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Substance use, recovery, and linguistics: The impact of word choice on explicit and implicit bias

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ABSTRACT

Background: The general public, treatment professionals, and healthcare professionals have been found to exhibit an explicit negative bias towards substance use and individuals with a substance use disorder (SUD). Terms such as "substance abuser" and "opioid addict" have shown to elicit greater negative explicit bias. However, other common terms have yet to be empirically studied.

Methods: 1,288 participants were recruited from ResearchMatch. Participants were assigned into one of seven groups with different hypothesized stigmatizing and non-stigmatizing terms. Participants completed a Go/No Association Task (GNAT) and vignette-based social distance scale. Repeated-measures ANOVAs were used to analyze the GNAT results, and one-way ANOVAs were used to analyze vignette results.

Results: The terms "substance abuser", "addict", "alcoholic", and "opioid addict", were strongly associated with the negative and significantly different from the positive counterterms. "Relapse" and "Recurrence of Use" were strongly associated with the negative; however, the strength of the "recurrence of use" positive association was higher and significantly different from the "relapse" positive association. "Pharmacotherapy" was strongly associated with the positive and significantly different than "medication-assisted treatment". Both "medication-assisted recovery" and "long-term recovery" were strongly associated with the positive, and significantly different from the negative association.

Conclusions: Results support calls to cease use of the terms "addict", "alcoholic", "opioid addict", and "substance abuser". Additionally, it is suggested that "recurrence of use" and "pharmacotherapy" be used for their overall positive benefits. Both "medication-assisted recovery" and "long-term recovery" are positive terms and can be used when applicable without promoting stigma.

1. Introduction

Substance use disorder (SUD) is a major public health concern in the United States, with over 21 million individuals aged 12 and older having a diagnosable SUD, yet fewer than 3.8 million of these individuals receive treatment each year (Center for Behavioral Health Statistics and Quality, 2017). An estimated 28% of the individuals who do not receive treatment but perceive a need for treatment, report reasons related to stigma for not accessing or engaging in care (Center for Behavioral Health Statistics and Quality, 2017). In addition to the impact on help-seeking behaviors, stigma is also thought to impact the quality of healthcare services delivered by medical professionals (van Boekel et al., 2013), as well as the services suggested in a treatment plan by substance use treatment professionals (Kelly and Westerhoff, 2010). Thus, stigma presents as a formidable barrier to engaging with SUD treatment (Stringer and Baker, 2015; Clement et al., 2015; Stone, 2015), the recommendation of SUD treatment services (Kelly and Westerhoff, 2010), and the quality of services delivered once engaged (van Boekel et al., 2013).

The general public also has been found to hold stigmatizing perceptions of individuals with substance use and mental health disorders. McGinty et al., (2015) and Barry et al. (2014) found that public support of policy initiatives, funding levels, and desired social distance were impacted when describing behavioral health disorders as either treated or untreated. Not surprising then, that of the specific reasons related to the stigma that individuals do not seek out treatment annually, the negative perception of neighbors and co-workers is often given (Center for Behavioral Health Statistics and Quality, 2017). Thus, stigma interacts with three different stakeholder groups in the substance use arena: 1) those individuals with substance use concerns or disorders, 2)

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treatment and healthcare professionals, and 3) the general public.

Stigma is a multidimensional construct that can manifest in myriad ways (Goffman, 1963). Link and Phelan (2001) define stigma in such a way that involves two primary components - a label and a stereotype. The label (e.g., addict) links the person to a set of undesirable characteristics that work to form the stereotype (i.e., beliefs held about a group of people with a substance use disorder). When people link a certain label to a person, and they believe the stereotype, they react negatively to the person which in turn leads them to place a more social distance from the person, engage in discriminatory ways, or support potentially harmful activities to the stereotyped individual.

Previous research has identified commonly used labels that have been used to stereotype individuals with a SUD. For instance, substance abuser has been found to invoke negative explicit behaviors in treatment professionals (Kelly and Westerhoff, 2010), while "opioid addict" elicited greater explicit bias among those in the general population (Goodyear et al., 2018). Positive counter-terms were also examined, with "person with a substance use disorder" and "person with an opioid use disorder" eliciting more positive explicit bias. Other terms have been put forth as likely to elicit stigma, though they have yet to be empirically explored. These terms, such as "clean", "dirty", "medication-assisted treatment", "medication-assisted recovery", "untreated", and "alcoholic", also have the potential to invoke greater explicit bias (Kelly et al., 2016; Kelly, 2004; Wakeman, 2017).

Stigma is not only experienced and exerted through explicit mechanisms; implicit bias mechanisms are also present. Implicit bias is rooted in the assumption that subconscious associations exist towards the characteristics of individuals (e.g., race (Greenwald et al., 1998), body type (Buhlmann et al., 2011), gender (Lemm and Banaji, 1999), and sexual orientation (Morrison and Morrison, 2008). These characteristics can also be seen as the same characteristics that make up the stereotype described by Link and Phelan (2001). Within the substance use field, implicit bias remains a largely unexplored concept. Two pilot studies completed by the authors (Ashford et al., 2018a, 2018b), pioneered the use of the Go/No-Go Association Task (GNAT; Nosek and Banaji, 2001) in an effort to capture the negative and positive implicit associations with the term "substance abuser" and "addict". Results mirrored the previous explicit bias work, with both "substance abuser" and "addict" being strongly associated with the negative, and the positive term "person with a substance use disorder" being less associated with the negative and significantly different than the negative terms.

The use of public awareness and educational campaigns has been found to reduce bias related to mental health (Clement et al., 2013), suicide (Dumesnil and Verger, 2009), and SUD (Livingston et al., 2012). For substance use bias interventions, Luty et al., (2008) found that depicting individuals with an opioid use disorder or alcohol use disorder in positive ways resulted in decreased social stigma among the general public. Though public awareness and educational interventions can have a positive effect on stigma, it is likely they can be improved through the modification of language used within the campaign. Though currently not empirically validated, campaigns that aim to reduce SUD social stigma through positive depictions of humanity may be of increased benefit from showing individuals as having an alcohol use disorder, rather than alcoholism. Thus, identifying the language that should be targeted for change is then an important next step.

Building upon the work of the methodology in the two previously completed pilot studies on implicit bias (Authors, In Press; Authors, In Review), the objectives of the current study are to capture the explicit and implicit bias elicited in commonly used negative (substance abuse, addict, alcoholic, opioid addict, relapse, medication assisted-treatment, and medication-assisted recovery) and positive terms (person with a substance use disorder, person with an alcohol use disorder, person with an opioid use disorder, recurrence of use, pharmacotherapy, and long-term recovery) related to substance use, misuse, and disorders among members of the general public.

Table 1
Participant demographic characteristics.

	(N = 1288)	
	N	(%)
Age *(years)*		
M = 43.18, SD = 16.16		
Gender		
Male	312	(24.2)
Female	976	(75.8)
Race / Ethnicity		
White	1144	(88.8)
Other	144	(11.2)
Marital Status		
Single	609	(47.3)
Married / Domestic Partnership	679	(52.7)
Education Level		
Associates Degree or less	286	(22.2)
4-year degree	480	(37.3)
Post-graduate degree	522	(40.5)
Employment Status		
Employed	837	(65.0)
Unemployed	451	(35.0)
Household Income		
Less than $10,000	65	(5.0)
$10-29,999	165	(12.8)
$30-49,999	233	(18.1)
Over $50,000	825	(64.1)

2. Methods

2.1. Participants

A total of 1,288 participants enrolled in the study. Participants were mostly female (75.8%), white (88.8%), and had a mean age of 43.18 years (SD = 16.16 years). Most participants were married (52.7%), had post-graduate degrees (40.5%), were employed (65.0%), and had a household income of over $50,000 (64.1%). Full demographic characteristics are available in Table 1. Of the 1288 participants enrolled, 1126 completed all portions of the study (demographics, vignette and social distance, GNAT); 162 participants completed all portions of the study except the vignette and social distance portion. Participants that completed all portions of the study and those that did not complete all portions of the study did not differ on any demographic variable.

2.2. Procedure

Following institutional review board from the lead author's university, participants were recruited through ResearchMatch, a national health volunteer registry that was created by several academic institutions and supported by the U.S. National Institutes of Health as part of the Clinical Translational Science Award (CTSA) program. ResearchMatch has a large population of volunteers who have consented to be contacted by researchers about research studies that they are eligible for. An initial interest email was sent to 98,000 random volunteers from the ResearchMatch registry. Volunteers that elected to receive more information about the study (N = 7500) were then provided a separate email that described the study in detail and provided a URL link to the informed consent. Participants that consented to participate in the study were sequentially placed into 7 groups representing each word pair option of the study (e.g., substance abuser and the person with a substance use disorder, addict and person with a substance use disorder, etc.). Each group of participants then completed a Go/No Go Association Task, vignette-based social distance measure, and provided basic demographics in a randomized order. In addition to the randomized order of study tasks, each participant was randomly assigned to one of three vignettes within their group; a control vignette, a stigmatizing word vignette, and a non-stigmatizing word vignette. All

data were managed and collected through Qualtrics in an anonymous protocol. No IP addresses or geolocation information was collected. Following completion of all study items, participants could elect to complete a second survey, not tied in any way to the first, in which they provided their contact info to be eligible for a $100 department store gift card.

2.2.1. Go/No Go association task

Administration of the Go/No Go Association Task (GNAT) began with four practice blocks to introduce each participant to the task, asking the participant to classify the objective categories (e.g., substance abuser, addict, etc.) with no evaluative category used, and to classify the evaluative categories (e.g., good or bad) with no objective category used. Following the practice blocks, each participant completed four GNATs, consisting of two blocks each (practice and test). Each block appeared in partially randomized order, measuring automatic attitudes towards the hypothesized stigmatizing term, as well as measuring automatic attitudes towards the hypothesized non-stigmatizing term. Following the recommendations of Nosek and Banaji (2001), the response deadline for the practice blocks was 1000 ms, and the test blocks used response deadlines of 750 ms first and 600 ms second. Each practice block consisted of 20 practice trials, while test blocks began with 16 practice trials, followed by 60 test trials that were used in the final analysis.

2.3. Measures

2.3.1. Vignettes

Three vignettes were used for each group of participants in the study, for a total of 21 vignettes across the entire study. Examples of vignettes are available in Table 2.

For each participant group, the first vignette served as a control and did not portray a person with any language related to substance use, treatment, or recovery. The second vignette for all groups portrayed the same person (e.g., the white female, Mary), but included hypothesized negative terminology (i.e., stigmatizing terms: addict, alcoholic, relapse, etc.) related to substance use, treatment, or recovery. The third vignette for all groups portrayed the same person but included hypothesized positive terminology (i.e., non-stigmatizing terms: a person with a substance use disorder, recurrence of use, etc.). After reading the randomly assigned vignettes, participants were asked to complete the Bogardus Social Distance Scale (BSDS) in relation to the person described in the assigned vignette.

2.3.2. GNAT

The GNAT (Nosek and Banaji, 2001) is an implicit association measure that is related to the Implicit Association Test (IAT; Greenwald et al., 1998). The GNAT involves participants classifying objects (i.e., words) into subordinate categories and then examining both the speed (response time) and correctness of the classification (signal detection theory (SDT; Green and Swets, 1966)). The GNAT provides a d-prime score (from the evaluation of response time and correct responses), which is a standardized metric of the strength of implicit association. This is an important difference from the IAT and the primary reason for the election of the use of the GNAT in the current study. The IAT requires a comparison of two categories in the scoring procedure, whereas the GNAT's d-prime scoring procedure allows for analysis and scoring of only one category or multiple categories, via the standardized d-prime.

The GNATs administered in this study were a modified version of the GNAT designed by Nosek and Banaji (2001) for the Millisecond Inquisit web application. The GNAT requires a participant to classify two objective categories (e.g., "Substance Abuser" and "Person with a Substance Use Disorder") with two evaluative categories (e.g., "Good" and "Bad") via a computer software application. For the current study, 7 different GNATs were used; 1) *substance abuser and person with a substance use disorder*, 2) *addict and person with a substance use disorder*, 3) *alcoholic and person with an alcohol use disorder*, 4) *relapse and recurrence of use*, 5) *opioid addict and person with an opioid use disorder*, 6) *medication-assisted treatment and pharmacotherapy*, and 7) *medication-assisted recovery and long-term recovery*.

The GNATs in the current study were scored using the d-prime (d') method described by Nosek and Banaji (2001), originally defined by Green and Swets (1966). This method calculates sensitivity, indexed by d', by first converting the proportion of correct "go" responses for signal items and incorrect "go" responses for noise items into z-scores and then calculating the difference between the z-score values. Of importance is that d' values of 0 or below (negative) indicate that participants were either not performing the task as instructed or were unable to identify signal items from noise items correctly. As such, test blocks with d' scores of 0 or below are removed from the final analysis. This resulted in less than 8% of participants being excluded from the final analysis in the current study. Participants not included in the final GNAT analysis did not differ from those that were included on any demographic variable.

2.3.3. Bogardus social distance scale

The Bogardus Social Distance Scale (BSDS) (Bogardus, 1925, 1933) is used to assess the comfort level of participants in response to individuals that differ from them across a predetermined set of characteristics (i.e., race, ethnicity, etc.). The BSDS was originally developed to assess comfort towards individuals of different ethnicity and racial identities; however, it has also been used in recent years to assess comfort of doctors towards nurses (Pearlin and Rosenberg, 1962), among college students with and without intellectual disabilities (Dent, 1966), and of nurses towards patients who are terminally ill (Kalish, 1966). Most recently, we used the BSDS in a pilot study prior to completing the current study, to assess the comfort level of the general public towards individuals with a substance use disorder - using both stigmatizing and non-stigmatizing labels (e.g., substance abuser or person with a substance use disorder) (Authors, In Review).

The original BSDS studies conducted by Bogardus in 1925 have been

Table 2
Sample vignette randomly assigned to participants.

Group	Vignette
Control	Mary is a white woman who has completed college. She has experienced the usual ups and downs of life, but managed to get through the challenges she has faced. Mary lives with her family and enjoys spending time outdoors and taking part in various activities in her community. She works at a local store.
Substance Abuser	Mary is a white woman who has completed college. She is also a substance abuser but has managed to get through the challenges she has faced. As a recovering addict, she lives with her family and enjoys spending time outdoors and taking part in various activities in her community. She also works at a local store.
Substance Use Disorder	Mary is a white woman who has completed college. She also has a substance use disorder but has managed to get through the challenges she has faced. As a woman in recovery, she lives with her family and enjoys spending time outdoors and taking part in various activities in her community. She also works at a local store.

Table 3
Within-subjects ANOVA word choice effects on positive and negative association d-prime scores.

Group: NW - PW	NW + Good MS (SD)	NW + Bad MS (SD)	PW + Good MS (SD)	PW + Bad MS (SD)	df	Error	F	p	N_p^2
SA – SUD (N = 153)	1.222 (0.932)	2.169 (1.181)	1.337 (0.985)	1.862 (1.080)	2.703	410.833	55.509	< .001	.268
Addict – SUD (N = 146)	1.584 (0.956)	2.395 (1.239)	1.584 (0.875)	2.069 (0.767)	2.478	359.267	41.419	< .001	.222
Alcoholic – AUD (N = 216)	1.548 (1.007)	2.436 (1.446)	1.624 (0.954)	2.031 (0.919)	1.940	417.021	60.569	< .001	.220
Relapse – ROU (N = 178)	0.900 (0.512)	1.940 (1.074)	1.426 (0.928)	2.016 (0.629)	2.435	431.011	117.020	< .001	.398
OA – OUD (N = 211)	1.681 (0.855)	2.413 (1.070)	1.740 (0.896)	2.218 (0.984)	2.759	579.384	65.372	< .001	.237
MAT – PT (N = 195)	1.701 (0.918)	1.775 (0.834)	1.990 (1.166)	1.770 (0.951)	2.302	446.496	9.166	< .001	.045
MAR – LTR (N = 189)	1.413 (0.672)	1.145 (0.673)	1.264 (0.555)	1.024 (0.581)	2.863	538.172	46.045	< .001	.197

SA = Substance Abuser, SUD = Person with a Substance Use Disorder, AUD = Person with an Alcohol Use Disorder, ROU = Recurrence of Use, OA = Opioid Addict, OUD = Person with an Opioid Use Disorder, MAT = Medication-Assisted Treatment, PT = Pharmacotherapy, MAR = Medication-Assisted Recovery, LTR = Long-term Recovery, NW = Hypothesized Negative Word, PW = Hypothesized Positive Word, MS = d-prime Mean Score, SD = d-prime Standard Deviation, df = Degree of Freedom, N_p^2 = partial eta squared.

replicated multiple times in the last 70 years, and though criticism exists questioning the reliability and validity of the measure (Krech and Crutchfield, 1947; Sartain and Bell, 1947), the replication studies have provided evidence of the measure as a reliable and valid measure (Hartley and Hartley, 1952; Newcomb, 1950; Sherif and Sherif, 1956).

The BSDS asks participants to answer 7 questions in an effort to measure the desire of the participant to allow the described person to: a) marry into immediate family; b) exist within immediate social circle; c) be a neighbor; d) be a co-worker; e) be a citizen in participant's country; f) be a visitor to participant's country; and g) comfort of participant to exclude the described person from participant's country. The BSDS was administered following the reading of a randomly assigned vignette describing an individual.

BSDS results in the current study were scored cumulatively, with "yes" responses for questions 1–6 given one-point ("no" responses given negative one-point), and "yes" responses to question 7 given negative one-point ("no" responses given one-point). Higher participant scores on the BSDS correlate with a greater willingness to have less social distance between the participant and the described individual in the assigned vignette.

2.4. Data analysis

All data analysis was completed via IBM SPSS V.23. Statistical significance for all tests was defined *a priori* at 0.05. Analysis of the BSDS scores was completed for each participant group using one-way analysis of variance (ANOVA) tests with social distance as the DV and assigned vignette as the IV. Analysis of the GNAT d' prime scores was completed for each participant group using a within-subjects repeated measures ANOVA with four levels of the DV (term + evaluative category (good/bad)) measured at the one-time interval. Each level of the DV was measured via the GNAT, with each level representing either the hypothesized stigmatizing term evaluated towards good and bad or the hypothesized non-stigmatizing word evaluated towards good and bad.

3. Results

3.1. Social distance

Total social distance scores were not significant for the *substance abuser* and *person with a substance use disorder* participant group (F(2,125) = 1.286, p = .280), the *alcoholic* and *person with an alcohol use disorder* participant group (F(2,197) = 1.001, p = 0.369), or the *medication-assisted recovery* and *long-term recovery* group (F(2, 173) = 1.501, p = 0.226).

Scores for the *addict* and *person with substance use disorder* participant group were significant; F(2, 102) = 7.384, p = 0.001. Post-hoc tests using the Sidak correction method found a significant difference between the control and *addict* group (p = 0.001), with the *addict* group having, on average, a 1.27 lower total social distance score. No other post-hoc comparisons were significant.

Scores for the *relapse* and *recurrence of use* participant group were also significant; F(2, 166) = 13.686, p < .001. Post-hoc tests using the Sidak correction method found a significant difference between both the control and *relapse* group (p < .001) and the control and *recurrence of use* group (p = .001). On average, the *relapse* group had a 1.79 lower total social distance score than the control group; and the *recurrence of use* group had a 1.33 lower total social distance score than the control group. No other post-hoc comparisons were significant.

Scores for the *opioid addict* and *person with an opioid use disorder* participant group were also significant; F(2, 178) = 5.559, p = .005. Post-hoc tests using the Sidak correction method found a significant difference between both the control and *opioid addict* group (p = 0.038), and the control and *person with an opioid use disorder* group (p = 0.007). On average, the *opioid addict* group had a 0.88 lower total social distance score than the control group; and the *person with an opioid use disorder* group had a 1.15 lower total social distance score than the control group. No other post-hoc comparisons were significant.

Scores for the *medication-assisted treatment* and *pharmacotherapy* participant group were also significant; F(2, 173) = 4.917, p = 0.008. Post-hoc tests using the Sidak correction method found a significant difference between both the control and *medication-assisted treatment* group (p = 0.024) and the control and *pharmacotherapy* group (p = 0.019). On average, the *medication-assisted treatment* group had a 1.28 lower total social distance score than the control group; and the *pharmacotherapy* group had a 1.37 lower total social distance score than the control group. No other post-hoc comparisons were significant.

3.2. Implicit associations

For all participant groups, within-subjects repeated measures ANOVA tests, using Greenhouse-Geisser results due to the violation of sphericity for all groups, found significant differences (all groups, p < .001). Full ANOVA results are available in Table 3.

Post-hoc tests (full results available in Tables 3–9) were completed for all pairwise comparisons using the Sidak correction method. For the *substance abuser* and *person with substance use disorder* group, "substance abuser" + bad (d' = 2.169) was the strongest association, and significantly different from "substance abuser" + good (d' = 1.222, p < 0.001), 'person with a substance use disorder" + good (d' = 1.337, p < 0.001) and "person with a substance use disorder" + bad (d' = 1.862, p = 0.007). (*See* Table 4)

For the *addict* and *person with a substance use disorder* group, "addict" + bad (d' = 2.395) was the strongest association, and significantly different from "addict" + good (d' = 1.584, p < 0.001), "person with a substance use disorder" + good (d' = 1.584, p < 0.001), and "person with a substance use disorder" + bad (d' = 2.069, p = 0.001). *(See* Table 5*)*

Table 4
Within-subjects pairwise comparisons of association d-prime scores: Substance Abuser and Person with a Substance Use Disorder.

(I) Word pair	(J) Word pair	MD (I-J)	SE	p[b]	95% CI[b]	
					LL	UL
SA + Good	SA + Bad	−.947[a]	.087	.000	−1.180	−.715
	SUD + Good	−.115	.064	.375	−.287	.056
	SUD + Bad	−.641[a]	.094	.000	−.893	−.389
SA + Bad	SA + Good	.947[a]	.087	.000	.715	1.180
	SUD + Good	.832[a]	.080	.000	.619	1.045
	SUD + Bad	.306[a]	.093	.007	.060	.553
SUD + Good	SA + Good	.115	.064	.375	−.056	.287
	SA + Bad	−.832[a]	.080	.000	−1.045	−.619
	SUD + Bad	−.525[a]	.085	.000	−.752	−.298
SUD + Bad	SA + Good	.641[a]	.094	.000	.389	.893
	SA + Bad	−.306[a]	.093	.007	−.553	−.060
	SUD + Good	.525[a]	.085	.000	.298	.752

SA = Substance Abuser, SUD = Person with a Substance Use Disorder, MD = Mean difference, SE = Standard Error, LL = Lower Limit, UL = Upper Limit, CI = Confidence Interval.
[a] The mean difference is significant at the 0.05 level.
[b] Adjustment for multiple comparisons: Sidak.

Table 5
Within-subjects pairwise comparisons of association d-prime scores: Addict and Person with a Substance Use Disorder.

(I) Word Pair	(J) Word Pair	MD (I-J)	SE	p[b]	95% CI[b]	
					LL	UL
Addict + Good	Addict + Bad	−.811[a]	.106	.000	−1.094	−.528
	SUD + Good	−.001	.082	1.000	−.219	.218
	SUD + Bad	−.485[a]	.076	.000	−.688	−.282
Addict + Bad	Addict + Good	.811[a]	.106	.000	.528	1.094
	SUD + Good	.810[a]	.102	.000	.538	1.082
	SUD + Bad	.326[a]	.083	.001	.104	.548
SUD + Good	Addict + Good	.001	.082	1.000	−.218	.219
	Addict + Bad	−.810[a]	.102	.000	−1.082	−.538
	SUD + Bad	−.484[a]	.068	.000	−.665	−.304
SUD + Bad	Addict + Good	.485[a]	.076	.000	.282	.688
	Addict + Bad	−.326[a]	.083	.001	−.548	−.104
	SUD + Good	.484[a]	.068	.000	.304	.665

SUD = Person with a Substance Use Disorder, MD = Mean difference, SE = Standard Error, LL = Lower Limit, UL = Upper Limit, CI = Confidence Interval.
[a] The mean difference is significant at the 0.05 level.
[b] Adjustment for multiple comparisons: Sidak.

For the *alcoholic* and *person with an alcohol use disorder group*, "alcoholic" + bad (d' = 2.436) was the strongest association, and significantly different from "alcoholic" + good (d' = 1.548, $p < 0.001$), "person with an alcohol use disorder" + good (d' = 1.624, $p < 0.001$), and "person with an alcohol use disorder" + bad (d' = 2.031, $p < 0.001$). (*See* Table 6)

For the *relapse* and *recurrence of use* group, both "relapse" + bad (d' = 1.940) and "recurrence of use" + bad (d' = 2.016) were the strongest associations and were not significantly different from each other ($p = 0.833$). Additionally, "relapse" + bad and "recurrence of use + bad were significantly different than "relapse" + good (d' = 0.900, $p < .001$), and "recurrence of use" + good (d' = 1.426, $p < 0.001$). Of note is that "recurrence of use" + good, though not the strongest association overall, was significantly different than "relapse" + good ($p < 0.001$). (*See* Table 7)

For the *opioid addict* and *person with an opioid use disorder* group, "opioid addict" + bad (d' = 2.413) was the strongest association, and significantly different from "opioid addict" + good (d' = 1.681, $p < 0.001$), "person with an opioid use disorder" + good (d' = 1.740, $p < 0.001$), and "person with an opioid use disorder" + bad (d' = 2.218, $p = 0.010$). (*See* Table 8)

Table 6
Within-subjects pairwise comparisons of association d-prime scores: Alcoholic and Person with an Alcohol Use Disorder.

(I) Word Pair	(J) Word Pair	MD (I-J)	SE	p[b]	95% CI[b]	
					LL	UL
Alcoholic + Good	Alcoholic + Bad	−.888[a]	.093	.000	−1.136	−.641
	AUD + Good	−.076	.053	.620	−.217	.064
	AUD + Bad	−.483[a]	.056	.000	−.633	−.334
Alcoholic + Bad	Alcoholic + Good	.888[a]	.093	.000	.641	1.136
	AUD + Good	.812[a]	.094	.000	.562	1.062
	AUD + Bad	.405[a]	.088	.000	.172	.638
AUD + Good	Alcoholic + Good	.076	.053	.620	−.064	.217
	Alcoholic + Bad	−.812[a]	.094	.000	−1.062	−.562
	AUD + Bad	−.407[a]	.046	.000	−.530	−.284
AUD + Bad	Alcoholic + Good	.483[a]	.056	.000	.334	.633
	Alcoholic + Bad	−.405[a]	.088	.000	−.638	−.172
	AUD + Good	.407[a]	.046	.000	.284	.530

AUD = Person with an Alcohol Use Disorder, MD = Mean difference, SE = Standard Error, LL = Lower Limit, UL = Upper Limit, CI = Confidence Interval.
[a] The mean difference is significant at the 0.05 level.
[b] Adjustment for multiple comparisons: Sidak.

Table 7
Within-subjects pairwise comparisons of association d-prime scores: Relapse and Recurrence of Use.

(I) Word Pair	(J) Word Pair	MD (I-J)	SE	p[b]	95% CI[b]	
					LL	UL
Relapse + Good	Relapse + Bad	−1.040[a]	.074	.000	−1.238	−.842
	ROU + Good	−.526[a]	.055	.000	−.672	−.380
	ROU + Bad	−1.116[a]	.047	.000	−1.242	−.990
Relapse + Bad	Relapse + Good	1.040[a]	.074	.000	.842	1.238
	ROU + Good	.514[a]	.081	.000	.298	.731
	ROU + Bad	−.076	.073	.883	−.271	.119
ROU + Good	Relapse + Good	.526[a]	.055	.000	.380	.672
	Relapse + Bad	−.514[a]	.081	.000	−.731	−.298
	ROU + Bad	−.590[a]	.069	.000	−.774	−.407
ROU + Bad	Relapse + Good	1.116[a]	.047	.000	.990	1.242
	Relapse + Bad	.076	.073	.883	−.119	.271
	ROU + Good	.590[a]	.069	.000	.407	.774

ROU = Recurrence of Use, MD = Mean difference, SE = Standard Error, LL = Lower Limit, UL = Upper Limit, CI = Confidence Interval.
[a] The mean difference is significant at the 0.05 level.
[b] Adjustment for multiple comparisons: Sidak.

For the *medication-assisted treatment* and *pharmacotherapy* group, "pharmacotherapy" + good (d' = 1.990) was the strongest association, and significantly different from "pharmacotherapy" + bad (d' = 1.770, $p = 0.015$), "medication-assisted treatment" + good (d' = 1.701, $p < 0.001$), and "medication-assisted treatment" + bad (d' = 1.775, $p = 0.009$). (*See* Table 9)

For the *medication-assisted recovery* and *long-term recovery* group, "medication-assisted recovery" + good (d' = 1.413) was the strongest association, and significantly different from "medication-assisted recovery" + bad (d' = 1.145, $p < 0.001$), "long-term recovery" + good (d' = 1.264, $p < 0.001$), and "long-term recovery" + bad (d' = 1.024, $p < 0.001$). Additionally, "long-term recovery" + good was significantly different from "long-term recovery" + bad ($p < .001$). (*See* Table 10)

4. Discussion

Results from the current study provide the first analysis of both implicit and explicit bias elicited from multiple hypothesized stigmatizing terms and hypothesized non-stigmatizing terms. Previous studies

Table 8
Within-subjects pairwise comparisons of association d-prime scores: Opioid Addict and Person with an Opioid Use Disorder.

(I) Word Pair	(J) Word Pair	MD (I-J)	SE	p[b]	95% CI[b]	
					LL	UL
OA + Good	OA + Bad	−.733[a]	.068	.000	−.914	−.552
	OUD + Good	−.060	.053	.830	−.199	.080
	OUD + Bad	−.537[a]	.061	.000	−.699	−.375
OA + Bad	OA + Good	.733[a]	.068	.000	.552	.914
	OUD + Good	.673[a]	.068	.000	.492	.854
	OUD + Bad	.196[a]	.061	.010	.033	.358
OUD + Good	OA + Good	.060	.053	.830	−.080	.199
	OA + Bad	−.673[a]	.068	.000	−.854	−.492
	OUD + Bad	−.477[a]	.064	.000	−.649	−.306
OUD + Bad	OA + Good	.537[a]	.061	.000	.375	.699
	OA + Bad	−.196[a]	.061	.010	−.358	−.033
	OUD + Good	.477[a]	.064	.000	.306	.649

OA = Opioid Addict, OUD = Person with an Opioid Use Disorder, MD = Mean difference, SE = Standard Error, LL = Lower Limit, UL = Upper Limit, CI = Confidence Interval.
[a] The mean difference is significant at the 0.05 level.
[b] Adjustment for multiple comparisons: Sidak.

Table 9
Within-subjects pairwise comparisons of association d-prime scores: Medication-Assisted Treatment and Pharmacotherapy.

(I) Word Pair	(J) Word Pair	MD (I-J)	SE	p[b]	95% CI[b]	
					LL	UL
MAT + Good	MAT + Bad	−.074	.050	.601	−.207	.059
	PT + Good	−.289[a]	.067	.000	−.466	−.112
	PT + bad	−.069	.042	.487	−.182	.044
MAT + Bad	MAT + Good	.074	.050	.601	−.059	.207
	PT + Good	−.215[a]	.067	.009	−.393	−.038
	PT + bad	.005	.047	1.000	−.120	.129
PT + Good	MAT + Good	.289[a]	.067	.000	.112	.466
	MAT + Bad	.215[a]	.067	.009	.038	.393
	PT + bad	.220[a]	.072	.015	.029	.411
PT + Bad	MAT + Good	.069	.042	.487	−.044	.182
	MAT + Bad	−.005	.047	1.000	−.129	.120
	PT + Good	−.220[a]	.072	.015	−.411	−.029

MAT = Medication-Assisted Treatment, PT = Pharmacotherapy, MD = Mean difference, SE = Standard Error, LL = Lower Limit, UL = Upper Limit, CI = Confidence Interval.
[a] The mean difference is significant at the 0.05 level.
[b] Adjustment for multiple comparisons: Sidak.

have found that greater explicit negative bias results from using terms such as “substance abuser” over terms such as “person with a substance use disorder” (Kelly and Westerhoff, 2010), as well as the term “opioid addict” over terms such as “person with an opioid use disorder” (Goodyear et al., 2018). Similar to these studies, the results here show that “substance abuser” and “opioid addict” are indeed mostly strongly associated with the negative, and significantly different from the positive counter terms “person with a substance use disorder” and “person with an opioid use disorder” respectively. While it has already been suggested in previous work that these negatively associated terms ceased being used, the current results provide further empirical evidence that the terms should indeed be removed from the lexicon and replaced with the positively associated terms.

Previous editorial publications have also theorized that terms such as “alcoholic”, “relapse”, “addict”, “medication-assisted treatment”, and “medication-assisted recovery” may also elicit negative bias and should potentially be replaced by less stigmatizing terms (Wakeman, 2017; Kelly et al., 2016; Kelly, 2004). Results from the current study have also validated a number of these previous theories, with “alcoholic”, “relapse”, and “addict”, all being most strongly associated with the negative. However, a few important distinctions should also be made.

Table 10
Within-subjects pairwise comparisons of association d-prime scores: Medication-Assisted Recovery and Long-term Recovery.

(I) Word Pair	(J) Word Pair	MD (I-J)	SE	p[b]	95% CI[b]	
					LL	UL
MAR + Good	MAR + Bad	.268[a]	.038	.000	.167	.369
	LTR + Good	.149[a]	.032	.000	.064	.234
	LTR + Bad	.389[a]	.037	.000	.291	.487
MAR + Bad	MAR + Good	−.268[a]	.038	.000	−.369	−.167
	LTR + Good	−.119[a]	.035	.005	−.212	−.026
	LTR + Bad	.121[a]	.033	.002	.032	.210
LTR + Good	MAR + Good	−.149[a]	.032	.000	−.234	−.064
	MAR + Bad	.119[a]	.035	.005	.026	.212
	LTR + Bad	.240[a]	.032	.000	.155	.325
LTR + Bad	MAR + Good	−.389[a]	.037	.000	−.487	−.291
	MAR + Bad	−.121[a]	.033	.002	−.210	−.032
	LTR + Good	−.240[a]	.032	.000	−.325	−.155

MAR = Medication-Assisted Recovery, LTR = Long-term Recovery, MD = Mean difference, SE = Standard Error, LL = Lower Limit, UL = Upper Limit, CI = Confidence Interval.
[a] The mean difference is significant at the 0.05 level.
[b] Adjustment for multiple comparisons: Sidak.

Only the terms “addict” and “alcoholic” were higher and significantly different than the hypothesized positive counter terms - “person with a substance use disorder” and “person with an alcohol use disorder” respectively; and suggest that using “person with a substance use disorder” and “person with an alcohol use disorder” could decrease elicited negative implicit bias. “Relapse” being associated with the negative was not significantly different than “recurrence of use” being associated with the negative, however, the strength of the “recurrence of use” association with the positive was higher and significantly different than that of the “relapse” positive association; this suggests that while both terms are negatively associated, there does exist potential benefit of using “recurrence of use”.

Interestingly, the association of “medication-assisted treatment” was not significantly different among the positive or negative. However, the association of “pharmacotherapy” to the positive was the strongest association, and significantly different from the positive association to “medication-assisted treatment”; while this does not support the notion that “medication-assisted treatment” is likely to elicit stronger negative implicit bias, it does suggest that using “pharmacotherapy” in its place is more likely to elicit stronger positive implicit bias. Similarly, “medication-assisted recovery” was associated with higher levels of positive bias and was significantly different than the positive association to “long-term recovery”. While this does seem to suggest that using the term “medication-assisted recovery” is likely to elicit stronger positive implicit bias than “long-term recovery”, the primary conclusion should be that “medication-assisted recovery” is not likely to elicit stronger negative implicit bias (and thus can be used without promoting stigma), and that both recovery terms (e.g., medication-assisted recovery” and “long-term recovery”) are in fact positively associated terms.

The current study sampled from the general public, and while additional study is needed on the levels of bias among individuals with a SUD and health care professionals, the results provide support for practical applications of language use in interventions designed to reduce bias and stigma among the general public. For example, public awareness campaigns designed for any channel of distribution (e.g., print, video, social media) should use the more positive variants discussed here. SUD Public awareness campaigns have been found to decrease social stigma among the general public (Luty et al., 2008), and it is likely that similar campaigns designed with language that elicits less negative bias will show improved results.

Results from the Bogardus Social Distance Scale provide initial evidence that an explicit bias effect is produced when using different labeling and identifying terms in text-based vignettes. However, the results do not support that explicit negative bias can be reduced by using hypothesized positive terms. Reviewing previous vignette-based explicit bias studies (Kelly and Westerhoff, 2010; McGinty et al., 2015; Goodyear et al., 2018), we believe that our current sample size, though supported through a power analysis to capture medium effect sizes, was ultimately too small to capture any significant differences between the positive and negative terms. It is plausible that any term that is associated with substance use disorder invokes an overall negative affect, supported by many of the vignette results having lower total social distance and significant differences compared to the control, but not between substance use related terms. It is also possible that the use of the Bogardus Social Distance Scale was too broad and confounded the results and our initial power analysis; other more defined measures of explicit bias towards addiction, such as the Perceived Stigma and Addiction Scale (PSAS; Luoma et al., 2010), could have proved a better choice. Overall, while the social distance scales do not support using the hypothesized positive terms over the hypothesized negative terms, they do suggest that any language used to describe substance use and related topics can elicit stronger negative explicit bias - including hypothesized negative terms.

4.1. Limitations

Though the sampling and recruitment methodology from ResearchMatch provided certain strengths to the current study, it also resulted in an oversampling of female and white participants. This is a known limitation of the volunteer participant pool enrolled at ResearchMatch, and future study should strive to recruit a truly representative sample. Additionally, the use of the Bogardus Social Distance Scale should be avoided in a future study as it is likely too broad to capture explicit biases related to addiction accurately. Measures such as the Perceived Stigma of Addiction Scale are likely better options to capture the construct. A recently published study (Goodyear et al., 2018) also found that the portrayal of gender in vignettes can affect reported biases, thus suggesting that our use of only the female gender in all vignettes may have confounded the explicit bias results.

4.2. Future directions

Future research into the domain of language and stigma, as it pertains to the substance use and recovery communities, should continue to explore positive counter-terms. While two of the results from the current study were overtly positive, the remaining positive terms were simply less negative. While this is an improvement, it suggests that the field must continue to evaluate its language and find better replacements. Additionally, previous research has suggested that health professionals may experience greater levels of biases, and the terms studied here should be further studied with samples drawn from those employed in the health professions. Future exploration of the ability to predict future behaviors (e.g., policy support, funding support, treatment recommendations, success in treatment) from levels of implicit and explicit bias may also prove useful. Though trending evidence suggests that at the public health and clinical level, negative terms should not be used, more research is needed specific to policymakers, organizations, and criminal justice professionals.

While language choice can be used to modify the elicited biases, it is also possible that the perception of language can be modified through other interventions. Theories such as priming and language reclamation should be applied to linguistics research in the substance use domain, attempting to find interventions or practices that can help reduce negative bias or improve positive bias.

Finally, all of the proposed language as perceived by individuals in recovery is also a critical area of exploration. Self-identifying as an "addict" or "alcoholic", done primarily in mutual-aid programs such as Alcoholics Anonymous, is used as an act of catharsis (Goffman, 1963; McIntosh and McKeganey, 2001; Hughes, 2007), facilitating a type of identity reclamation, similar to other marginalized groups who have reclaimed stigmatizing labels as an act of social empowerment (Gaucher et al., 2015). Promoting language change among this milieu of the recovery community will require additional evidence that this catharsis and identity reclamation is also achievable using more positive language.

5. Conclusion

The language used in describing substance use, substance use disorders, and other related topics affect the types of explicit and implicit bias that individuals experience. Terms such as "substance abuser", "addict", "opioid addict", "alcoholic", and "relapse" should be used sparingly, if at all. More positive terms can be used in their place, such as "person with a substance use disorder", "person with an opioid use disorder", "person with an alcohol use disorder", and "recurrence of use", and are likely to elicit stronger positive implicit bias and minimize any negative explicit or implicit bias. Additionally, though the term "medication-assisted treatment" is not likely to elicit stronger negative biases, replacing the term with "pharmacotherapy" elicits stronger positive implicit biases and may serve clients in more empowering ways. Finally, both "medication-assisted recovery" and "long-term recovery" elicit strong positive implicit associations and either can likely be used without promoting stigma when applicable.

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Conflict of interest

No conflict declared.

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