry it cannot be excluded that a portion of bipolar disorder comorbidity was misdiagnosed; DID identities can vary markedly in mood-related presentations, leading to an overdiagnosis of bipolarity (Loewenstein, 2018).

Childhood maltreatment is well known to be highly prevalent across all dissociative disorders, and to comprise a major pathogenetic risk factor (Dalenberg et al., 2012; Loewenstein, 2018; DSM-5). Just as dissociative disorders occupy a symptom severity spectrum, so do their traumatic antecedents (Kruger & Fletcher, 2017). Emotional abuse and emotional neglect have been most strongly and consistently associated with DDD, though other trauma categories can certainly be encountered (Ó Laoide et al., 2018; Michal et al., 2007; Simeon et al., 2001). On the other hand, DID is characterized by multiple types of interpersonal childhood maltreatment, often including neglect and physical, sexual, and emotional abuse before the age of 6 in a broader context of family attachment pathology (Cyr et al., 2010; Loewenstein, 2018). Early life interpersonal traumas and betrayal by caregivers have been associated with later DA, though less definitively (Loewenstein, 2018).

The epidemiologic study of pathological dissociation in Puerto Rican youth examined childhood trauma, and similarly to this study reported that all five types of victimization examined (emotional abuse, neglect, physical abuse, sexual abuse, exposure to violence) were positively associated with pathological dissociation (Martinez-Taboas et al., 2006). Notably, the two significant

predictors when controlling for trauma interrelations were physical abuse and exposure to violence; these were among the three strongest predictors in the current study as well. Undoubtedly, the examination of the impact of childhood maltreatment on PD in our analyses involved obvious underestimations. Sexual abuse, a hallmark trauma of DID, was not available in our database. Additionally, emotional abuse included components of spurning and undersocializing (Hart et al., 1996) but omitted verbal abuse. Physical abuse, witnessing domestic violence, and physical neglect were measured more reliably. Especially in light of this limitation, the strong prediction of pathological dissociation severity not only by childhood maltreatment as a whole but also uniquely and additively by each trauma category is a compelling national finding, converging with a large literature demonstrating the cumulative dosing impact of adverse childhood experiences on adult mental health (Merrick et al., 2017).

In conclusion, the NCS-R showed a 4.1% U.S. prevalence of pathological dissociation likely indicative of dissociative disorder, and was associated with diminished physical and mental wellbeing, suicidal behavior, extensive comorbidity, and predictive childhood maltreatment, drawing continuing attention to both the frequency and seriousness of these still underdiagnosed, undertreated, and at times disputed, disorders.

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