

TABLE 1 Study characteristics.

Author [year]	Country	Groups	n	Age (mean SD)	Control groups, matched by
Azizi et al. [49] [2017]	Iran	Opioid dependence Control ¹	88 (0F/88M) 40 (0F/40M)	30.90 (4.14) 29.32 (3.89)	Age, gender, education level
Bottesi et al. [50] [2021]	Italy	SUD Control	131 (56F/75M) 131 (56F/75M)	39.74 (11.83) 40.02 (12.34)	Sex
Buckholdt et al. [33] [2015]	United States	Substance abuse Control	81 (39F/42M) 118 (90F/28M) ^c	36.6 (11.4) 20.9 (4.8)	ND
Di Pierro et al. [51] [2015]	Italy	SUD Control	58 (16F/42M) 73 (53F/20M)	35.14 (9.31) 28.85 (5.95)	ND
Dingle et al. [52] [2018]	Australia	SUD Control	35 (13F/22M) 35 (13F/22M)	25 (4.48) 25 (4.34)	Age, gender, ethnicity, education level
Fox et al. [53] [2007]	United States	Cocaine dependence Control	60 (28F/32M) 50 (24F/26M)	37.2 (5.9) 33.6 (10)	ND
Fox et al. [54] [2008]	United States	Alcohol dependence Control	50 (9F/41M) 62 (32F/30M)	37.5 (8.2) 33.7 (9.4)	ND
Garke et al. [27] [2021]	United States	SUD Control ²	415 (180F/235M) 225 (134F/91M)	35.13 (10.21) 32.26 (11.37)	ND
Ghorbani et al. [55] [2017] ³	Iran	Alcohol dependence Control	205 (51F/154M) 100 (40F/60M)	32.36 (10.26) 30.32 (9.98)	ND
Hardy et al. [56] [2018]	United States	SUD Control ⁴	70 (70F/0M) 117 (117F/0M)	42.5 (11.8) 37.9 (11.8)	Sex
Jakubczyk et al. [57] [2020]	Poland	Alcohol use disorder Control	165 (20F/145M) 110 (28F/82M)	44.0 (11.2) 40.6 (8.1)	ND
Krause-Utz et al. [58] [2019]	Germany	SUD Control ⁵	28 (28F/0M) 60 (60F/0M)	31.14 (8.35) 27.60 (6.84)	Sex
London et al. [59] [2020]	United States	Methamphetamine dependence Control	11 (2F/9M) 12 (5F/7M)	38.3 (9.31) 33.8 (7.48)	ND
Okita et al. [60] [2016]	United States	Methamphetamine dependence Control	94 (38F/56M) 102 (54F/48M)	34.20 (9.7) 33.3 (8.94)	ND
Pelot et al. [61] [2020]	Canada	SUD Control	20 (13F/7M) 20 (13F/7M)	30.85 (ND) 30.85 (ND)	Age, gender
Rettie et al. [62] [2018]	United Kingdom	Alcohol use disorder Control	45 (13F/32M) 36 (28F/8M)	44.83 (9.92) 44.11 (13.38)	ND

TABLE 1 (Continued)

Author [year]	Country	Groups	n	Age (mean SD)	Control groups, matched by
Russell et al. [63] [2017]	United States	SUD ⁶	86 (42F/44M)	17.16 (0.27)	ND
		Control	28 (20F/8M)	18.71 (0.6)	
Russell et al. [64] [2019]	United States	SUD ⁷	27 (9F/18M)	17.26 (1.48)	ND
		Control	29 (9F/20M)	17.55 (2.03)	
Seo et al. [48] [2016]	United States	Alcohol dependence	37 (8F/29M)	37.2 (7.9)	Age, intelligence, handedness and gender
		Control	37 (14F/23M)	34.3 (8.6)	
Stover et al. [47] [2013]	United States	Substance abuse (alcohol, cocaine, or marijuana)	43 (0F/43M)	34.58 (9.93)	Sex
		Control	43 (0F/43M)	34.79 (8.5)	
Uhlmann et al. [17] [2016]	South Africa	Methamphetamine dependence	21 (4F/17M)	25 (ND)	Age, gender, handedness
		Control ⁸	19 (4F/15M)	23 (ND)	
Zareban et al. [65] [2018]	Iran	SUD	166	32.65 (8.22)	ND
		Control	120 (total sample 109F/177M but within group sex composition not reported)	22 (5.79)	

SUD = substance use disorder; n = sample size; ND = no data; SD = standard deviation; M = male; F = female; NIH = National Institutes of Health; DERS = Difficulties in Emotion Regulation Scale. RHS = recovery high school; DSM = Diagnostic and Statistical Manual of Mental Disorders; SCID = structured clinical interview for DSM; MINI = Mini-International Neuropsychiatric Interview; BPD = borderline personality disorder; ADHD = attention deficit hyperactivity disorder.

^aScores obtained by e-mailing authors;

^bscores estimated from graphs;

^cdiscrepancies within the study were present for extracted values which are explained in Supporting information, Appendix S3.

¹Azizi et al. 2017 had an opium user group and a methadone maintenance treatment group that were combined.

²Garke et al. 2021 also had a community group with substance misuse that included participants with and without a SUD diagnosis. This group was excluded from our main analysis, but a sensitivity analysis was conducted that combined this group with the SUD group (see Supporting information, Figure S6).

³Ghorbani et al. 2017 administered both the DERS and ERQ. This study was included in both analyses.

⁴Hardy et al. 2018 also had a food addiction group (n = 42) that was not included in our analysis.

⁵Krause-Utz et al. 2019 had three groups: a borderline personality disorder group, a clinical control group comprising individuals with SUD or ADHD and a control group. Data from this study were further subdivided into four groups (BPD, SUD, ADHD, HC) in the supplement, which is where we obtained the SUD and control data we extracted from this study.

⁶Russell et al. 2017 had three different SUD groups that were combined into one SUD group in our analysis.

⁷Russell et al. 2019 assessed DERS scores for the SUD group pre- and post-treatment. Only the pre-treatment data were included in our analysis.

⁸Uhlmann et al. 2016 also had a methamphetamine-dependent group with a history of psychosis (n = 22) that was excluded from analysis, as all participants in this group had a comorbid diagnosis.

TABLE 1 (Continued)

Author [year]	Component of DERS	DERS Score (mean, SD)	Recruitment source	Diagnostic tool	NIH quality assessment
Azizi et al. [49] [2017]	All six subscale scores	121.18 (7.77)	Outpatient substance abuse treatment center	ND	Fair
Bottesi et al. [50] [2021]	All six subscale scores	102.62 (8.83) 87.42 (13.31)	Patients' relatives/friends Patients from community mental health centers and inpatient mental health clinics	DSM-5 (but no structured diagnostic tool mentioned)	Fair
Buckholdt et al. [33] [2015]	Total score, all six subscales	58.97 (9.35) 92.6 (24.9)	Engaged through advertisements Patients in residential substance abuse treatment facility	ND	Poor
Di Pierro et al. [51] [2015]	Total score, all six subscales ^a	78.9 (22.6) 82.96 (12.33)	Undergraduate university students Patients in a residential treatment service for patients with SUDs	SCID-II for DSM-IV	Fair
Dingle et al. [52] [2018]	Total score, all six subscales	77.41 (10.53) 108.43 (25.03)	Community participants recruited through fliers and word of mouth Residents in a drug and alcohol therapeutic community	SCID for DSM-IV administered to SUD group to confirm diagnosis	Fair
Fox et al. [53] [2007]	Total score, four subscale scores reported and 2 estimated from graph (non-acceptance and goals) ^b	66.69 (16.46) 85.8 (22.5) 60.9 (15.0)	Recruited from social media/word of mouth Cocaine-dependent patients and healthy volunteers recruited through local advertisement	Controls screened for alcohol misuse using AUDIT-C SUD group met DSM-IV criteria for cocaine dependence (but no diagnostic tool mentioned) and tested positive for cocaine in urine toxicology screen	Good
Fox et al. [54] [2008]	Total scores and all six subscale scores estimated from graphs ^b	ND ND	Treatment-seeking alcohol-dependent participants and social drinkers recruited through local advertisements	Met DSM-IV criteria (but no diagnostic tool mentioned) and tested positive on a urine toxicology screen	Good
Garke et al. [27] [2021]	Total score, all six subscales	88.67 (24.96) 65.99 (19.44)	The SUD groups were recruited from two state-run residential treatment centers in Mississippi. For one of the two residential SUD groups, an alcohol and/or cocaine use disorder diagnosis was required The community sample was recruited through social media advertisements, fliers, and newspaper advertisements in the Greater New Haven, CT area	SCID-I for DSM-IV	Good
Ghorbani et al. [55] [2017] ³	Total score	115.17 (29.81)	Outpatient addiction treatment clinic in Karaj, Iran	AD group: DSM-IV TR diagnosis of alcohol dependence	Good

(Continues)

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Author [year]	Component of DERS	DERS Score (mean, SD)	Recruitment source	Diagnostic tool	NIH quality assessment
Hardy et al. [56] [2018]	Total score and all subscale scores ^a	72.35 (20.68)	Control group included undergraduate students from Tehran University	Controls: SCID-I for DSM-IV-TR	
Jakubczyk et al. [57] [2020]	Total score, all six subscales	90.3 (19.3)	Waiting rooms in diabetes, gynecology and primary care clinics in a public hospital in Atlanta, Georgia	MINI for DSM-IV	Good
		70.0 (14.5)	Recruited from inpatient alcohol treatment program	AUD group: MINI for ICD-10	Good
			Recruited from individuals presenting to a general practitioner for medical advice, prophylactic examination, or infection treatment		
Krause-Utz et al. [58] [2019]	Total score, all six subscales (data taken from paper's supplement)	79.86 (20.50) 69.47 (13.32)	Both groups were recruited from the Central Institute of Mental Health in Mannheim and Leiden University	SCID-I for DSM-IV, International Personality disorder examination (IPDE), MINI, and Wender-Reimherr interview	Good
London et al. [59] [2020]	Total score	74.91 (19.83) 54.25 (15.96)	ND	MINI or SCID for DSM-IV	Good
Okita et al. [60] [2016]	Total score	76.2 (20.10) 55.2 (12.53)	Both groups recruited using internet and newspaper advertisements	SCID for DSM-IV	Good
Pelot et al. [61] [2020]	Total score	90.30 (26.5)	Male SUD participants were recruited from an outpatient addiction program and female SUD participants were recruited from an inpatient addiction program	ND	Fair
		67.90 (11.4)	HCs recruited from the community		
Rettie et al. [62] [2018]	Total score	116.58 (25.63)	Clients undergoing alcohol detoxification who had completed pharmacological treatment	ND	Poor
		62.22 (13.85)	Control group of staff members at the same detoxification unit		
Russell et al. [63] [2017]	Total score	102.78 (28.17) 76.2 (26.1)	Students attending RHS in Massachusetts	ND	Fair
			Recruited through convenience sampling from Connecticut high schools		
Russell et al. [64] [2019]	Total score	101.72 (27.10) 81.07 (21.58)	Students attending RHS	ND	Fair
			Recruited through local high schools, public libraries, and similar community settings		

TABLE 1 (Continued)

Author [year]	Component of DERS	DERS Score (mean, SD)	Recruitment source	Diagnostic tool	NIH quality assessment
Seo et al. [48] [2016]	Impulse subscale score Total scores obtained by e-mailing authors ^a	ND ND	Patients at inpatient treatment facility Recruited via community newspaper, flyers and web advertising	SCID for DSM-IV	Fair
Stover et al. [47] [2013]	Total score	98.21 (14.38)	Recruited from substance abuse treatment programs and other community settings	Met DSM-IV criteria, but no diagnostic tool mentioned	Fair
Uhlmann et al. [17] [2016]	Total score, all six subscales	88.88 (10.88) 82.71 (18.04) 67.43 (17.84)	Recruited from same community Participants recruited from drug rehabilitation centers, hospitals, and communities in Cape Town	SCID-I for DSM-IV-TR	Good
Zareban et al. [65] [2018]	All six subscales	105.23 88.44	Recruited from addiction rehabilitation clinics Recruited using convenience sampling technique	ND	Poor

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