



# HHS Public Access

Author manuscript

*Subst Use Misuse*. Author manuscript; available in PMC 2022 July 19.

Published in final edited form as:

*Subst Use Misuse*. 2021 ; 56(12): 1752–1764. doi:10.1080/10826084.2021.1949611.

## Social Stigma toward Persons with Opioid Use Disorder: Results from a Nationally Representative Survey of U.S. Adults

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### Abstract

**Background:** This study seeks to understand the general adult population’s knowledge, attitudes, and stigma towards opioid use disorder (OUD), people with histories of opioid misuse, and policies related to OUD.

**Methods:** We conducted a cross-sectional national survey of the U.S. adult population, using AmeriSpeak’s<sup>®</sup> web, probability-based panel. The number of participants were 947 (493 females and 454 males) general population adults ages 19–89 years old who completed a self-report survey covering: social stigma of OUD, opioid policy attitudes, perceptions of OUD as a crime, knowledge and beliefs about opioids and treatment, personal experience with opioids and the criminal justice (CJ) system, and demographics.

**Results:** Thirteen percent self-reported ever misusing opioids, 3% reported an opioid overdose, and 14% reported personal experience with the CJ system. On average, the general adult population moderately endorses stigmatizing behaviors, agrees that OUD is a medical condition, agrees with policies to increase access to OUD treatment, and is less likely to endorse OUD as a crime. Having a disregard for OUD as a medical condition was most associated with higher levels of stigma, endorsing OUD as a crime, and disagreeing with policies to help people access OUD treatment.

**Conclusions:** Our data provide guidance to policymakers concerning individuals with certain characteristics to target for public education efforts to reduce stigma and draw more support for public health interventions for OUD. Our data also suggest that the content of this education should include improving understanding of OUD as a medical condition.

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Declaration of interest

The authors declare that they have no conflict of interest. The authors alone are responsible for the content and writing of the article.

## Keywords

Opioids; social stigma; national sample; general public; substance use

The opioid epidemic has remained a public health crisis since its emergence in the 1990s (Martins et al., 2017a; 2017b), with continuing elevated rates of opioid overdose mortality (Florence et al., 2016; Schatman & Ziegler, 2017) and ER visits (Cai et al., 2010). While, medications for addiction treatment (MAT), such as methadone and buprenorphine, have been successful at reducing the likelihood of illicit opioid use and opioid-involved overdose (Marsden et al., 2017; Mattick et al., 2014; Sordo et al., 2017), there are significant barriers to the dissemination and adoption of evidence-based treatment (Glasgow et al., 2006). Specifically, there is growing evidence of the strong correlations between stigma and challenges accessing treatment for opioid use disorder (OUD) (Brown et al., 2010; Dschaak & Juntunen, 2018; Luoma et al., 2014; Wakeman & Rich, 2018). The extent to which these local findings reflect national-level stigma patterns or exhibit geographic variability remains unclear. Limited research for example has explored how the public views individuals with OUD (Corrigan & Nieweglowski, 2018) and whether attitudes toward this population affect the types of interventions the public supports for addressing OUD (Barry et al., 2016; Kennedy-Hendricks et al., 2017; McGinty et al., 2015).

While stigma is traditionally thought of as a socially constructed differentiation of power, normalizing oneself and devaluing and ‘othering’ those with certain attributes or involved in an activity or attitude, its reach extends beyond the interpersonal and into practices, interventions, and levels of support for various policies (Brown, 2011; Goffman, 1963; Major et al., 2018) (Brown, 2011; Goffman, 1963; Major et al., 2018). Stigma can emerge through intrapersonal manifestation of stigma (internalized judgment), interpersonal expression of stigma from family/friends and even healthcare practitioners (Brown, 2011; Goffman, 1963). Stigma is well established as an influencer on health in relation to illicit substance use and other health outcomes including HIV and mental illness (Major et al., 2018).

Levels of stigma toward people with substance use disorders (SUD) and by extension OUD, have been found to be higher than stigma toward other types of mental illness (Barry et al., 2014; Corrigan et al., 2009). Research on the general public’s attitudes and stigma toward those with OUD specifically is limited, though it is not unreasonable to expect there may be similar mechanisms at play, including highly stigmatizing attitudes toward those with OUD, and varying levels of stigma depending on the sociodemographic characteristics of those living with OUD (Goodyear et al., 2018; Wood & Elliott, 2020). To address these research gaps on OUD and stigma, we fielded a nationally-representative survey to understand the general population’s beliefs, attitudes, and stigma toward OUD, people with opioid misuse, and policies related to OUD.

In addition to acting as a barrier to treatment, stigma can influence backing for evidence-based policies that support those with SUD/OUD (Link & Hatzenbuehler, 2016) and can also lead to collective “not-in-my-backyard” resistance to providing community-based services and shape public opinion away from public health approaches (McGinty & Barry,

2020). While some studies on this concept suggest that the majority of the general public supports policies that would benefit those with OUD, they also seem to suggest there is a gap in our understanding of the relationship between attitudes toward the disease and those who suffer from it as previous studies have found highly stigmatizing attitudes toward those with OUD (Kennedy-Hendricks et al., 2017; Perry et al., 2020).

Drawing on attribution theory and the familiarity hypothesis, two influential frameworks used to explain stigma toward mental illness (Corrigan et al., 2003; Holmes et al., 1999), we use a nationally-representative sample to assess public stigma toward those with OUD. Attribution theory (Weiner, 1986) suggests that a major determinant of helping behavior is the helper's perception why aid is needed and links perceived controllability (i.e. blameworthiness) and perceived stability (i.e. enduringness of ailment) to the responses of the public. Guided by attribution theory, we assess the hypothesis that if the general public views OUD as a medical condition they will see the person as less blameworthy and report lower levels of stigma.

Based on the familiarity hypothesis (Corrigan, 2000) and related research on mental illness and stigma (Corrigan & Nieweglowski, 2018), we expect that lived personal or indirect experiences through family members or friends with opioid misuse will increase tolerance and lower stigma. We also assess if history with the criminal justice (CJ) system (lived and/or indirect through a family member or friend) which can often bring a person closer to the problem of OUD might relate to stigma. Research on OUD and stigma and the role of familiarity (whether with opioid misuse or the justice system) is scant with some exceptions for opioid misuse (Kennedy-Hendricks et al., 2017). The literature on other determinants/correlates of SUD and OUD stigma have found mixed results on the role of demographic and background factors (Kennedy-Hendricks et al., 2017; Keyes et al., 2010; Kulesza et al., 2013) and will also be explored in this paper.

We also examine the general public's attitudes toward OUD treatment policies and endorsement of using the criminal law to address OUD with the same set of covariates. Based on the literature, we also hypothesized that the general public will 1) exhibit low levels of knowledge and awareness of OUD and treatment; 2) hold generally favorable attitudes toward OUD treatment; 3) hold generally unfavorable attitudes toward individuals with OUD; and 4) endorse OUD being considered a criminal activity and a candidate for a justice intervention.

## Materials and methods

### Study design

A cross-sectional random sample of participants was drawn from AmeriSpeak<sup>®</sup>, a probability-based ongoing panel of about 35,000 households designed to be representative of the U.S. household population (excluding those not found in households such as individuals currently incarcerated, institutionalized and homeless). The study was approved by the lead author's organization's Institutional Review Board (with a multiple project assurance with the U.S. Department of Health and Human Services) for the conducting of human subject's research. For AmeriSpeak<sup>®</sup>, a stratified random sample of U.S. households are selected

and sampled using area probability and address-based sampling, with a known, nonzero probability of selection from the NORC at the University of Chicago (NORC) National Sample Frame. These sampled households are then contacted by U.S. mail, telephone, and field interviewers (face-to-face) to capture harder to reach cases. The panel provides sample coverage of approximately 97% of the U.S. household population (Dennis, 2019). A methodology study comparing the AmeriSpeak sample to the US Census American Community Survey showed minor differences, on average under 1.5%, by sex, age group, race/ethnicity, education, marital status, employment, income, region, and home Internet access (Bilgen et al., 2018; Montgomery et al., 2016). The annual panel retention rate is about 85% (Dennis, 2019). AmeriSpeak panel's weighted household recruitment rate, which includes a second stage of recruitment for initial non-responders to capture harder-to-reach populations, is 37%, one of the highest for comparable national probability-based household panels (Montgomery et al., 2018). The AmeriSpeak panel implements monthly Omnibus surveys using a probability sample of adults, accounting for age, race/ethnicity, education, and sex. A comparison of the January 2020 Omnibus sample and January 2019 data from the American Community Survey showed small differences, on average under 2%, by sex, age group, race/ethnicity, education, marital status, employment, income, region, and home Internet access.

For this paper, our team implemented our survey under AmeriSpeak's monthly Omnibus survey program. AmeriSpeak staff sent an email to a randomly-selected group of panel members describing the study, covering informed consent and inviting them to participate in the survey. One-quarter of the contacted participants from the AmeriSpeak panel of 3,900 invited adult panelists completed this project's survey ( $n = 976$ ). Our overall response rate is (37% panel recruitment rate \* 25% completion rate for those invited to do the stigma survey) just under 10% (9.25%). However, as discussed in the analysis plan, we weight our data to national census benchmarks, taking into account selection probabilities (balanced by sex, age, education, race/ethnicity, and region) and non-response (Dennis, 2019). Table 1 shows the unweighted and weighted univariate results for our measures. We also present, where available, US Census data from the most recent Current Population Survey in Table 1 from 2019. As can be seen in Table 1, our weighted survey results are generally within a few percentage points of the census data and all within our confidence interval (e.g. our weighted results for those identify as Asian was 3.61% compared to the census percentage of 3.2% which is also within our confidence interval of 2.42% to 4.79%). The survey was offered in English and Spanish. Sample participants who did not respond to the initial invitation were contacted multiple times by email and phone. Participants received an incentive worth \$4 for responding to the survey.

## Respondents

The cross-sectional sample was invited to complete the survey from February 27 to March 2, 2020. Participants were given a 47-item survey assessing opioid policy attitudes, social stigma toward people with OUD, perceptions of the criminality of OUD, knowledge and beliefs about opioid use and OUD treatment, personal experience with opioids and the CJ system, and demographic/background questions. Participants were 976 general population adults. To allow for ready comparisons across our models, we used listwise deletion

allowing for a uniform set of observations across all of our models ( $n = 947$  across all of our tables). Our sample of 493 females and 454 males ranged from ages 19 – 89 (mean age = 47.73,  $SD = 17.85$ ). As seen in Table 1, participants described themselves as White, non-Hispanic (64%), Hispanic (16%), Black, non-Hispanic (11%), or one of the remaining ethnic group categories in Table 1 (9%). Roughly one third had either a 4-year college degree (34%) or some college (28%), while some did not complete high school (10%). Most participants were employed (54%), followed by retired (18%), disabled (10%) or another unemployment situation (18%). Approximately half of participants had a household income less \$50,000, 43% were between \$50,000 and \$149,000, and 7% were over \$150,000.

## Measures

In total, 48 items were included in the survey that took about 10-15 min for most participants to answer (see Technical Appendix for the exact wording of all survey items).

## Dependent variables

**Social stigma toward people with an OUD**—We developed a 6-item scale (Cronbach's  $\alpha = .78$ ) adapted from prior stigma survey research (Kennedy-Hendricks et al., 2017; Yang et al., 2019). Questions asked about willingness to have a person with a past history of OUD work with you or marry into your family and willingness to have a person with a current OUD work with you, marry into your family, their perceived dangerousness and trustworthiness. Respondents rated their agreement with each statement on a five-point Likert-type scale (1 = strongly disagree, 2 = somewhat disagree, 3 = neither disagree nor agree, 4 = somewhat agree, and 5 = strongly agree). Four items on this scale were reverse coded before computing the mean of all six items. A higher score on our stigma scale reflects greater stigma toward individuals with an OUD. For this and the other scales used in this paper, scores for each scale were computed by averaging the score for all scale items. For this and the other scales, we treat the middle category of 'neither disagree nor agree' (a score of 3) as a moderate score, but we recognize that some researchers believe it is more appropriate to interpret the middle score as having 'no opinion' or being 'neutral' (Nowlis et al., 2002). We discuss this issue in the limitations section.

**Opioid policy scale**—Based on the work of Kennedy-Hendricks and colleagues (2017), policy attitudes were assessed with eight items about policies related to government spending for OUD, accessibility of OUD treatment, and criminal charges. Like the stigma scale, respondents rated their agreement with each statement on a five-point Likert-type scale (1 = strongly disagree to 5 = strongly agree). Six items were reverse coded so that higher scores indicated greater "opposition" to policies that benefit people with an OUD; that is, policies that increase spending to help those with OUD and protect people from criminal charges. The Cronbach's  $\alpha$  for the policy scale was .79.

**Perceptions of criminality in relation to OUD**—Again based on the work of Kennedy-Hendricks et al. (2017), perceptions of criminality were assessed with five items related to arresting and prosecuting people who misuse opioids and their access to treatment. Like the stigma scale, respondents rated their agreement with each statement on a five-point Likert-type scale (1 = strongly disagree to 5 = strongly agree). Two items were reverse coded

before computing the mean of all five items, so that higher scores indicate greater perceived criminality of OUD. The Cronbach's  $\alpha$  for the criminality scale was .75.

### Independent variables

**Knowledge factor: Disregard of opioid use disorder (OUD) as a medical condition**—For this measure, we used one of the subscales, based on five items, from a large 16-item measure of knowledge of OUD, with higher scores representing lower knowledge (greater disregard of the evidence that OUD is a medical condition). Like the stigma scale, respondents rated their agreement with each statement on a five-point Likert-type scale (1 = strongly disagree to 5 = strongly agree). We conducted an exploratory factor analysis starting with 16 items that were pilot tested to assess knowledge and beliefs related to OUD. These items were developed by starting with NIDA's fact sheets on general misperceptions of opioids (National Institute on Drug Abuse, 2018) and refined with feedback from an advisory workgroup, comprised of substance use researchers. For all 16 items (see Technical Appendix), respondents indicated their level of agreement with each statement on a five-point Likert-type scale. Principal components analysis was used with extraction based on eigenvalues  $>1$ . The Varimax rotation method was used to identify resulting factors. The 16 items loaded into five factors (noted in bold in the Technical Appendix) with loadings above .30. This disregard of OUD as a medical condition subscale had eigenvalues of .40, no cross-loading with other components, and an acceptable Chronbach's  $\alpha$  (.72).

**History of opioid misuse**—To measure the respondent's personal experience with opioid misuse, we asked respondents "Have you ever used opioids/prescription pain medication illicitly obtained or used in a way not prescribed by a doctor?" Similar questions were asked if they had family members or close friends who ever misused opioids in their lifetime. Opioid misuse was defined for the respondent as use of opioids or prescription pain medication illicitly obtained or used in a way not prescribed by a doctor. The survey instructions in the Appendix provide more details on the drugs included under opioids.

**Experience with criminal justice system**—To measure the respondent's personal experience with the criminal justice system, we asked respondents whether they themselves and whether a family member or close friend ever had a conviction for a misdemeanor or felony crime or been incarcerated in jail or prison.

**Background factors**—Data were collected on the sociodemographic characteristics of the respondents from the AmeriSpeak panel which updates these items annually, including age, sex, race/ethnicity, education, and whether they live in an urban area. However, we collected household income and employment on this survey to have more up-to-date data on those measures.

### Analytic plan

Descriptive statistics and 95% confidence intervals were computed for each study variable. Multiple linear regression models were conducted with stigma, criminality, and policy scale scores as continuous dependent variables. The regressions examined the relationship

between these scales and a series of respondent characteristics. All analyses used data weighted to national census benchmarks, taking into account selection probabilities (balanced by sex, age, education, race/ethnicity, and region) (Dennis, 2019) and non-response (using a response propensity approach calculating the conditional probability that a particular respondent completed the survey given observed covariates) (Bethlehem et al., 2011). All data were analyzed using IBM SPSS 24.1.

## Results

Table 1 summarizes sociodemographic and key characteristics of the respondents. Among the 947 adult respondents, 14% self-reported that they ever misused opioids and 3% reported an opioid overdose. More than one-third (39%) of respondents self-reported having a family member(s) or close friend(s) that ever misused opioids and 17% reported having a family member(s) or close friend(s) that ever overdosed. Just over one in ten (14%) of the sample population reported personal experience with the CJ system and almost 44% reported a family member and/or close friend ever having an experience with the CJ system.

Table 2 presents mean scores for the stigma, policy, and criminality scales and the knowledge/attitude toward OUD as a medical condition factor across (1) all respondents, (2) by opioid (personal, family/friend) exposure and (3) by CJ system (personal, family/friend) exposure. Higher scores indicate more negative opinions toward people with OUD and treatment for OUD. In general, the scores hovered around the middle on the 1-5 scale.

Table 3 presents results from the regressions on stigma toward people with OUD, criminality beliefs regarding OUD, and opposition to policies that benefit people with OUD (the policy scale). The models do a reasonably good job explaining variation in the outcome measures, adjusted  $R^2$  for the models were 0.16, 0.33 and 0.28, for stigma, criminality, and policy, respectively. Below we present the results according to our hypotheses.

### Hypothesis 1 – low levels of knowledge

The mean score for the knowledge factor was 2.60 ( $SD = 0.78$ ) or below the midpoint 3, indicating that the general population is more likely to agree with statements that describe OUD as a medical condition (indicating greater knowledge not lower levels of knowledge).

### Hypothesis 2 – favor policies toward OUD treatment

The mean scores for the policy scale was 2.57 ( $SD = 0.78$ ), indicating that the general population is less likely to oppose policies that benefit people with OUD (i.e. more people are generally in favor of policies that provide help and treatment to people with OUD). In our bivariate analyses, those with opioid exposure (2.44 vs 2.66,  $t(945) = 4.29$   $p < .01$ ) and CJ system exposure (2.50 vs 2.63,  $t(945) = 2.65$ ,  $p < .01$ ) were less likely to oppose policies that benefit people with OUD than those without such exposure.

As seen in Table 3, in the policy model (higher scores equals greater opposition to policies that benefit people with OUD), the disregard for OUD as a medical condition variable had the largest significant parameter ( $\beta = 0.48$ ,  $t(946) = 16.22$ ,  $p < .001$ ). A one unit change in

disregarding OUD as a medical condition was associated with a .48 standard deviation unit increase in opposing policies that benefit people with OUD.

Opioid exposure (not CJ system exposure) was statistically associated with policy. Both personally ( $\beta = -0.09$ ,  $t(946)=-2.71$ ,  $p=.007$ ) and having a family/friend ( $\beta = -0.10$ ,  $t(946)=-3.06$ ,  $p=.002$ ) with opioid misuse experience were less likely to be in opposition to policies that would benefit people with OUD (i.e. they support beneficial policies). Having a college degree or above (compared to having a high school diploma or equivalency) was also negatively associated with our policy measure ( $\beta = -0.12$ ,  $t(946)=-2.96$ ,  $p=.003$ ). Being Black ( $\beta = -0.10$ ,  $t(946)=-3.31$ ,  $p=.001$ ) and Other, non-Hispanic ( $\beta = -0.07$ ,  $t(946)=-2.77$ ,  $p=.006$ ) (compared to non-Hispanic Whites) were also negatively associated with the policy measure.

### Hypothesis 3- Stigma toward those with OUD

The mean score for the stigma scale was slightly greater than 3 (3.35,  $SD = 0.78$ ), indicating mid-levels of stigma toward people with OUD. In the model (see Table 3), more disregard for OUD as a medical condition explained the most variation in stigma and was strongly associated with higher levels of stigma ( $\beta = 0.28$ ,  $t(946)=8.87$ ,  $p<.001$ ). Also, each year increase in age was associated with a 0.19 standard deviation increase on the stigma scale.

A personal experience with opioid misuse and a personal experience with the CJ system was associated with lower levels of stigma ( $\beta = -0.09$ ,  $t(946)=-2.46$ ,  $p=.014$  and  $\beta = -0.10$ ,  $t(946)=-2.86$ ,  $p=.004$  respectively), but having a family/friend with opioid misuse including overdose and having a family/friend with a CJ experience was not significantly associated with stigma. Overall, the race/ethnicity variable was statistically significant ( $F(5,941)=3.67$ ,  $p = .002$ ), Asian identity was associated with higher stigma (compared to non-Hispanic Whites) ( $\beta=.08$ ,  $t(946)=2.58$ ,  $p=.010$ ) and Black identity with less stigma (compared to non-Hispanic Whites) ( $\beta=-.09$ ,  $t(946)=-2.69$ ,  $p=.007$ ).

### Hypothesis 4 – endorse OUD as a crime

With higher scores indicating greater perceived criminality for OUD, the mean score for the criminality scale was 2.72 ( $SD = 0.81$ ), indicating that the general population is more likely to disagree on average with arresting, convicting, or sentencing to jail/prison because of an OUD (2= disagree and 3= neither disagree nor agree). Our bivariate analyses identified less endorsement of opioid as a crime by opioid exposure (2.59 vs 2.82,  $t(945) = 4.37$ ,  $p<.001$ ). In the criminality model (see Table 3), disregard for OUD as a medical condition explained the largest amount of variation in endorsing criminality of OUD ( $\beta = 0.51$ ,  $t(946)=17.37$ ,  $p<.001$ ). Personal experience of opioid misuse was more strongly associated ( $\beta = -0.19$ ,  $t(946)=-5.82$ ,  $p<.001$ ) with decreased criminality beliefs than having a family/friend with opioid misuse experience ( $\beta = -0.08$ ,  $t(946)=-2.51$ ,  $p=.012$ ); however exposure to the CJ system personally or *via* family/friends did not help explain differences in criminality beliefs. Black was the only race/ethnic group (compared to non-Hispanic White) associated with less criminality beliefs ( $\beta = -0.07$ ,  $t(946)=-2.21$ ,  $p=.027$ ). Both increasing age ( $\beta = 0.09$ ,  $t(946)=2.30$ ,  $p=.022$ ) and being male ( $\beta = 0.08$ ,  $t(946)=2.48$ ,  $p=.013$ ) were associated with greater criminality beliefs.



## Discussion

We hypothesized that the general public would report high levels of stigma. We find, however, that US adults do not have high levels of stigma toward OUD, as we would consider a score of 4 or above (indicating agreement with stigmatizing statements) to be high. We found that stigma levels varied by experiences of opioid misuse, CJ involvement and several other individual level characteristics. Supporting this finding, we also found that the general population is more likely to agree with policies that support treatment for people with OUD, confirming previous studies (Kennedy-Hendricks et al., 2017). In addition, adults are more likely to disagree with arresting, convicting, or sentencing to jail/prison because of OUD. Opposite to our hypothesis, we found that the general population generally understands that OUD is a medical condition.

We identified several factors that are associated with higher levels of stigma related to OUD. As suggested by Attribution Theory, our strongest factor associated with reduced stigma was the belief that OUD is a medical condition. Those adults who disregard OUD as a medical condition are more likely to hold stigmatizing beliefs toward OUD, perhaps because they see the person as more blameworthy due to their view of OUD as a personal choice. This finding suggests perhaps the need for awareness raising campaigns on the evidence supporting OUD as a medical condition (Corrigan & Nieweglowski, 2018). However, as noted by Pescosolido and colleagues, (Pescosolido et al., 2010) research data in the related field of mental health and alcohol dependence show that the impact on stigma of efforts to frame SUD and mental illness as brain diseases in some cases has no effect or even increased stigma by potentially heightening the perceptions of the permanence of the illness as a disease and pessimism regarding recovery.

While holding a neurobiological conception of these disorders increased the likelihood of support for treatment, it was also associated with either no effect or some increases in community stigma (Pescosolido et al., 2010). More research is needed to see if such a relationship applies to OUD in the 2020s (Pescosolido used data from more than 15 years ago). Pescosolido and colleagues assert that a focus on the abilities and competencies of those with a disorder or dependency to function and integrate effectively within the community might be a more promising path to reduce public stigma (Pescosolido et al., 2010). McGinty and Barry (2020) also point to other strategies to reduce stigma such as using “person-first” language in communications about OUD, highlighting the availability of effective treatment for OUD, using sympathetic narratives to humanize people with addiction, emphasizing societal rather than individual causes of addiction, and embedding stigma reduction campaigns with other comprehensive treatment strategies (McGinty & Barry, 2020).

Next, we found some support for the familiarity hypothesis that exposure to opioid misuse or CJ, personally (but not *via* family members or close friends) would affect stigma, policy attitudes, and perceptions of criminality. While Kennedy-Hendricks et al. (2017) did not find that personal experience with opioids was related to stigma, like our study, these findings are consistent with the fact that those with lived experiences or familiarity with family or friends suffering from addiction can relate to the power of addiction and tend to be less

stigmatizing (Corrigan & Nieweglowski, 2018). Similarly, those with lived justice system experience may be more likely to understand the difficulties of trying to re-orient their life away from illegal behavior and we also found that they tend to be less stigmatizing. While we have a general population sample and common wisdom is that you might not expect to find many people with lived justice system experience, we had 14% of our sample with a prior justice system experience which is consistent with recent estimates of the proportion of the US adult population with a criminal record (Friedman, 2015).

Having a family member or friend with an opioid use history or with a CJ experience did not help explain variation in stigma. This was surprising since research suggests that stigma toward mental health is generally reduced through increased contact with individuals with mental illness (Alexander & Link, 2003; Couture & Penn, 2003). It could be that the experience of a family member or friend of a person struggling with opioids or past justice involvement indirectly is just not as salient as the lived experience of individuals who personally underwent problems with opioids and criminal justice involvement. A family member or friend's indirect experience just might not be potent enough to 'tip the scales' to changing one's view on opioid stigma. While it is no doubt very difficult for family and friends to have the indirect experience of opioids and justice involvement, on average, it might not be as life changing as that of the lived personal experience, with the indirect experience not affecting levels of stigma for family and friends. In the case of opioids, family members or friends' views were nevertheless associated with less support for a criminal law approach for opioids and they were less likely to be in opposition to policies that would benefit people with OUD (i.e. they support beneficial policies). However, family/friend histories of justice involvement proved even less salient than opioid histories for family/friends and were also not associated with preferring use of the criminal law for opioids or OUD policies. The differences between lived and indirect experiences with opioids and the justice system is an understudied area. This area requires more research before ruling out the importance of the role of these indirect experiences in shaping attitudes toward opioids. For now, we need to recognize the complexity of the problem of stigma and the likely need for more nuanced interventions to bring the difficulties of OUD and recovery to the attention of the general public.

We also observed some variation in support of stigmatizing beliefs toward OUD by demographics. Respondents who are younger, Black, have less than a high school education hold less stigmatizing beliefs toward OUD (compared to non-Hispanic Whites and those with a high school diploma/equivalency). However, Asians (compared to non-Hispanic Whites) and those earning higher income (\$85,000-\$149,999 compared to those earning \$50,000 - \$84,000) are more likely to support stigmatizing beliefs toward OUD and people who misuse opioids. These data can also help culturally tailor some of the public education efforts to specific groups likely to harbor greater opioid stigma.

Next, we found a somewhat similar set of significant covariates for the criminality model. Those Americans who disregard OUD as a medical condition are more likely to endorse addressing OUD through the criminal law. We found that personal exposure and indirect exposure through family friends to opioid misuse was associated with less support for a

criminal law approach, suggesting that those with greater immediate familiarity with opioid misuse do not see the benefits of using the criminal law to address OUD.

We hypothesized but did not find that exposure to the CJ system would help explain differences in endorsing a criminal law approach to OUD. We observed some variation in support of criminalizing OUD by demographics. For example, to promote greater endorsement for non-criminal justice interventions for OUD, policymakers or other advocates might consider targeting education to older white males, those with a high school education, those not retired from employment, and those earning higher income (\$85,000-\$149,999).

A similar set of factors and demographics, as the stigma and criminality models, were also associated with support for policies related to changing laws or increasing government spending or benefits to increase access to OUD treatment. Those who disregard OUD as a medical condition expressed greater opposition to policies that benefit people with OUD; that is, they were less supportive of pro-treatment approaches to OUD. We found that exposure to opioid misuse was associated with more support for pro-treatment policies, suggesting that those with familiarity see the benefits of a more pro-public health approach to OUD.

## Limitations

While our use of a cross-sectional design is common in the stigma literature, it is not possible to make causal or other temporal inferences with these data. It is not clear whether disregard of OUD as a medical condition leads to higher stigma toward OUD or whether the reverse is true. There are also some challenges with interpreting the mid-points on attitudinal scales like the type used in this study on stigma, policies, criminality, and disregard for OUD as a medical condition. For these scales, we treat the middle category of ‘neither disagree nor agree’ (a score of 3 from a scale from 1 to 5) as a moderate or mid-level score, but we recognize that not all methodologists agree with such an interpretation. While it is beyond the scope of this paper to conduct a psychometric study of the scaling of our measures, we do acknowledge literature that suggests that the category of ‘neither disagree or agree’ should be treated interpreted as having ‘no opinion’ or being ‘neutral’ (Nowlis et al., 2002). Nevertheless, recent research suggests that it is often reasonable to interpret the midpoint as a substantive response (e.g. representing a moderate attitude) and that the effects of the ability and motivation of the respondents on midpoint response are not necessarily uniform and do not univocally support a bias in their response (Truebner, 2021).

As noted earlier, while we have a fair number of individuals with histories of opioid misuse and lived experience with the CJ system in our sample (14%), our household study did not include individuals at the highest risk (e.g. those currently incarcerated). As with other self-report surveys, our respondents could suffer from recall and social desirability biases, although this form of online survey measurement is common in the social sciences and has been shown to generate reliable and valid estimates of risky behaviors (Thornberry & Krohn, 2000). Also, self-report surveys on stigma have been used by other substance abuse researchers (Barry et al., 2014; Kennedy-Hendricks et al., 2017). Next, we assessed lifetime

exposure to opioid misuse and the CJ system. It would have also been useful to have had a measure of recent (e.g. past year) opioid and CJ exposure to assess if more recent exposure had a stronger effect on our outcome measures.

As with other household surveys, our study had a modest response rate (see methods section) which could have potentially left out some segment of the American adult population. Nevertheless, the AmeriSpeak panel's response rate of 37% is one of the highest for comparable national probability-based household panels (Montgomery et al., 2018). Also, we weighted our data to national census benchmarks, taking into account selection probabilities (balanced by sex, age, education, race/ethnicity, region [and age \* gender, age \* race and race \* gender]). However, AmeriSpeak does not weight its data on employment. Usually by weighting on the above factors it creates good representation on a series of other factors but not all factors such as specific sub-groups of employment (e.g. our estimate of 6.97% for those "not working – looking for work" is higher by a few percentage points than typically measured by the Bureau of Labor Statistics for that group) (Bureau of Labor Statistics, 2020). We also addressed possible non-response bias with our statistical weights (Dennis, 2019).

## Conclusion

Our findings suggest that most American adults hold moderate levels of stigma toward OUD. However, most respondents regard OUD as a medical condition, and are more likely to agree with policies that provide treatment to people with an OUD than with policies that rely upon the criminal law. Our data provide guidance on groups to engage in public education through the mass media to reduce stigma and draw more support for public health interventions for OUD. While it might be a complex relationship as noted earlier (Pescosolido et al., 2010), our data also suggest that researchers need to explore in rigorous evaluations whether there is value in including a component emphasizing OUD as a medical condition in the content of public education efforts.

## Funding

This work was supported by grant 1U2CDA050098-01 via a subcontract, AWD100228, with the University of Chicago. Funding came from the National Institute of Health's (NIH) National Institute on Drug Abuse (NIDA), Justice Community Opioid Innovation Network (JCOIN), protocol approval number JCOIN 026. The views expressed do not necessarily reflect the policies of NIDA. NIDA staff worked with the study investigators on the study research questions, measures and research design but had no involvement in the collection, analysis, or interpretation of data, in the writing of this report, or in the decision to submit this article for publication.

## Technical Appendix

### I. Policy attitudes toward opioid use disorder

Instructions: The next set of question are about a class of drugs called opioids and your experience with them directly or through a family member or close friend. When we refer to opioids below, we are including both illegal drugs, such as heroin; and legal prescription opioids that might be misused or used differently than prescribed, such as synthetic opioids (fentanyl), and pain relievers or cough sirups available by prescription,

such as oxycodone (OxyContin®), hydrocodone (Vicodin®), codeine (including Lean and Purple Drink), percocet, tramadol, morphine, and others.

As with all AmeriSpeak surveys we want to remind you of the confidential nature of this survey and that all survey questions below are voluntary. However, we encourage you to answer the below questions and have your voice heard on America’s current opioid problem.

*We would like to ask you some questions about policies related to the problem of opioid addiction/prescription pain medication or cough sirup misuse.*

**Do you disagree or agree with the following statements?**

Statement	Select one option				
	1 = Strongly disagree	2 = Somewhat disagree	3 = Neither disagree or agree	4 = Somewhat agree	5 = Strongly agree
a. I favor expanding Medicaid <sup>1</sup> insurance benefits for low income families to provide coverage for treatment of opioid use disorders/addiction problems, including addiction to prescription pain medications.	1	2	3	4	5
b. I favor making naloxone (also known as “Narcan”), a medication that can quickly reverse the effects of a person experiencing an opioid overdose, widely available and affordable without a prescription.	1	2	3	4	5
c. I believe that making drug treatment mandatory is an effective way to help people with an opioid use disorder.	1	2	3	4	5
d. I favor increasing government spending to improve treatment of opioid use disorder/addiction.	1	2	3	4	5
e. I favor passing laws to protect people from criminal charges for drug crimes if they seek medical help for experiencing an opioid/prescription pain medication problem.	1	2	3	4	5
f. I believe that incarceration/jail is an effective way to improve the health of people with an opioid use disorder.	1	2	3	4	5
g. I believe that incarceration/jail is an effective way to reduce the risk of overdosing for people with an opioid use disorder.	1	2	3	4	5
h. I believe that people in jail/prison with an opioid use disorder/addiction problem should get access to medication for opioid use disorder (e.g. methadone, buprenorphine, or naltrexone)	1	2	3	4	5

<sup>1</sup>The respondent will see/hear a hover definition (in blue font) for this term: Please note that Medicaid provides health coverage to eligible low-income adults, children, pregnant women, elderly adults, and people with disabilities. Medicaid is funded and administered by states, according to federal requirements.

## II. Social stigma toward opioids use disorder scale

Do you disagree or agree with the following statements?

Statement	Select one option				
	1 = Strongly disagree	2 = Somewhat disagree	3 = Neither disagree or agree	4 = Somewhat agree	5 = Strongly agree
a. I would be willing to have a person with a <u>past history</u> of opioid use disorder/addiction start working closely with me on a job.	1	2	3	4	5
b. I am comfortable having a person with a <u>past history</u> of opioid use disorder/addiction marry into my family.	1	2	3	4	5
c. I would be willing to have a person with a <u>current</u> opioid use disorder/addiction start working closely with me on a job.	1	2	3	4	5
d. I would be comfortable to have a person with a <u>current</u> opioid use disorder/addiction marry into my family.	1	2	3	4	5
e. People with a <u>current</u> addiction to opioids/prescription pain medications are more dangerous than the general population.	1	2	3	4	5
f. A person who is <u>currently</u> addicted to opioids/prescription pain medication cannot be trusted.	1	2	3	4	5

## III. Perceptions of criminality/appropriateness of treatment

Instructions: We would like to ask you some questions about your feelings toward treatment and punishment for opioid use disorder.

Do you disagree or agree with the following statements?

Statement	Select one option				
	1 = Strongly disagree	2 = Somewhat disagree	3 = Neither disagree or agree	4 = Somewhat agree	5 = Strongly agree
a. I favor arresting and prosecuting people who obtain opioids/pain medication from sources other than a medical provider.	1	2	3	4	5
b. I favor arresting and prosecuting people who or use opioids in a way not as prescribed by a doctor.	1	2	3	4	5
c. People found guilty of misuse of opioids/prescription pain medication need to be sentenced to jail or prison.	1	2	3	4	5
d. Individuals who are incarcerated with an opioid use disorder/addiction should get access to evidence-based treatment while incarcerated.	1	2	3	4	5

Statement	Select one option				
	1 = Strongly disagree	2 = Somewhat disagree	3 = Neither disagree or agree	4 = Somewhat agree	5 = Strongly agree
e. Individuals who are on parole or probation with an opioid use disorder/addiction should get access to evidence-based treatment.	1	2	3	4	5

#### IV. Beliefs about opioid use disorder (OUD) and OUD treatment

These items were not adapted from an existing scale, but rather are new items developed from literature that were pilot tested with this survey. The items in bold below were used for the Disregard of Opioid Use Disorder as a Medical Condition Subscale.

Below we ask about your beliefs and knowledge of opioids and treatments for opioid use disorder (addiction to opioids). Answer whether you agree or disagree with the following statements about opioid use disorder/addiction.

Statement	Select one option				
	1 = Strongly disagree	2 = Somewhat disagree	3 = Neither disagree or agree	4 = Somewhat agree	5 = Strongly agree
a. Opioid addiction is defined by a person continuing to use opioids despite negative consequences.	1	2	3	4	5
b. Anyone who uses opioids long-term for pain has an opioid addiction.	1	2	3	4	5
<b>c. Most people who develop and/or struggle with opioid use disorder/addiction lack self-control.</b>	1	2	3	4	5
<b>d. Opioid use disorder/addiction is a moral failing.</b>	1	2	3	4	5
<b>e. A person struggling with opioid use disorder/addiction can quit using anytime if they choose.</b>	1	2	3	4	5
g. When misused, opioids can slow your breathing or even cause you to stop breathing entirely and lead to an overdose or death.	1	2	3	4	5
g. Evidence-based treatments for opioid use disorder can recover people from opioid addiction.	1	2	3	4	5
h. Opioid use disorder is a medical condition like other chronic health conditions.	1	2	3	4	5
i. A person struggling with opioid use disorder/addiction must hit rock bottom before they are ready to accept treatment.	1	2	3	4	5
j. It is easy to find good opioid use disorder treatment.	1	2	3	4	5

Statement	Select one option				
	1 = Strongly disagree	2 = Somewhat disagree	3 = Neither disagree or agree	4 = Somewhat agree	5 = Strongly agree
k. The FDA has approved medications that are effective in treating opioid use disorder/addiction.	1	2	3	4	5
l. Jailing someone with an opioid use disorder for at least a few days will help them by reducing their risk for an overdose.	1	2	3	4	5
<b>m. Medication for opioid use disorder (e.g. methadone, buprenorphine, or naltrexone) is a hoax.</b>	1	2	3	4	5
<b>n. Medication for opioid use disorder (e.g. methadone, buprenorphine/suboxone, or naltrexone/vivitrol) is just substituting one form of drug abuse for another type of drug abuse.</b>	1	2	3	4	5
o. People with an opioid use disorder/addiction need long-term treatment with medications.	1	2	3	4	5
p. People who misuse opioids can function as responsible members of society.	1	2	3	4	5

## V. Experience with opioids and criminal justice system

The next set of questions are about your own personal experiences or the experiences of any family members or close friends. We recognize these are sensitive items but like all the items on this survey your responses will be kept private and treated confidentially.

Statement	Please select one option	
a. Have you ever used opioids/prescription pain medication illicitly obtained or used in a way not prescribed by a doctor?	Yes	No
b. Have you ever overdosed from opioids/prescription pain medication?	Yes	No
c. Have you ever been convicted of any misdemeanor or felony crime?	Yes	No
d. Have you ever been incarcerated in jail or prison?	Yes	No
e. Have any family members or close friends you know ever used opioids/prescription pain medication illicitly obtained or used in a way not prescribed by a doctor?	Yes	No
f. Have any of your family members or close friends ever overdosed from opioids/prescription pain medication?	Yes	No
g. Have any of your family members or close friends ever been convicted of any misdemeanor or felony crime?	Yes	No
h. Have any of your family members or close friends ever been incarcerated in jail or prison?	Yes	No

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**Table 1.** Nationally representative sample of US Household adults: AmeriSpeak first quarter 2020 (n = 947a).

Characteristic	Unweighted %	Weighted <sup>b</sup> %	Weighted 95% Confidence Interval	US Census CPS% <sup>c</sup>
<b>Age</b>				
18-29	8.71	20.79	18.20, 23.38	21.10
30-44	27.81	24.86	22.10, 27.61	25.20
45-59	24.45	25.61	22.83, 28.39	26.20
60+	39.03	28.74	25.85, 31.63	27.50
<b>Male</b>	41.76	47.95	44.76, 51.13	48.30
<b>Race/ethnicity</b>				
Asian, non-Hispanic	2.52	3.61	2.42, 4.79	3.20
Black, non-Hispanic	8.71	11.07	9.07, 13.07	11.90
Other, non-Hispanic	1.99	2.14	1.22, 3.07	2.20
White, non-Hispanic	75.03	64.12	61.06, 67.18	63.5
Two or more race, non-Hispanic	3.36	3.23	2.10, 4.36	2.90
Hispanic	8.39	15.83	13.50, 18.16	16.30
<b>Lives in Metropolitan Statistical Area</b>	80.17	77.44	74.77, 80.11	—
<b>Educational attainment</b>				
< HS graduate	3.25	10.14	8.22, 12.07	10.60
HS graduate or equivalent	15.01	27.44	24.60, 30.29	28.60
Some college	39.24	28.12	25.25, 30.99	28.30
College degree or above	42.50	34.29	31.26, 37.32	32.50
<b>Employment Status</b>				
Not working – on temporary layoff from a job	0.21	0.34	-0.03, 0.70	—
Not working – looking for work	4.51	7.00	5.37, 8.63	—
Not working – retired	24.55	18.19	15.73, 20.65	—
Not working – disabled	6.40	10.06	8.15, 11.98	—
Not working – other	7.03	10.31	8.37, 12.25	—
Working – as a paid employee	46.90	45.30	42.12, 48.48	—
Working – self-employed	10.39	8.80	6.99, 10.60	—
<b>Household Income</b>				

Characteristic	Unweighted %	Weighted <sup>b</sup> %	Weighted 95% Confidence Interval	US Census CPS% <sup>c</sup>
<\$25,000	16.68	24.15	21.42, 26.88	23.40
\$25,000-\$49,999	24.97	25.47	22.69, 28.24	23.40
\$50,000-\$84,999	24.13	21.18	18.58, 23.79	21.10
\$85,000-\$149,999	25.08	22.23	19.58, 24.88	24.10
\$150,000+	9.13	6.98	5.35, 8.60	8.00
<b>Opioid exposure</b>				
Personal experience with opioid misuse <sup>d</sup>	10.28	13.64	11.45, 15.83	—
Personal overdose	1.68	2.52	1.52, 3.53	—
Family/friend experience with opioid misuse <sup>d</sup>	40.40	38.78	35.67, 41.89	—
Family/friend overdose	17.39	17.17	14.75, 19.58	—
<b>Criminal justice exposure</b>				
Personal experience with criminal justice system <sup>e</sup>	11.96	13.72	11.52, 15.91	—
Family/friend experience with criminal justice system <sup>e</sup>	42.39	43.90	40.73, 47.06	—

<sup>a</sup>Sample size included in this table includes participants with data for all three models: stigma, policy, and criminality.

<sup>b</sup>Base and sample-specific post-stratification weights were applied so the results are representative of US household adults.

<sup>c</sup>Data for this column is based on 2020 US Census Current Population Survey (CPS) data <https://www.census.gov/data/cps/data/cpstablecreator.html>.

<sup>d</sup>Opioid misuse is defined in the survey as ever used opioids/prescription pain medication illicitly obtained or used in a way not prescribed by a doctor.

<sup>e</sup>Experience with criminal justice system is defined in the survey as convicted of any misdemeanor or felony crime and/or incarcerated in jail or prison.

Descriptive statistics on outcome measures and knowledge by opioid misuse and justice system exposure, first quarter 2020 ( $n = 947$ ).

Table 2.

Scale Cronbach's $\alpha$	All respondents <sup>a</sup> Mean (95% CI)	Respondents with opioid exposure <sup>b</sup> Mean (95% CI)	Respondents without opioid exposure % Mean (95% CI)	Respondents with justice system exposure <sup>c</sup> Mean (95% CI)	Respondents without justice system exposure Mean (95% CI)
Stigma <sup>d</sup> $\alpha=.79$	3.35 (3.30, 3.40)	3.33 (3.25, 3.41)	3.36 (3.29, 3.42)	3.31 (3.24, 3.39)	3.37 (3.31, 3.43)
Policy <sup>e</sup> $\alpha=.79$	2.57 (2.52, 2.62)	2.44 (3.36, 2.52)**	2.66 (2.59, 2.73)**	2.50 (2.429, 2.57)**	2.63 (2.56, 2.70)**
Criminality <sup>f</sup> $\alpha=.76$	2.72 (2.67, 2.78)	2.59 (2.51, 2.67)**	2.82 (2.76, 2.89)**	2.68 (2.60, 2.77)	2.76 (2.69, 2.82)
Knowledge factor/Disregard for opioid misuse as a medical condition <sup>g</sup> $\alpha=.73$	2.60 (2.55, 2.65)	2.58 (2.50, 2.65)	2.61 (2.55, 2.68)	2.60 (2.53, 2.67)	2.60 (2.53, 2.66)

\*  $P < .05$

\*\*  $P < .01$  for t-test between opioid exposure vs no opioid exposure and justice system exposure vs no justice system exposure groups.

<sup>a</sup>The N for all respondents in this table is those who had complete data for all three models: stigma, policy, and criminality.

<sup>b</sup>Opioid exposure defined as personal misuse, overdose, having a family member or friend misuse or overdose on opioids.

<sup>c</sup>Justice system exposure includes being personally or having a family member or friend convicted or incarcerated in jail or prison.

<sup>d</sup>The stigma scale score was calculated from six items about willingness to have a person with a past history of opioid misuse work with you or marry into your family and willingness to have a person with a current opioid misuse work with you, marry into your family, their perceived dangerousness and trustworthiness. Higher scores indicate more stigma toward people who misuse opioids.

<sup>e</sup>The policy scale score was calculated from eight items about policies related to government spending for opioid misuse, accessibility of opioid misuse treatment, and criminal charges. Higher scores indicate less support for policies that benefit people who misuse opioids.

<sup>f</sup>The criminality scale was calculated from five items related to arresting and prosecuting people who misuse opioids and their access to treatment. Higher scores indicate greater perceived criminality of opioid misuse.

<sup>g</sup>Disregard for opioid misuse as a medical condition was calculated from five items. Higher scores indicate greater disregard of OUD as a medical condition (lower knowledge).

Individual-level characteristics of factors associated with opioid stigma, criminality and policy outcomes: AmeriSpeak first quarter 2020 (N = 947).

Table 3.

Variable	Stigma <sup>a</sup>		Criminality <sup>b</sup>		Policy <sup>c</sup>	
	Standardized $\beta$ (95% CI)	Standardized $\beta$ (95% CI)	Standardized $\beta$ (95% CI)	Standardized $\beta$ (95% CI)	Standardized $\beta$ (95% CI)	Standardized $\beta$ (95% CI)
Age	0.189 (0.101, 0.277)**	0.093 (0.013, 0.172)*	0.046 (-0.035, 0.128)			
Male (reference: female)	0.032 (-0.023, 0.099)	0.077(0.016, 0.138)**	0.108 (0.045, 0.171)**			
<b>Race/Ethnicity</b> (reference: non-Hispanic White)						
Asian, non-Hispanic	0.079 (0.019, 0.138)*	0.030 (-0.024, 0.084)	-0.029 (-0.085, 0.026)			
Black, non-Hispanic	-0.091(-0.157, -0.025)**	-0.067 (-0.127, -0.007)**	-0.104 (-0.165, -0.042)**			
Other, non-Hispanic	-0.014 (-0.070, 0.043)	0.000 (-0.051, 0.051)	-0.074 (-0.127, -0.022)**			
Two or more race, non-Hispanic	0.038 (-0.023, 0.099)	0.003 (-0.052, 0.058)	0.013 (-0.043, 0.070)			
Hispanic	-0.054(-0.121, 0.013)	0.045 (-0.016, 0.106)	0.016 (-0.046, 0.079)			
<b>Educational attainment</b> (reference: HS graduate or equivalent)						
< HS graduate	-0.089 (-0.157, -0.021)**	-0.068(-0.129, -0.007)*	0.047(-0.016, 0.110)			
Some college	-0.006 (-0.078, 0.066)	-0.066(-0.131, -0.001)*	-0.028 (-0.095, 0.039)			
College degree or above	-0.045 (-0.127, 0.038)	-0.158 (-0.232, -0.084)**	-0.116 (-0.193, -0.039)**			
<b>Employment Status</b> (reference: working – as a paid employee)						
Not working – on temporary layoff from a job	-0.016 (-0.079, 0.047)	0.004(-0.053, 0.061)	0.027 (-0.032, 0.086)			
Not working – looking for work	-0.023 (-0.085, 0.039)	0.001(-0.055, 0.056)	-0.07 (-0.127, -0.012)*			
Not working – retired	0.015 (-0.067, 0.098)	-0.089(-0.163, -0.015)*	-0.091 (-0.168, -0.014)*			
Not working – disabled	-0.010 (-0.081, 0.062)	-0.031 (-0.095, 0.034)	-0.102 (-0.169, -0.036)**			
Not working – other	0.054 (-0.013, 0.121)	-0.012(-0.072, 0.048)	0.03 (-0.032, 0.092)			
Working – self-employed	0.061 (-0.002, 0.124)	-0.041 (-0.097, 0.016)	-0.045 (-0.103, 0.013)			
<b>Household income</b> (reference: \$50,000-\$84,000)						
<\$25,000	-0.013 (-0.097, 0.071)	0.004(-0.072, 0.080)	-0.040 (-0.118, 0.038)			
\$25,000-\$49,999	-0.053 (-0.131, 0.026)	0.006(-0.065, 0.076)	-0.001 (-0.074, 0.072)			
\$85,000-\$149,999	0.073 (0.000, 0.147)	0.082(0.016, 0.149)*	0.084 (0.016, 0.153)*			
\$150,000+	0.0593 (-0.013, 0.120)	0.036 (-0.024, 0.096)	0.025 (-0.037, 0.087)			
<b>Lives in MSA</b> (reference: does not)	0.053 (-0.009, 0.115)	-0.029 (-0.085, 0.027)	-0.011 (-0.069, 0.047)			

Variable	Stigma <sup>a</sup>		Criminality <sup>b</sup>		Policy <sup>c</sup>	
	Standardized $\beta$ (95% CI)	Standardized $\beta$ (95% CI)	Standardized $\beta$ (95% CI)	Standardized $\beta$ (95% CI)	Standardized $\beta$ (95% CI)	Standardized $\beta$ (95% CI)
Personal experience with opioids (including overdose) (reference: no experience)	-0.087 (-0.157, -0.018) <sup>*</sup>	-0.186 (-0.249, -0.123) <sup>**</sup>	-0.089 (-0.154, -0.025) <sup>**</sup>			
Personal experience with criminal justice system (reference: no experience)	-0.101 (-0.171, -0.032) <sup>**</sup>	-0.018 (-0.080, 0.045)	-0.049 (-0.114, 0.016)			
Family/friend experience with opioids (including overdose) (reference: no experience)	0.011 (-0.061, 0.082)	-0.082 (-0.146, -0.018) <sup>*</sup>	-0.103 (-0.170, -0.037) <sup>**</sup>			
Family/friend experience with criminal justice system (reference: no experience)	0.033 (-0.039, 0.105)	-0.028 (-0.037, 0.093)	-0.001 (-0.67, 0.068)			
Disregard for OUD as a medical condition <sup>d</sup>	0.282 (0.220, 0.345) <sup>**</sup>	0.508 (0.452, 0.564) <sup>**</sup>	0.479 (0.421, 0.537) <sup>**</sup>			

<sup>\*</sup>  $p < .05$

<sup>\*\*</sup>  $p < .01$ .

<sup>a</sup>The stigma scale score was calculated from six items about willingness to have a person with a past history of opioid misuse work with you or marry into your family and willingness to have a person with a current opioid misuse work with you, marry into your family, their perceived dangerousness and trustworthiness. Higher scores indicate more stigma toward people who misuse opioids. Adjusted  $R^2 = .162$ ;  $p$ -value  $< .001$ .

<sup>b</sup>The criminality scale was calculated from five items related to arresting and prosecuting people who misuse opioids and their access to treatment. Higher scores indicate greater perceived criminality of opioid misuse. Adjusted  $R^2 = .327$ ;  $p$ -value  $< .001$ .

<sup>c</sup>The policy scale score was calculated with eight items about policies related to government spending for opioid misuse, accessibility of opioid misuse treatment, and criminal charges. Higher scores indicate less support for policies that benefit people who misuse opioids. Adjusted  $R^2 = .276$ ;  $p$ -value  $< .001$ .

<sup>d</sup>Disregard for opioid misuse as a medical condition was calculated from five items. Higher scores indicate greater disregard of OUD as a medical condition (lower knowledge).