

Substance Abuse-Related Self-Stigma in Women with Substance Use Disorder and Comorbid Posttraumatic Stress Disorder

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Keywords

Self-stigma · Substance use disorders · Posttraumatic stress disorder · Childhood trauma · Stereotypes

Abstract

Background: Self-stigma is a result of internalizing negative stereotypes by the affected person. Research on self-stigma in substance use disorders (SUD) is still scarce, especially regarding the role of childhood trauma and subsequent posttraumatic disorders. **Objectives:** The present study investigated the progressive model of self-stigma in women with SUD and posttraumatic stress disorder (PTSD), and the predictive value of PTSD severity and childhood trauma experiences on self-stigma. **Method:** In a cross-sectional study with 343 women with SUD and PTSD, we used the Self-Stigma in Alcohol Dependency Scale, the Childhood Trauma Questionnaire (CTQ), the PTSD Symptom Scale Interview (PSS-I),

and to control for SUD severity and depression, the Addiction Severity Index Lite and the Beck Depression Inventory-II. Hierarchical regression analyses were conducted for each stage of self-stigma (*aware-agree-apply-harm*). **Results:** The interrelated successive stages of self-stigma were largely confirmed. In the regression models, no significant effects of the PSS-I- and the CTQ-scores were observed at any stage of self-stigma. *Agreeing* with negative stereotypes was solely predicted by younger age, *applying* these stereotypes to oneself was higher in women with younger age, higher depression and SUD severity, and suffering from the application (*harm*) was only predicted by depression. **Conclusions:** The progressive model of self-stigma could be confirmed in women with SUD and PTSD, but PTSD severity and childhood trauma did not directly affect this process. Self-stigma appears to be related to depression in a stronger way than PTSD is related to women with SUD and PTSD.

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Introduction

Stigma affects thinking, behaviour and treatment outcome in mental disorders [1]. A large body of research exists on stigma of mental illness and other health conditions, for example, HIV/AIDS, but there is still lack of research on the stigma of addiction and the burden for people with substance use disorders (SUD) [2–4].

Stigma can be distinguished into *public stigma*, which refers to stereotypes, prejudices and discrimination in the general population towards the person concerned, and *self-stigma*, the process of internalizing those external negative views and applying the corresponding stereotypes and prejudice to themselves [2].

The process of self-stigmatization in mental disorders [5–7] has been described in a model with 4 successive, interrelated stages. First, people start to be aware of the stereotypes prevalent in other people (stereotype awareness, *aware*). In a second step, people personally agree with these stereotypes (stereotype agreement, *agree*). In a third step, they apply these stereotypes to themselves (self-concurrence, *apply*) and in the last step, this application negatively impacts self-esteem and self-efficacy (self-esteem decrement, *harm*). Thus, according to the model, accepting public stereotypes is a prerequisite for the development of self-stigma.

Self-stigma was found to be negatively associated with self-esteem, hope and empowerment, and was positively associated with depression and symptom severity of mental disorders [5, 8–12]. Furthermore, self-stigma negatively affects treatment-seeking behaviour [13–18], quality of life [19–21] and recovery [22, 23]. However, not everyone, who perceives public stigma, internalizes these prejudices and suffers from low self-esteem. How each person reacts is still unclear and the conditions for internalizing stigmata are poorly understood.

Only a few studies investigated predictors of self-stigma in SUD. A systematic review of Kulesza et al. [24] concludes that self-stigma is positively associated with substance use frequency and drug and alcohol use severity. Among those individuals who use drugs, self-stigma is also related to higher depression and anxiety and lower psychological well-being. Schomerus et al. [7] found that among individuals who drink alcohol, self-stigma was negatively correlated with self-efficacy to refuse drinking. Results regarding sociodemographic variables are inconsistent, presumably due to the variance of the investigated samples and stigma types [24]. However, higher perceived stigma towards people who use alcohol seems to be associated with a lower level of education. Moreover,

there seems to be an association between perceived stigma and age, but its direction is unclear due to the different investigated populations (adolescents vs. adults). In summary, self-stigma seems to be positively related to depression and anxiety in patients with SUD, and negatively related to psychological well-being and social inclusion [25].

Potential determinants of self-stigma in SUD, which have been poorly investigated so far, are traumatic experiences, especially childhood abuse and neglect (CAN), and posttraumatic stress disorder (PTSD) [26]. Early traumatic experiences have been shown to be a robust predictor of the development of SUD and are related to maladaptive perceptions, beliefs and behaviours [27]. PTSD is one of the most frequent comorbid disorders in patients with SUD with a lifetime-prevalence of PTSD ranging from 26 to 52% in SUD populations [28–30]. A recent study showed that self-stigma of alcohol dependence is stronger in persons with a history of childhood trauma [31]. Most results on the association between traumatic experiences and self-stigma are drawn from specific populations like military or veteran samples [14–16, 32–38]. These studies indicate a significant association between self-stigma and help-seeking attitudes [14, 36], PTSD [16, 33, 37], depression, functional impairment and alcohol problems [16]. However, findings on the contributing role of CAN and PTSD on self-stigma in people with SUD are lacking [39].

In this study, we investigated (1) whether the progressive model of self-stigma is replicable in women with SUD and comorbid PTSD, and (2) whether self-stigma can be predicted by PTSD symptom severity and childhood trauma.

Methods

Setting and Procedure

The current study focuses on data assessed at baseline of a multicentre study on “Childhood Abuse and Neglect as a cause and consequence of Substance Abuse” (CANSAS-Study) [40], funded by the German Federal Ministry of Education and Research. The CANSAS-Study is a nationwide German research project which examined the associations between PTSD and SUD within 6 sub-projects. The data presented here were assessed at baseline as part of a subproject on the cognitive-behavioural treatment for patients with PTSD and SUD (Project 2.A) [40]. In this project, female participants meeting DSM-IV criteria for both SUD and PTSD were recruited between October 2012 and June 2015 with the help of counselling agencies at 5 participating study sites (Hamburg, Cologne, Essen, Bielefeld, and Hannover), newspaper advertisements and other means. Data collection was performed by clinical raters with at least a bachelor degree who received extensive training in

conducting clinical interviews and the administration of all the other assessments. Ongoing supervision and rater trainings were conducted to assure the validity of the data.

The study included female patients only due to higher prevalence rates of SUD and PTSD comorbidity in females (e.g., [27, 41]), and the suggestion of some authors that trauma treatment should preferably be offered in gender-specific groups (e.g., [42]). In the present study, only baseline measures were analysed, irrespective of the following interventional study procedures.

Participants

Eligibility was defined according to the following criteria: (1) age 18–65, (2) female gender, (3) diagnosis of SUD according to DSM-IV with active use in the last 12 months, (4) diagnosis of at least partial PTSD according to DSM-IV (PTSD criteria A and B, and at least one of criteria C and D) [43]. Exclusion criteria were (1) current psychotic disorder, (2) acute suicidality, (3) severe cognitive impairment and (4) intravenous drug use within 4 weeks before the start of study participation. All participants received extensive information about the study prior to participation and gave written informed consent. The study protocol was approved by the Ethics Committee of the Medical Association of Hamburg, Germany, and by each local committee of the other study sites. It was registered at the German Clinical Trials Register under the ID DRKS00004288.

Measures

Self-Stigma

To assess self-stigma, we used the Self-Stigma in Alcohol Dependence Scale (SSAD) [7]. This scale is an adaptation from the Self-Stigma of Mental Illness Scale [44]. According to the progressive model of self-stigma [6, 7], the SSAD consists of the 4 scales “stereotype awareness” (*aware*), “stereotype agreement” (*agree*), “self-concurrence” (*apply*) and “self-esteem decrement” (*harm*). Each scale includes 16 statements, which are self-rated from 1 “do not agree at all” to 5 “strongly agree”. Sum scores for each scale range from 16 to 80. The reliability of the subscales was high in our sample with Cronbach’s alpha ranging from $\alpha = 0.85$ (*apply*) to $\alpha = 0.91$ (*aware*).

Since the SSAD was developed for patients with alcohol dependence, we changed the wording of the items to obtain a better fit for our sample (alcohol or drug use). To be specific, the words “alcohol problems” were changed to “addiction problems” (e.g., *aware*: “I think the public believes most persons with addiction problems are dangerous”; *agree*: “I think most people with addiction problems are lazy”; *apply*: “Because I have an addiction problem, I am dangerous.”; *harm*: “I currently respect myself less because I am to blame for my problems.”). Therefore, all items of the scales aware, agree, and apply, and 2 of 16 items of the scale harm were adapted.

Substance Use Severity

The Addiction Severity Index Lite (ASI-Lite) [45] is an interview which assesses 7 potential problem fields related to substance dependence. Composite scores can be calculated for each problem field and range from 0 to 1. The ASI-Lite has strong psychometric properties (e.g., [46]). For our analyses we used a combination of the 2 composite scores for alcohol and drug use respectively. We computed a single score for “SUD severity” based on the higher value of both composite scores.

PTSD Severity

The PTSD Symptom Scale Interview (PSS-I) [47] was used to assess the severity of PTSD symptoms. The PSS-I consists of 17 items corresponding to the symptoms of PTSD symptom clusters B, C and D according to DSM-IV. The severity of each symptom is rated by the interviewer on a scale from 0 to 3 resulting in a sum score (range 0–51), with higher scores indicating higher PTSD symptom severity. The PSS-I has strong psychometric properties [47]. The reliability of the PSS-I was good within our sample (Cronbach’s $\alpha = 0.81$).

Early Traumatic Experiences

The Childhood Trauma Questionnaire (CTQ) [48] covers 5 possible types of early traumatic experiences. A total of 28 items on the scales emotional abuse, physical abuse, emotional neglect, physical neglect and sexual abuse are self-rated on a scale from 1 “never true” to 5 “very often true”. Each of the 5 scales ranges from 5 to 25 with higher scores indicating more severe traumatic experiences. The CTQ showed good reliability in the general German population [49] and within our sample (Cronbach’s $\alpha = 0.71$ [physical abuse] to Cronbach’s $\alpha = 0.96$ [sexual abuse]).

Depressive Symptom Severity

The Beck’s Depression Inventory-II [50] is one of most commonly used self-report inventories for assessing the severity of depressive symptoms. It consists of 21 questions about the emotional state in the last 2 weeks. Each question is followed by 4 statements that reflect the symptom severity ranging from 0 to 3. Sum scores range from 0 to 63 with higher scores indicating more severe depressive symptoms. A high reliability was given in our sample (Cronbach’s $\alpha = 0.91$).

Diagnoses of SUD and PTSD

SUD and PTSD diagnoses were confirmed using the German research version of the Structured Clinical Interview for DSM-IV Disorders [51] at study baseline. Demographic information including age, years of education, marital status and employment, and medical information including current or former treatment, was also obtained in the course of this interview. The baseline assessment was conducted by trained clinical raters with at least a bachelor degree.

Statistical Analyses

Examining the Progressive Model of Self-Stigma

To investigate the progressive model of self-stigma, we first examined whether the SSAD scales differed overall. A repeated-measures ANOVA was conducted followed by paired *t* tests, which examined differences between the proximate scales. Moreover, we looked at inter-correlations to investigate whether each scale correlated most highly with its predecessor scale. Additionally, descriptive analyses on self-stigma were conducted for the subgroups with those who used (1) alcohol only, (2) any other drugs but alcohol only, and (3) alcohol and drugs.

Predicting Self-Stigma by Early Traumatic Experiences and PTSD

We conducted multiple hierarchical regression analyses with each of the 4 SSAD scales as dependent variables and the measures of CAN and PTSD symptom severity as independent variables. We adjusted for demographic characteristics including age and educa-

tion, depressive symptom severity and SUD severity, since prior studies have found an association between these variables and self-stigma. Although results on the association with age and education are sparse, also with regard to the direction between age and self-stigma heterogeneous, we included age and education (dummy coded with low educational level as the reference category) in the first step of the hierarchical regression. In the second and third steps, we included depressiveness and SUD severity as further control variables. The order of entry of the control variables was based on empirical and theoretical assumptions: with regard to their temporally determined priority we assumed that age and education would precede depressiveness and SUD severity in most cases. Current PTSD symptom severity (as measured by the PSS-1) and CAN (as measured by the 5 scales of the CTQ) were the measures of interest, and thus, included in the fourth and fifth step, respectively, in order to investigate the incremental amount of explained variance in self-stigma. The assumptions for hierarchical regression analyses such as normality distribution of residuals, homoscedasticity and no multicollinearity of predictors were tested and fulfilled.

Results

Participants

A total of 610 women were assessed for eligibility, of which 234 could not be included into the trial, mainly because they did not fulfil the inclusion criteria ($n = 123$). Further reasons were as follows: declination to participate ($n = 47$), lost to baseline assessment ($n = 34$), and other reasons, for example, incomplete screening or imprisonment ($n = 30$). Another 33 women discontinued the baseline assessment, resulting in a final study sample of $n = 343$ women who completed baseline measurements.

Study Sample

Sample characteristics are shown in Table 1. The women were on average 40.9 years old (SD 11.4). The majority were unemployed (67.1%) and single (83.7%). The mean depressive symptom severity was 27.8 (SD 12.0), which indicates moderate depression.

More than half of all women abused or were dependent on both alcohol and drugs (53.9%). Alcohol, cannabis and sedatives were the most frequently abused substances. Nearly every participant (94.5%) had at least one substance dependence diagnosis, whereas the remaining 5.5% met the criteria for substance abuse. SUD severity was moderate (M 0.34, SD 0.25). For a full PTSD, 75.2% of all women met criteria and the mean PTSD symptom severity was M 27.3 (SD 9.7). The highest scores were reported for the CTQ subscales emotional abuse (M 17.4, SD 5.5), and emotional neglect (M 17.9, SD 5.3). Most of

the women ($n = 315$; 92%) either have received prior treatment or were currently undergoing treatment for SUD and/or PTSD.

Examining the Progressive Model of Self-Stigma

Within the total sample, sum scores were the highest for the SSAD subscale *aware* (M 60.8, SD 12.3) and decreased gradually for the following subscales *agree* (M 37.8, SD 10.6), *apply* (M 31.1, SD 10.1) and *harm* (M 31.0, SD 10.5; Table 2). Subgroup analyses for the “alcohol only” ($n = 108$) and “other drugs only” ($n = 50$) groups showed similar results, except for the *agree* scale, for which the subgroup “other drugs only” (M 39.5; SD 9.9) showed higher scores than the subgroup “alcohol only” (M 36.4; SD 10.1).

The scales differed from one another according to the repeated-measures ANOVA ($F [2.255, 759.87] = 886.58$, $p < 0.001$, $\eta_p^2 = 0.73$; Huynh-Feldt corrected). Single paired t test with Holm’s sequential Bonferroni correction resulted in significant differences between the scales *aware* and *agree* ($t [340] = 30.35$, $p < 0.001$, *Cohen’s d* = 2.00), and between the scales *agree* and *apply* ($t [339] = 11.66$, $p < 0.001$, *Cohen’s d* = 0.64). However, *apply* and *harm* did not significantly differ from each other ($t [337] = 0.33$, $p = 0.74$). Table 3 shows the inter-correlations of the 4 scales. All correlations of proximate scales are higher than those of distal scales. The highest correlation was found for *apply* and *harm* ($r = 0.78$; $p < 0.01$), the lowest was found for *aware* and *harm* ($r = 0.18$; $p < 0.01$).

Predicting Self-Stigma by CAN and PTSD Severity

Table 4 shows the results of 4 hierarchical multiple regression analyses that were conducted for each of the 4 SSAD scales as dependent variables.

Stereotype Awareness (Aware)

Depression was correlated with *aware* ($r = 0.11$, $p = 0.019$) but did not statistically significantly contribute to the prediction in the final model ($\beta = 0.12$, $p = 0.068$). The final model overall explained 3% of the variance in *aware* ($R^2 = 0.03$).

Stereotype Agreement (Agree)

In the second regression model, younger age correlated in a statistically significant manner with *agree* ($r = -0.15$, $p = 0.002$) and was the sole significant predictor of *agree* in the regression model ($\beta = -0.15$, $p = 0.014$). Taken together with years of education, a unique proportion of variance in the *agree* scale was explained ($\Delta R^2 = 0.03$, $p = 0.029$). PTSD symptom severity was also correlated

Table 1. Demographic and clinical sample characteristics

	Total sample (<i>n</i> = 343)
<i>Demographic characteristics</i>	
Age, years, mean (SD, range)	40.94 (11.37, 19–65)
Years of education, <i>n</i> (%)	
≤9 years	114 (33.3)
10 years (high school diploma)	114 (33.2)
≥13 years (Matura or university degree)	115 (33.5)
Marital status, <i>n</i> (%)	
Single	287 (83.7)
Married, cohabiting	34 (9.9)
Married, living separately	22 (6.4)
Employment status, <i>n</i> (%)	
Unemployed	230 (67.1)
Employed	112 (32.7)
<i>Depressive symptoms</i>	
Depressive symptom severity (BDI-II), mean (SD, range)	27.82 (12.03, 0–58)
<i>Substance use</i>	
Diagnosis ¹ , <i>n</i> (%)	
Substance use: Exclusively alcohol	108 (31.5)
Substance use: Exclusively other drugs	50 (14.6)
Substance use: Both alcohol and other drugs	185 (53.9)
Substances use disorder, <i>n</i> (%)	
Alcohol	293 (85.4)
Sedatives	106 (30.9)
Cannabis	165 (48.1)
Stimulants	96 (28.0)
Opiates	73 (21.3)
Cocaine	97 (28.3)
Hallucinogens	61 (17.8)
Polytoxicomania	96 (28.0)
Others	21 (6.1)
Consumption of any substances in the last 30 days (ASI-Lite), <i>n</i> (%)	
Total	270 (78.7)
Alcohol	225 (65.6)
Drugs	153 (44.6)
Days of consumption in the last 30 days (ASI-Lite), mean (SD, range)	
Alcohol	8.34 (10.08, 0–30)
Drugs ²	8.09 (12.04, 0–30)
Alcohol and Drug problem severity (ASI-Lite), mean (SD, range)	0.34 (0.25, 0–0.96)
<i>PTSD and early traumatic experiences</i>	
Diagnosis, <i>n</i> (%)	
Full PTSD	258 (75.2)
Subsyndromal PTSD	85 (24.8)
PTSD symptom severity (PSS-I), mean (SD, range)	27.30 (9.71, 0–49)
Early traumatic experiences (CTQ), mean (SD, range)	
Emotional abuse	17.36 (5.52, 5–25)
Physical abuse	11.58 (5.78, 5–25)
Sexual abuse	13.60 (6.93, 5–25)
Emotional neglect	17.87 (5.31, 5–25)
Physical neglect	11.43 (4.46, 5–24)

¹ Substance use disorders include abuse or dependence of substances.

² The drug category was composited from the single categories heroin, methadone, opiates, psychotropic drugs, cocaine, amphetamines, cannabis, hallucinogens, inhalants, and other.

BDI-II, beck depression inventory-II; ASI-Lite, addiction severity index lite; PTSD, posttraumatic stress disorder; PSS-I, PTSD symptom scale interview; CTQ, childhood trauma questionnaire.

Table 2. Self-stigma: SSAD scales (total sample and substance use subsamples)

SSAD scale	Total sample ($n = 343$), mean (SD, range)	Alcohol only ($n = 108$), mean (SD, range)	Other drugs only ($n = 50$), mean (SD, range)	Alcohol and drugs ($n = 185$), mean (SD, range)
Aware	60.83 (12.33, 20–80)	60.49 (11.60, 25–80)	59.90 (13.37, 25–80)	61.29 (12.49, 20–80)
Agree	37.80 (10.57, 16–76)	36.39 (10.07, 16–64)	39.52 (9.94, 19–66)	38.15 (10.97, 18–76)
Apply	31.13 (10.06, 16–69)	29.35 (8.66, 16–64)	30.27 (10.20, 16–69)	32.39 (10.64, 16–69)
Harm	30.96 (10.53, 16–69)	29.11 (9.44, 16–62)	28.91 (10.37, 16–58)	32.58 (10.94, 16–69)

SSAD, self-stigma in alcohol-dependence scale.

Table 3. Inter-correlations of the 4 SSAD scales

	SSAD			
	Aware	Agree	Apply	Harm
SSAD				
Aware	1			
Agree	0.26**	1		
Apply	0.22**	0.48**	1	
Harm	0.18**	0.34**	0.78**	1

** $p < 0.01$.

SSAD, self-stigma in alcohol-dependence scale.

with the *agree* scale ($r = 0.10$; $p = 0.04$) but did not contribute to the model. The final model explained 4% of the variance in *agree* ($R^2 = 0.04$).

Self-Concurrence (Apply)

Statistically significant bivariate associations with the *apply* scale were found for younger age ($r = -0.13$, $p = 0.01$), higher depression ($r = 0.31$, $p < 0.001$), a higher SUD severity ($r = 0.14$, $p = 0.007$), more severe early emotional abuse experiences ($r = 0.13$, $p = 0.008$) and more severe PTSD symptoms ($r = 0.16$, $p = 0.002$). In the regression model, age ($\beta = -0.14$, $p = 0.009$), depression ($\beta = 0.28$, $p < 0.001$) and SUD severity ($\beta = 0.11$, $p = 0.039$) were predictive of the outcome in the final model and moreover, each explained a unique proportion of variance (age and education: $\Delta R^2 = 0.03$, $p = 0.03$; depression: $\Delta R^2 = 0.09$, $p < 0.001$; SUD severity: $\Delta R^2 = 0.01$, $p = 0.04$). The final model explained 14% of the variance in *apply* ($R^2 = 0.14$).

Self-Esteem Decrement (Harm)

The correlations with the *harm* subscale were similar to those found for the *apply* scale. Depression ($r = 0.46$, $p < 0.001$), SUD severity ($r = 0.15$, $p = 0.002$), early emo-

tional abuse ($r = 0.16$, $p = 0.002$) and PTSD symptoms ($r = 0.23$, $p < 0.001$) were also correlated with *harm*. Moreover, early emotional neglect ($r = 0.12$, $p = 0.016$), and early physical neglect ($r = 0.11$, $p = 0.027$) were associated with *harm* in the univariate analyses. Age and educational level were not correlated with *harm*. However, in the regression analysis, depression was the sole predictor of *harm* in the final model ($\beta = 0.42$, $p < 0.001$) and contributed a unique proportion of explained variance of $\Delta R^2 = 0.20$ ($p < 0.001$). The final model explained 24% of variance in *harm* ($R^2 = 0.24$).

Given the heterogeneity with regard to the links between age and education on self-stigma, respectively, we repeated the regression analyses without age and education. Except for minor changes in regression coefficients, the results remained the same.

Discussion

The present study is the first to investigate the progressive model of self-stigma in women with SUD and comorbid PTSD. Additionally, we examined the predictive value of PTSD severity and childhood trauma experiences on the different stages of self-stigma.

The progressive model of self-stigma hypothesizes that each of the 4 stages is the precondition for the following stage. The scores of the 4 scales decreased continuously in our sample, except *apply* and *harm*, which did not differ significantly. Both scales had a similarly high score, comparable with the score of *apply* in an alcohol-dependent sample [7]. Moreover, in our sample, the score of the *aware* subscale (M 60.8, SD 12.3) was significantly higher compared to that of patients with alcohol dependence (M 46.5; 1-sample t test: $t [340] = 21.47$, $p < 0.001$) [7]. Subgroup analyses in our study have shown that both groups, “other drugs only” and “alcohol only”, had similar high scores. However, the scores of the *agree* subscale

Table 4. Prediction of SSAD scales

Step	Predictors	SSAD aware			SSAD agree			SSAD apply			SSAD harm		
		$r_{\text{un-adj.}}$	β	ΔR^2	$r_{\text{un-adj.}}$	β	ΔR^2	$r_{\text{un-adj.}}$	β	ΔR^2	$r_{\text{un-adj.}}$	β	ΔR^2
Step 1	Age, years	-0.063	-0.055	0.007	-0.153**	-0.148*	0.027*	-0.126**	-0.141**	0.027*	-0.083	-0.090	0.022
	Education (10 years)	0.047	0.045		0.038	<0.001		0.102	0.090		0.093	0.104	
	Education (≥ 13 years)	-0.009	0.013		-0.068	-0.068		-0.040	0.013		0.016	0.065	
Step 2	Depression (BDI-II)	0.113*	0.121	0.012*	0.075	0.021	0.005	0.309***	0.282***	0.090***	0.456***	0.421***	0.200***
Step 3	SUD severity (ASI-Lite)	-0.006	-0.016	<0.001	0.020	0.041	0.002	0.135**	0.112*	0.011*	0.154**	0.092	0.007
Step 4	Early traumatic experience (CTQ)												
	Emotional abuse	-0.088	0.152	0.010	0.048	0.088	0.004	0.133**	0.104	0.013	0.157**	0.122	0.009
	Physical abuse	0.006	-0.039		-0.007	-0.048		0.077	0.041		0.017	-0.063	
	Sexual abuse	-0.007	-0.041		0.009	-0.017		-0.005	-0.082		0.043	-0.038	
	Emotional neglect	0.027	-0.065		0.007	-0.019		0.080	-0.082		0.117*	-0.053	
	Physical neglect	0.025	-0.001		-0.006	-0.021		0.080	0.045		0.106*	0.048	
Step 5	PTSD symptoms (PSS-I)	0.036	-0.036	0.001	0.098*	0.070	0.004	0.158**	-0.013	<0.001	0.229***	-0.009	<0.001
R^2 (adjust. R^2)		0.030 (0.003)			0.041 (0.008)			0.141 (0.112)			0.238 (0.212)		
		F(11, 322) = 0.897			F(11,322) = 1.251			F(11,321) = 4.804***			F(11,320) = 9.074***		

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.

Due to list wise deletion, regression analyses were performed with $n = 334$ for SSAD aware, $n = 333$ for SSAD apply and $n = 332$ for SSAD harm. Education was dummy-coded with " ≤ 9 years of education" as the reference category.

SSAD, self-stigma in alcohol dependence scale; BDI-II, beck's depression inventory; SUD, substance use disorder; ASI, addiction severity index; CTQ, childhood trauma questionnaire; PTSD, posttraumatic stress disorder; PSS-I, PTSD symptom scale interview; $r_{\text{un-adj.}}$, unadjusted bivariate correlations; β , standardized regression coefficients; ΔR^2 , incremental proportion of variance explained by each regression step.

were the highest in the "other drugs only" group, indicating that women with drug use seem to agree more with public prejudices regarding their conditions as compared to individuals with alcohol dependence only [52].

The total correlation pattern of the self-stigma scales, however, was consistent with that of the proposed model [5, 7] and the interrelated successive stages of self-stigma were largely replicated in our sample of women with SUD and comorbid PTSD.

The second research question investigated the role of CAN and PTSD symptom severity in the process of self-stigma, while controlling for demographic and clinical characteristics. The severity of PTSD symptoms and the extent of early traumatic experiences did not have any significant effect on either stage of self-stigma. In a sample of alcohol-dependent persons, Stolzenburg et al. [31] found childhood trauma to be significantly associated with the self-stigma stages *agree*, *apply* and *harm*. The lack of effect may be due to the methodological shortcoming of the reduced variance in PTSD symptoms and early traumatic experiences, since both were inclusion criteria for the study. Our results suggested that *agreeing* with

negative stereotypes was solely predicted by younger age, *applying* these stereotypes to oneself was predicted by younger age, higher depression, and SUD severity, whereas suffering from the application of the stereotypes (*harm*) was solely predicted by depression.

Being *aware* of negative stereotypes was not significantly predicted by any of the examined variables. Although depression was positively associated with the *aware* scale in the univariate correlation, this relationship did not reach statistical significance in the final model.

Although results on the association between age and self-stigma in other mental disorders are inconsistent, there seems to be a tendency towards younger age being related to higher internalized stigma [8]. In our sample, being *aware* and *agreeing* with stereotypes was predicted by younger age. In contrast to other studies where this relationship was found [53], our sample had a relatively high mean age (M 40.9). Thus, even in the adult population, younger age seems to be a risk factor for internalizing negative stereotypes towards alcohol and drug use. Based on the results of a large European study, Krajewski et al.

[53, 54] hypothesized an inverse u-shaped function between age and self-stigma.

Results on the predictive value of further demographic measures on stigma are also inconsistent [24]. While lower educational level was associated with higher stigma in patients with depression [55], higher education was found to be a risk factor for self-stigma in patients with SUD [56]. In our sample, no significant association was found for educational level.

Depressiveness was the strongest predictor of *apply* and *harm*, consistent with the finding of a previous research in individuals with SUD or PTSD (e.g., [16, 24, 57]). Core features of depression are low self-esteem and diminished hope [58]; thus, as described by Corrigan et al. [6], “one of the difficulties (...) is sorting out the effects of self-stigma from those of depression because symptoms of depression fundamentally lead to diminished self-esteem”. Therefore, to distinguish the effects of depression from those of self-stigma on self-esteem and hope, studies investigating all 3 constructs would be needed.

Prior research on self-stigma in individuals with traumatic experiences was mostly carried out in military samples. Patients with PTSD showed significantly higher internalized stigma scores than those without PTSD [33]. Self-stigma related to seeking treatment and the perception of being stigmatized by others correlated positively with depression, PTSD and functional impairment, while the latter was also positively correlated with alcohol problems [16]. These results show the potential impact of PTSD on self-stigma, although such effects were not observed in our study after controlling for depressive symptoms. Severity of PTSD symptoms, but also emotional abuse and neglect in childhood, were positively associated with self-stigma (*apply* and *harm*) in the univariate analyses, but when we controlled for depression, these associations were no longer observed. Depression may thus mediate the effect between PTSD symptoms/CAN and self-stigma, that is, the risk to develop self-stigmatizing beliefs might be increased only when people with CAN and PTSD experience depressive symptoms. A mediating effect of depression for *harm* was shown in a recent study [31]. Another explanation for the missing relationship between PTSD and self-stigma in our multivariate models might be that our focus was on PTSD severity but not PTSD diagnosis per se. All patients in our sample were affected by PTSD, which might have reduced the explanatory value of this variable. The meaning of traumatic experiences and its consequences for stigma

should be further investigated in future studies in order to understand the complexity of conditions and maintenance of maladaptive beliefs.

One limitation of our study was the cross-sectional design, which limits our ability to draw causal inferences. This is of particular relevance for the association between depression and self-stigma. Depressive symptoms might lead to a higher self-stigma, as well as vice versa, and longitudinal studies are needed to examine the nature of the relationship between these variables.

A second limitation is a potential selection bias due to our study sample. All participants were recruited for an RCT, which investigated the effectiveness of a cognitive behavioural treatment for patients with PTSD and SUD. Nearly all women have had prior treatment or were currently in treatment. Therefore, all participants in this study were, to a certain extent, motivated for treatment. Due to the results on the negative association of self-stigma and treatment seeking behaviour, it could be argued that our sample could be biased regarding self-stigma and could have expressed lower stigmatizing beliefs than patients with SUD and PTSD not seeking treatment. However, the mean scores of the SSAD scales were rather high in our sample. The subgroup of women who had drug abuse or dependence was heterogeneous regarding the used substance, including legal and illegal drugs with varying degrees of social acceptance (Table 1). People with intravenous drug use within the past 4 weeks were excluded from the study. Thus, results on this subgroup are difficult to interpret and limited regarding generalizability.

Finally, the SSAD was constructed and validated for people with alcohol problems. For the purpose of our study, we had to adapt the wording of many items, but the proposed progressive model of self-stigmatization was largely confirmed in our sample, suggesting its validity also for patients with other SUD problems. While in this study we investigated SUD-related stigmatization in the specific group of SUD patients with comorbid PTSD, future research should consider to widen this focus and develop instruments that cover potential effects of both sources of stigmatization, SUD and PTSD.

In summary, the progressive model of self-stigma could be confirmed in our sample of women with SUD and comorbid PTSD. Furthermore, our findings suggest that age, SUD severity and especially depression could be important variables when trying to identify patients with SUD and PTSD at increased risk for self-stigmatizing attitudes and the psychological consequences related to them. Being aware of the mechanisms and processes of

self-stigma in this specific severely affected population can help clinicians to address these maladaptive beliefs early on in therapy. Clinicians should give attention to patients' attitudes towards alcohol-and drug-related stereotypes, especially in young women with high depressiveness. Interventions to reduce self-stigma should be developed and investigated in these highly impaired SUD patients.

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Disclosure Statement

The authors declare that there are no potential conflicts of interest with respect to the research, authorship, or publication of this article.

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Authors Contribution

Conceptualization: H.M., P.H., S.S., G.S. and I.S.; data curation: J.G., A.L., P.H., Y.P. and I.S.; formal analysis: H.M. and I.S.; funding acquisition: M.D., N.S., B.S., T.H. and I.S.; investigation: H.M. and I.S.; methodology: H.M., Y.P. and I.S.; project administration: H.M., M.D., N.S., B.S., T.H., J.G., A.L., P.H. and I.S.; resources: M.D., N.S., B.S., T.H. and I.S.; supervision: S.S., G.S. and I.S.; validation: H.M. and I.S.; visualization: H.M. and I.S.; writing – original draft: H.M. and I.S.; writing – review and editing: all authors.

Appendix

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