

Addiction onset and offset characteristics and public stigma toward people with common substance dependencies: A large national survey experiment

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ABSTRACT

Drug-related overdose deaths topped 100,000 between 2020 and 2021. Opioids and stimulants are implicated as the primary drivers of this public health crisis. Stigma remains one of the primary barriers to treatment and recovery from substance use disorders. However, little is known about how stigma varies across different substance types, whether individuals are actively using or in recovery, and medical versus recreational onset. We examined these questions using data from the 2021 Shatterproof Addiction Stigma Index, the only nationally representative data available on this topic. Respondents (N = 7051) completed a vignette-based survey experiment to assess public stigma (social distance, prejudice, competence, and causal attributions) toward people with alcohol, opioid (following a prescription pain or recreational use onset), heroin, or methamphetamine dependencies. Vignette characters were described as active users or in recovery. Adjusting for covariates (e.g., race, age, gender), prejudice and desire for social distance were highest toward heroin and methamphetamine, and lowest toward alcohol dependence. The perceived onset of the dependency affected stigma. Specifically, prescription opioids with a recreational onset were more stigmatized than those with a medical onset. Moreover, individuals depicted as being in recovery were less stigmatized than those depicted as active users. Recovery status had the largest impact on prejudice and social distance toward methamphetamine, relative to other conditions. The nature and magnitude of substance dependency stigma differs across substance types and onset and offset conditions. Reducing stigma will require tailored strategies that consider the multidimensional nature of stigma toward people with addiction.

1. Introduction

Substance dependency is a prevalent and urgent public health problem. Drug-involved overdose rates have steadily increased over the past 20 years (National Institute on Drug Abuse, 2019), surpassing 100,000 deaths between April 2020 to April 2021 (CDC, 2021). Opioids and stimulants are implicated as the primary drivers of this increase (National Institute on Drug Abuse, 2019). Although numerous effective evidence-based treatments for substance dependency exist (Ali et al., 2017; Chiesa & Serretti, 2014; Steinka-Fry et al., 2017), treatment seeking remains relatively low, particularly within the first years of dependency onset (Blanco et al., 2015; Kessler et al., 2001). Stigma has been identified as a key barrier to treatment and recovery (Crapanzano et al., 2019; Corrigan et al., 2017) given its robust relationship with negative attitudes toward treatment seeking and continued substance use (Hammarlund et al., 2018; Luoma, 2010; Mak et al., 2017).

Although a large body of work has examined stigma toward mental illness as a barrier to treatment (Arnaez et al., 2020; Corrigan et al., 2014; Fox et al., 2018), research on stigma toward substance dependency is less developed (Corrigan et al., 2017; Hammarlund et al., 2018) and has several important limitations. First, it has been primarily conducted with small, non-representative samples (Cunningham et al., 1993; Janulis et al., 2013; Phillips & Shaw, 2013), thus limiting its generalizability. Second, this research typically focuses on non-specified substances (e.g., “drug dependence”; e.g., Barry et al., 2014; Corrigan et al., 2006; Corrigan et al., 2009), or compares stigma toward one or two substance types (Link et al., 1999; Pescosolido et al., 2010; Perry et al., 2020), prohibiting comparisons between a wider range of substances or circumstances of use that could reveal important drivers of public attitudes and social exclusion. Finally, studies have rarely considered potentially important contextual factors, such as the perceived onset or offset of the condition, that could affect

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stigmatization (e.g., McGinty et al., 2015; Weiner et al., 1988).

We see at least two potential reasons why stigma might differ toward different substance types. First, substances perceived to cause threatening, uncontrolled, and unpredictable behavior that could lead to crime or violence against others are likely to evoke the largest stigmatizing responses (Corrigan et al., 2002; Martin et al., 2000). Second, legality may play a role in the degree to which a form of substance use is stigmatized due to the double stigma of substance use and criminality. Research comparing prescription versus illicit procurement of opioids finds that people engaging in illegal substance use elicit stronger negative reactions (Goodyear et al., 2018; Weeks & Stenstrom, 2020). As such, alcohol and prescription drugs, being legal to purchase and consume, may be less stigmatized than other substances.

Hypothesis 1. Vignettes depicting a person with heroin or methamphetamine dependencies will elicit more negative public attitudes than those depicting a person with prescription opioid or alcohol dependencies.

In addition to the type of substance, the contextual factors associated with substance use onset likely affect stigmatization. Indeed, the same condition can elicit different levels of stigma if the target is perceived as being responsible for developing the condition (e.g., Black et al., 2014; Hoyt et al., 2019; Pearl and Lebowitz, 2014; Weiner et al., 1988). Along these lines, prior research found that a person with opioid dependency was less stigmatized than one with alcohol dependency when onset was attributed to prescription of opioids by a physician for a legitimate medical condition (Perry et al., 2020). Moreover, as noted above, deviance and illegality may affect the degree to which recreational versus medical onset opioid dependency are stigmatized (Goodyear et al., 2018; Weeks and Stenstrom, 2020).

Hypothesis 2. Vignettes depicting a person with prescription opioid dependency with recreational onset will elicit more negative public attitudes than those depicting a person with prescription opioid dependency with medical onset.

Another potentially important determinant of stigma toward substance dependencies pertains to offset and treatability. According to a recent study, about three in four people with substance dependencies eventually enter treatment and successfully recover from addiction (Jones et al., 2020), and about 9% of all American adults are currently living in recovery after some form of substance dependency (Kelly et al., 2017). However, little is known about the degree to which people in recovery continue to be stigmatized. Two prior studies suggest that people engaging in active substance use are perceived more negatively by the public than those who have been treated for substance dependency and are no longer using substances (McGinty et al., 2015; Phillips and Shaw, 2013), although the scope of substances examined was narrow in both studies.

Hypothesis 3. Vignettes depicting a person with active substance dependency will elicit more negative public attitudes than those depicting a person with substance dependencies in recovery.

The current study tests these hypotheses using a survey experimental design. Specifically, we systematically compare the nature and magnitude of stigma toward four common types of active and treated substance dependency – alcohol, prescription opioids, heroin, and methamphetamine – using a large, representative sample in the United States.

2. Methods

2.1. Sampling strategy

The survey was administered between July 13 and July 27 of 2021–11,661 U.S. adults over the age of 18. The survey was fielded by Ipsos Public Affairs, and was conducted using KnowledgePanel®, a

probability-based web panel developed to be representative of the U.S. population (e.g., MacInnis et al., 2018; Yeager et al., 2011). See [Supplemental Materials](#) for additional details. There was a 60.4% (N = 7051) completion rate on the survey. Up to 1% of data (N = 55) are dropped due to missing data (list-wise for control variables, case-wise for dependent variables). See [Table 1](#) for respondent characteristics.

2.2. Vignettes

We used a vignette strategy to elicit prejudice, desire for social distance, and beliefs toward a hypothetical person showing symptoms and behaviors consistent with a professional evaluation of substance dependency (for benefits of this approach, see Finch, 1987). Respondents were randomly assigned to one of the ten vignettes targeting four substances: prescription opioids (medical or recreational onset), heroin, methamphetamine, and alcohol. The target individual was described as an active user or in treatment and recovery. The vignettes were based on prior work (e.g., McGinty et al., 2015; Perry et al., 2020). Details, including full wording of the vignettes, are provided in the [Supplemental Appendix](#). Dependent variables were largely derived from the National Stigma Study - Replication fielded on the 2018 General Social Survey (Perry et al., 2020; Pescosolido et al., 2021).

Desire for social distance was measured using six items scaled together (mean of all non-missing items, higher = more social distance) that measure willingness to move next door, spend an evening socializing, be close personal friends with, work closely with, have group home in neighborhood, and have marry into family. For each item, respondents indicated willingness on a 1 (“definitely willing”) to 4

Table 1
Sample Descriptive Statistics, *Shatterproof Addiction Stigma Index, 2021*, N = 7051.

	n	Prop.
Respondent Characteristics		
Sex		
Male	3504	0.50
Female	3547	0.50
Age Category		
Race		
White, Non-Hispanic	5111	0.72
Black, Non-Hispanic	641	0.09
Hispanic	787	0.11
Other, 2 + Races, Non-Hispanic	512	0.07
Education		
< HS	473	0.07
H.S. Degree	1798	0.25
Some College	2154	0.31
College Degree	2626	0.37
Household income		
Less than \$10000	196	0.03
\$10000-\$24999	590	0.08
\$25000-\$49999	1133	0.16
\$50000-\$74999	1290	0.18
\$75000-\$99999	1007	0.14
\$100000-\$149999	1388	0.20
\$150000 +	1447	0.20
Vignette Condition		
Active User		
Alcohol Dependence	706	0.20
Opioid Dependence, Medical	711	0.20
Opioid Dependence, Rec	703	0.20
Heroin Dependence	706	0.20
Methamphetamine Dependence	704	0.20
Active recovery		
Alcohol Dependence	705	0.20
Opioid Dependence, Medical	703	0.20
Opioid Dependence, Rec	702	0.20
Heroin Dependence	706	0.20
Methamphetamine Dependence	705	0.20

(“definitely unwilling”) scale. Reliability on these items was excellent (Cronbach’s $\alpha = 0.90$), so items were averaged together to create a social distance scale (higher values = greater desired social distance).

Prejudice was measured using five items scaled together (mean of all non-missing items, higher = more prejudice). Items included perceptions of unpredictability (“People like [NAME] are unpredictable”) rated on a 1 (strongly agree) to 4 (strongly disagree) scale. Respondents also indicated the likelihood that the vignette character would “do something violent toward other people” or “do something violent toward himself”, “be trustworthy”, or “be competent” on a 1 (very likely) to 4 (not at all likely) scale. The unpredictability and harm items were from the NSS-RII. Reliability on these items was good (Cronbach’s $\alpha = 0.80$), so they were reverse scored and averaged together to create a prejudice scale (higher values = more prejudice).

Causal attributions were measured by asking respondents to indicate the likelihood on a 1 (very likely) to 4 (not at all likely) scale that the vignette character’s situation was caused by “his own bad character” or “the way he was raised”. Two items measured perceived competence – how likely is it that the vignette character can manage their money and make treatment decisions on their own – with responses ranging from a 1 (very) to 4 (not at all) scale. For ease of interpretability, these items were binarized (0 = very/somewhat unlikely/able; 1 = very/somewhat likely/unable). Using the full scales produced similar patterns of results (see [Supplemental Materials](#)).

2.3. Statistical analyses

All variables were assessed for normality, missingness, and outliers. We applied survey weights (provided by Ipsos) to adjust for sampling methodology and to provide population estimates for the U.S. (based on March 2021 Census data). All hypothesis tests were 2-tailed. We conducted survey-weighted regression models in Stata 17 to examine the association between substance type, recovery status, and stigma outcomes, controlling for respondent characteristics. Full regression results for all analyses are provided in the [Supplemental Materials](#). Covariates included respondent gender, age, race, education, and household income, and were selected based on related work (e.g., [Perry et al., 2020](#)).

We employed linear regression for the social distance and prejudice scales. Scale scores were standardized (i.e., unit-change is a one-standard deviation increase) to facilitate interpretation of the magnitude of effects. For ease of interpretation, scores for [Hypotheses 1 and 3](#) were standardized relative to all conditions, excluding prescription opioid dependence with a medical onset (which was excluded in the analyses). For [Hypothesis 2](#), scores were standardized relative to the two prescription opioid onset conditions. Since the goal of [Hypothesis 3](#) was to determine the effect of recovery status on stigma, interaction terms between substance and recovery type were only included for [Hypothesis 3](#). This allowed us to examine whether recovery status influenced stigma to differing extents for unique substance types.

All other analyses used logistic regression to facilitate interpretation (full scales produced similar patterns of results; see [Supplemental Materials](#)). Regression results were used to estimate and graph predicted probabilities and values (i.e., marginal effects). Marginal effects were calculated using the `-margins-` commands in Stata, holding all covariates at the mean for each vignette condition, which is consistent with best practices for interpreting predicted probabilities of effects (e.g., [Perraillon et al., in progress](#)).

3. Results

Hypothesis 1. Vignettes depicting a person with heroin or methamphetamine dependencies will elicit more negative public attitudes than those depicting a person with prescription opioid or alcohol dependencies.

We first examined whether stigma differed between alcohol,

prescription opioid, heroin, and methamphetamine dependencies. Because the heroin and methamphetamine conditions both had recreational onsets (see [Supplemental Materials](#)) and the onset for alcohol dependence was not specified, [Hypothesis 1](#) focused on the prescription opioid condition with recreational onset for direct comparability across substances and to avoid varying more than one condition at a time. Analyses controlled for recovery status.

Similar patterns emerged for prejudice and desire for social distance (See [Fig. 1](#); Supplemental Tables 1 and 2; Supplemental [Fig. 1](#)). Specifically, prejudice toward the vignette character was predicted to be .23 standard deviations *below* the scale mean (CI $-0.28, -0.19$) for alcohol use disorder (which served as the reference category). This prediction was significantly lower than prejudice toward people with prescription opioid use disorder, which was predicted to be .10 standard deviations *below* the mean (CI $-0.15, -0.06$; $p < .001$). Prejudice toward individuals with heroin and methamphetamine use disorders were predicted to be .20 (CI $.15, .25$) and .18 (CI $.13, .23$), respectively, standard deviations *above* the scale mean. Prejudice toward both was higher relative to alcohol and prescription opioid use disorders (both $ps < 0.001$).

Desire for social distance from the vignette character was predicted to be .22 standard deviations *below* the scale mean (CI $-0.26, -0.17$) for alcohol use disorder. This was significantly lower than reported desire for social distance from people with prescription opioid use disorder, which was predicted to be .11 standard deviations *below* the scale mean (CI $-0.16, -0.07$; $p = .002$). Desire for social distance from individuals with heroin and methamphetamine use disorders were predicted to be .17 (CI $.12, .22$) and .20 (CI $.15, .24$) *above* the scale means for heroin and methamphetamine use disorder, respectively, which was higher relative to alcohol and prescription opioid use disorders (both $ps < 0.001$). Comparisons across individual social distance items are provided in [Table 2](#). Here, the greatest disparities as a function of substance type emerged for willingness to live next door or spend an evening, with the lowest desire for distance from people with alcohol dependency, and the highest for methamphetamine and heroin dependency. Desire for social distance for all substance types was highest in the context of working closely on a job and marrying into the family, with methamphetamine and heroin dependency again eliciting higher levels of desired social distance than alcohol dependency.

Results from the regression of causal attributions on vignette condition are presented in Supplemental [Table 1-3](#). Personal attributions (e.g., attributing dependency to someone’s upbringing or character) are typically considered indicators of personal responsibility and therefore higher stigma. While 60.0% (CI 57.7–62.8%) of respondents attributed alcohol dependence to an individual’s upbringing, these levels were significantly lower for the other substance types. Specifically, only 29.3% made this attribution for prescription OUD (29.3%, CI 30.0–31.6%, $p < .001$), 36.4% for heroin (CI 34.0–38.8%, $p < .001$), and 37.4% for methamphetamine (CI 34.8–40.0%, $p < .001$) dependency. Interestingly, 50.1% of respondents attributed alcohol dependence to an individual’s bad character (CI 48.3–53.5%), and 53.4% made this attribution for prescription opioid dependency (CI 50.5–56.0%), which did not differ from alcohol ($p = .18$). However, 61.0% endorsed bad character for both heroin (CI 57.8–62.8%) and methamphetamine (CI 58.4–63.5%) dependency, which was significantly higher than for alcohol (both $ps < 0.001$).

With respect to biological attributions, 75.2% (CI 73.0–77.4%) attributed alcohol dependency to a chemical imbalance, whereas this number was 66.3% (CI 63.9–68.7%, $p < .001$) for prescription opioids, 62.4% (CI 59.9–65.0%, $p < .001$) for heroin dependency, and 64.0% (CI 61.6–66.6%, $p < .001$) for methamphetamine dependency. Patterns were stronger for genetics, with 69.5% (CI 66.7.0–71.9%) endorsing this attribution for alcohol dependency, but only 44.9% (CI 42.3–47.4%, $p < .001$) endorsing it for prescription opioids, 39.1% (CI 36.7–41.6%, $p < .001$) for heroin, and 41.9% (CI 39.4–44.4%, $p < .001$) for methamphetamine dependency.

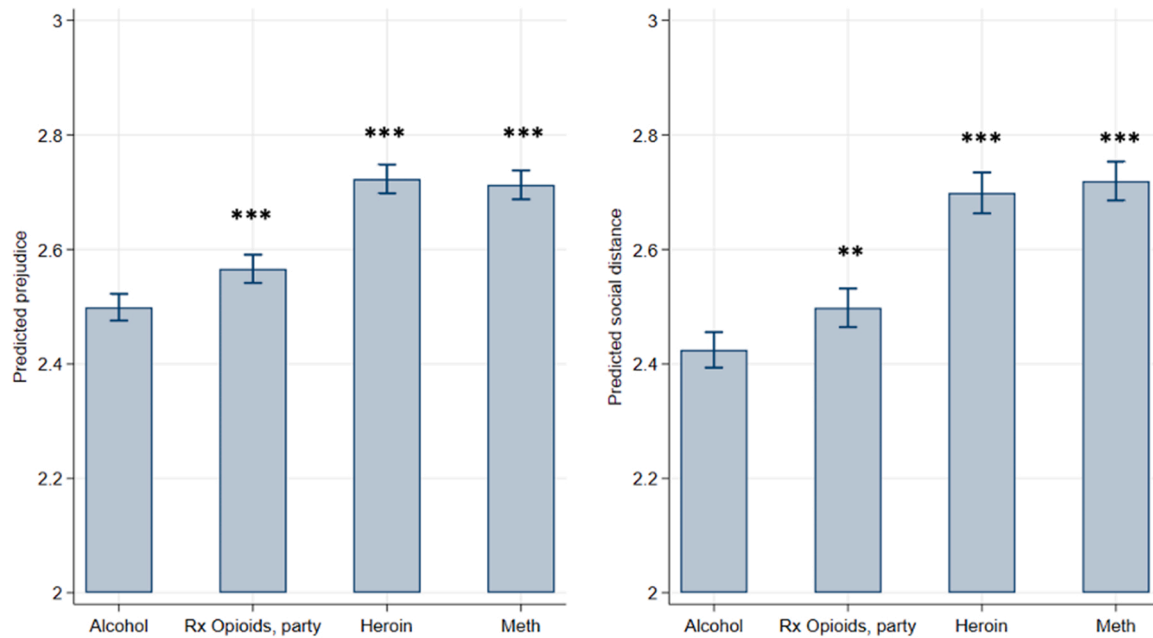


Fig. 1. Predicted probabilities for Hypothesis 1, showing prejudice (left) and desired social distance (right) as a function of substance type in the vignettes, adjusting for covariates. Prescription opioid condition with recreational onset is depicted. Error bars reflect 95% confidence intervals. Significance (*) shown relative to alcohol, the reference category, *** $p < .001$, ** $p < .01$.

Table 2

Distribution of stigmatizing public attitudes by substance type, recovery status, Shatterproof Addiction Survey, 2021 (N = 7051). For ease of comparison, both the medical and recreational onset opioid conditions are presented. Consistent with Hypothesis 1, F values compare alcohol, heroin, methamphetamine, and prescription opioid (recreational onset). Non-standardized mean responses provided for prejudice and social distance scales (1 = low, 4 = high). All other responses indicate percentage of respondents who agreed or strongly agreed with the given statement.

	Rx Opioid, medical onset		Alcohol		Rx Opioid, recreational onset		Heroin		Methamphetamine		Full sample	F
	Active	Recovery	Active	Recovery	Active	Recovery	Active	Recovery	Active	Recovery		
Social distance scale	2.63 (710)	2.24 (695)	2.64 (704)	2.20 (705)	2.74 (699)	2.25 (699)	2.95 (705)	2.45 (704)	3.02 (701)	2.42 (700)	2.56 (7022)	91.73 ***
Prejudice scale	2.69 (710)	2.30 (693)	2.65 (702)	2.34 (701)	2.79 (698)	2.35 (699)	2.93 (702)	2.52 (702)	2.95 (701)	2.47 (701)	2.60 (7009)	109.46 ***
	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)	% (N)		
Desire for Social Distance (unwilling to.)												
Live next door	44.3 (313)	22.0 (152)	41.8 (293)	23.4 (164)	51.7 (360)	26.9 (188)	74.9 (526)	45.0 (152)	76.8 (698)	39.3 (275)	44.6 (6996)	53.52**
Spend an evening socializing	47.2 (334)	24.2 (168)	48.8 (342)	25.4 (178)	51.6 (360)	27.4 (191)	64.0 (449)	35.8 (251)	71.6 (501)	33.9 (237)	43.0 (7005)	41.69 **
Work closely	63.5 (447)	25.3 (175)	63.8 (446)	24.7 (174)	67.7 (472)	28.2 (197)	69.1 (482)	32.0 (224)	74.9 (524)	30.3 (211)	47.9 (6991)	69.16 **
Have group home in neighborhood	48.4 (343)	46.7 (321)	46.5 (326)	40.6 (284)	54.5 (379)	48.3 (337)	58.5 (410)	51.7 (362)	62.6 (436)	52.7 (367)	51.0 (6984)	19.88 **
Marry into the family	72.3 (509)	47.8 (328)	76.5 (533)	47.7 (333)	79.3 (548)	50.5 (351)	84.9 (592)	61.5 (429)	89.1 (620)	57.7 (401)	66.8 (6956)	46.29 **
Be close personal friends	52.6 (372)	27.8 (192)	50.2 (350)	26.6 (186)	57.4 (399)	32.9 (229)	68.0 (474)	43.1 (303)	71.7 (501)	38.2 (267)	46.9 (6982)	40.10 **
Competence												
Cannot manage finances	48.7 (344)	83.2 (574)	57.5 (404)	88.4 (619)	42.1 (293)	84.8 (592)	22.6 (159)	67.4 (473)	21.8 (152)	73.0 (510)	59.0 (6996)	82.61 **
Cannot make treatment decisions	57.3 (404)	78.3 (542)	64.7 (452)	84.5 (593)	51.9 (363)	81.2 (566)	43.4 (305)	72.8 (510)	43.5 (303)	74.8 (524)	65.2 (6996)	44.92 **
Causal attributions												
Likely due to bad character	35.4 (251)	32.4 (226)	55.0 (386)	46.7 (327)	56.0 (392)	50.6 (354)	61.4 (432)	59.7 (420)	63.4 (444)	58.2 (406)	51.9 (7012)	13.63 **
Likely due to way raised	19.8 (140)	19.0 (132)	55.5 (390)	64.6 (453)	28.7 (200)	30.1 (211)	35.2 (248)	37.5 (263)	35.1 (245)	39.9 (280)	36.7 (7006)	37.20 **
Likely due to genetic problem	37.5 (266)	42.0 (291)	69.1 (486)	69.7 (488)	43.8 (306)	46.0 (322)	37.1 (261)	41.0 (286)	40.6 (284)	43.5 (305)	47.0 (7012)	36.35 **
Likely due to chemical imbalance	70.8 (501)	67.3 (467)	76.1 (536)	74.5 (523)	71.2 (498)	61.5 (429)	68.6 (482)	55.8 (392)	69.5 (487)	58.8 (413)	67.4 (7009)	19.83 **

Note: Table presents percent reporting “very likely” or “somewhat likely” with frequencies in parentheses. Estimates are adjusted for survey sampling weights.

Results from the logistic regression of perceived competence on covariates are shown in [Supplemental Table 4](#). About 73.0% of respondents perceived a person with alcohol dependency as being capable of managing their own finances (CI 70.8–75.2%), whereas only 63.4% perceived this about a person with prescription opioid dependency (CI 61.2–65.7%, $p < .001$). These perceptions were even lower for heroin, 45.0% (CI 42.8–47.3%), and methamphetamine 47.3% (CI 45.0–49.6%) dependency (both $ps < 0.001$). Similarly, for ability to make decisions about seeking treatment, 74.6% of respondents perceived a person with alcohol dependence as capable of making treatment decisions (CI 72.4–76.8%), which was greater than the 66.5% for prescription opioid (CI 64.2–68.9%), 58.2% for heroin (CI 55.8–60.6%), and 59.1% for methamphetamine (CI 56.7–61.5%) dependencies (all $ps < 0.001$).

Hypothesis 2. Vignettes depicting a person with prescription opioid dependency with recreational onset will elicit more negative public attitudes than those depicting a person with prescription opioid dependency with medical onset.

Next, we examined stigma toward prescription opioid dependence as a function of onset condition (medical versus recreational). Consistent with our prediction, we found that prejudice toward the vignette character with the medical onset condition was predicted to be -0.05 (CI $-0.10, -0.003$) standard deviations *below* the mean, which was significantly lower than the recreational onset condition, which was predicted to be $.10$ (CI $.05, .15$; $p < .001$) standard deviations *above* the mean. Similarly, desire for social distance from the vignette character with the medical onset condition was $.03$ (CI $-0.08, .02$) standard deviations *below* the mean, which was significantly lower than for the recreational onset condition, which was $.06$ (CI $.01, .11$, $p = .01$) standard deviations *above* the mean. See [Fig. 2](#); [Supplemental Tables 5 and 6](#); [Supplemental Fig. 2](#).

Results from the regression of causal attributions are presented in [Supplemental Tables 5–7](#). Respondents were more likely to make attributions to an individual's upbringing when the onset was recreational, 29.6% (CI 27.2–31.9%) than when it was medical, 19.3% (CI

17.3–21.4%, $p < .001$). About 53.5% of respondents attributed recreational onset to an individual's bad character (CI 50.9–56.1%), but this dropped to 33.8% for medical onset (CI 31.3–36.3%, $p < .001$). For biological attributions, onset type did not affect attribution to a chemical imbalance ($p = .17$) but did affect attribution to genetics. Respondents were more likely to attribute prescription opioid dependence to genetics when the onset was recreational, 45.1% (CI 42.6–47.6%), versus medical, 39.5% (CI 36.9–42.1%, $p = .002$).

Finally, onset type did not affect perceptions that an individual was perceived as capable of managing their own finances ($p = .15$) or making decisions about seeking treatment ($p = .51$). See [Supplemental Table 8](#).

Hypothesis 3. Vignettes depicting a person with active substance dependency will elicit more negative public attitudes than those depicting a person with substance dependencies in recovery.

Finally, we examined whether recovery status (active users versus in recovery) affected stigma toward substance dependencies (See [Fig. 3](#); [Supplemental Fig. 3](#)). Analyses controlled for substance type (alcohol, recreational prescription opioid, heroin, and methamphetamine), and included the interaction between substance type and recovery status. Prejudice was significantly lower toward individuals in recovery, which was predicted to be $.38$ (CI $-0.42, -0.35$) standard deviations *below* the mean, than for individuals with active dependencies, predicted to be $.40$ (CI $.37, .43$; $p < .001$) standard deviations *above* the mean. The interaction between substance type and recovery status was also significant for all three substance types relative to alcohol dependency (all $ps < 0.004$). As seen in [Fig. 3](#) and [Table 2](#), although prejudice was lowest toward individuals with alcohol dependency in recovery, which was predicted to be $.53$ (CI $-0.59, -0.46$) standard deviations *below* the mean, there was a larger reduction in prejudice toward individuals depicted as being in recovery versus as active users for all other substance types (see [Fig. 3](#); [Supplemental Table 9](#) for all standardized scores). For individuals in recovery, social distance was predicted to be $.34$ (CI $-0.38, -0.31$) standard deviations *below* the mean, which was significantly lower than

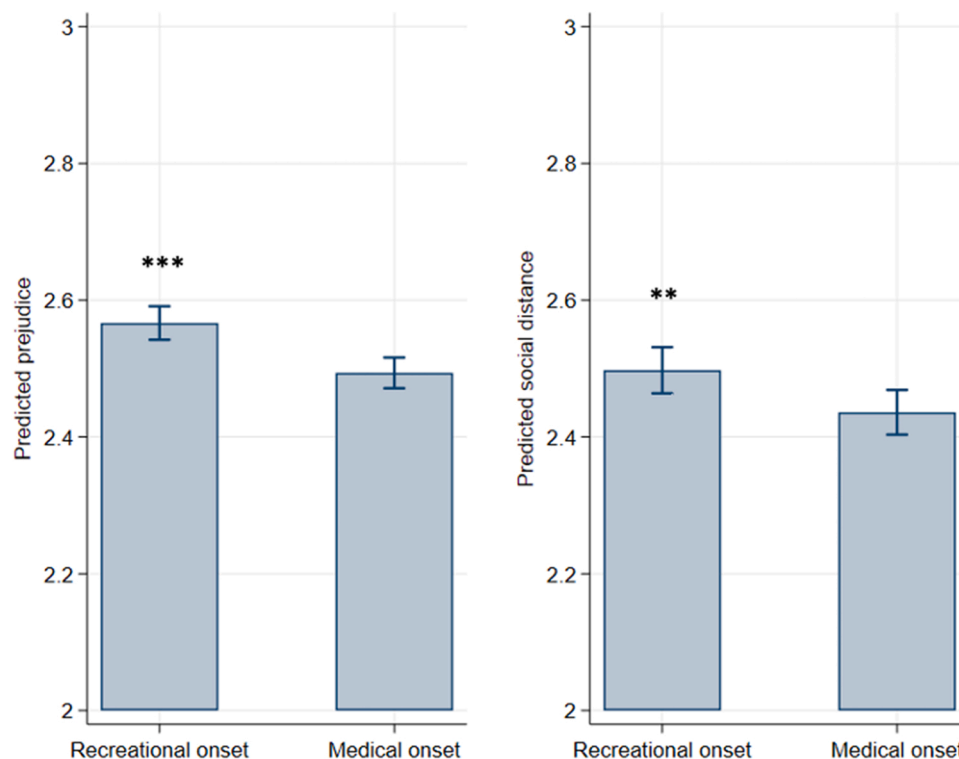


Fig. 2. Predicted probabilities for [Hypothesis 2](#), showing prejudice (left) and desired social distance (right) as a function of onset type for prescription opioid dependence, adjusting for covariates. Error bars reflect 95% confidence intervals. Significance (*) shown relative to medical onset, *** $p < .001$, ** $p < .01$.

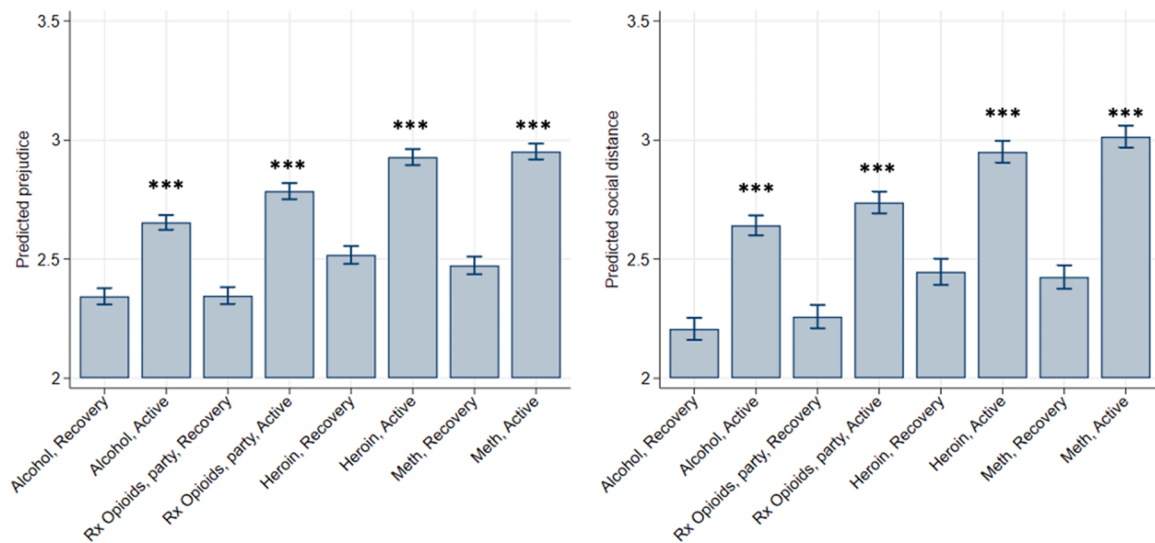


Fig. 3. Predicted probabilities for [Hypothesis 3](#), showing prejudice (left) and desired social distance (right) as a function of substance and recovery type in the vignettes, adjusting for covariates. Prescription opioid condition with recreational onset is depicted. Error bars reflect 95% confidence intervals. Significance (*) for recovery status (active user relative to active recovery) shown within substance category, *** $p < .001$.

it was toward individuals with active dependencies, which was predicted to be .36 (CI .33, .39; $p < .001$) standard deviations above the mean. The interaction was only significant for methamphetamine dependency ($p = .001$). Here, the recovery status manipulation had a stronger effect on desire for social distance for methamphetamine relative to alcohol dependency (see [Fig. 3](#); see [Supplemental Tables 10–11](#) for full regression statistics).

Recovery status had opposing effects on attributions of causes for substance dependencies. About 43.0% of respondents attributed dependency to someone's upbringing if they were described as being in recovery (CI 41.2–44.7%), which was higher than the 38.7% for active using (CI 37.0–40.5%, $p = .001$). However, 58.9% attributed dependency to an individual's bad character when the individual was described as an active user (CI 57.1–60.7%) versus 53.9% when the individual was in recovery (CI 52.0–55.7%, $p < .001$). No interactions emerged for either attribution (all $ps > 0.06$). Attribution to genetics did not differ for individuals described as being in recovery ($p = .06$), nor did any interactions emerge (all $ps > 0.22$). However, attributions to a chemical imbalance were influenced by recovery status, with 71.4% of respondents making this attribution if the individual was an active user (CI 70.0–73.1%) versus 62.6% when the individuals was in recovery (CI 60.8–64.3%, $p < .001$). Moreover, relative to alcohol dependency, interactions emerged for all three substance types (all $ps < 0.04$). As seen in [Table 2](#), the recovery status manipulation had a stronger effect on imbalance attributions for the three substance types relative to alcohol. See [Supplemental Tables 10–12](#) for full regression statistics.

Finally, active users were perceived as being less competent than individuals in recovery, with the most dramatic differences in fiscal competence. Specifically, 36.0% of respondents perceived active users as being able to manage their own finances (36.0%, CI 34.3–37.7%), whereas this number doubled to 78.4% of respondents when the individual was in recovery (CI 76.9–80.0%, $p < .001$). An interaction emerged here only for methamphetamine dependency ($p = .004$). As seen in [Table 2](#), recovery status had the strongest effect on methamphetamine dependency. About 50.9% of respondents perceived active users as being able to make treatment decisions (CI 49.1–52.7%). This number significantly increased to 78.3% when the individual was depicted as being in recovery (CI 76.8–79.8%, $p < .001$). No interactions were observed (all $ps > 0.08$). See [Supplemental Table 13](#).

4. Discussion

Several key findings emerged from the current study examining four key dimensions of stigma: desire for social distance, traditional prejudice, perceived competence, and causal attributions. First, illicit substances (heroin, methamphetamine) were more stigmatized than legal (e.g., alcohol) substances. Second, onset also affected stigma such that prescription opioid dependence with a recreational onset elicited greater stigma than a medical onset. Finally, individuals who were depicted as being in recovery were less stigmatized than those depicted as active users. However, depicting an individual as being in recovery was associated with the largest reductions in both prejudice and social distance for illicit drugs, notably methamphetamine. This finding is consistent with prior work showing that depictions of recovery predicted a greater reduction in stigma for illicit drug dependence (heroin) relative to treated mental illnesses (e.g., depression; [McGinty et al., 2015](#)).

Our finding that illicit (i.e., illegal) substances (e.g., heroin) are more stigmatized than legal (e.g., alcohol) substances is consistent with prior work ([Goodyear et al., 2018](#); [Weeks and Stenstrom, 2020](#)). Moreover, that heroin was more stigmatized across most dimensions than prescription opioids (the same class of drug) points to the impact of perceived legality of the substance on stigma. Consistent with this, prescription opioids with a recreational onset (which may be perceived as a more illicit onset) were generally more stigmatized than those with a medical onset.

Attributions also differed as a function of substance type. While respondents were more likely to attribute alcohol dependence (compared to all other substance types) to the way an individual was raised and biological causes, heroin and methamphetamine dependence were more likely to be attributed to bad character. One possibility for this discrepancy may be that heroin and methamphetamine are perceived as being a choice. Indeed, respondents were about 1.5 times more likely to attribute opioid dependence to someone's bad character when the onset of their dependence was depicted as being recreational (which may be perceived as a choice) versus medical. Finally, although perceived responsibility did not substantially affect perceptions of competence, recovery status did, particularly in the domain of managing finances.

There are several limitations in the current study. First, individuals' responses are necessarily influenced by the information in the vignettes (but see [Finch, 1987](#)). Second, though our data examined stigma across

multiple substance types, other substances (e.g., marijuana) should be considered in future work. Finally, given recent shifts in media coverage about the opioid crisis (e.g., McGinty et al., 2019), it is unclear how, if at all, public discussion of the opioid crisis (e.g., through the media) might have influenced how respondents distinguished between prescription opioids versus heroin, and recreational versus medical onset of prescription. Future research should examine these questions.

As one of the largest studies of addiction stigma using a representative sample, these results identify key differences in the underlying drivers of stigma for different substance dependencies – patterns which, like similar findings for mental illness (e.g., Krendl & Freeman, 2019), support a need for tailored interventions to reduce stigma. Additional research is needed to understand the nuanced nature of addiction stigma under different conditions rather than methodologies which treat all substance dependencies as monolithic. Our findings also suggest that, although stigma was highest toward illicit substances, these individuals may experience the largest reduction in stigma when they are depicted as being in recovery. Thus, interventions that emphasize recovery (e.g., Flanagan et al., 2016; Luty et al., 2008) may be important in reducing addiction stigma, particularly for illicit substances. Together, these findings lay important groundwork for future basic and translational research.

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CRedit authorship contribution statement

Drs. Krendl and Perry contributed equally to the development of this survey. Both contributed to the analyses. Dr. Krendl wrote the initial draft of the manuscript, and Dr. Perry provided extensive feedback on it.

Conflict of interest statement

Drs. Krendl & Perry were paid by Shatterproof as consultants on this project.

Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at [doi:10.1016/j.drugalcdep.2022.109503](https://doi.org/10.1016/j.drugalcdep.2022.109503).

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