Development and examination of the Attribution Questionnaire-Substance Use Disorder (AQ-SUD) to measure public stigma towards adolescents experiencing substance use disorders

Annalee Johnson-Kwochka[a,b]

Matthew C. Aalsma[b]

Patrick O. Monahan[c]

Michelle P. Salyers[a]

[a] Department of Psychology, Indiana University-Purdue University Indianapolis, Indianapolis, IN, U.S.A.
[b] Adolescent Behavioral health Research Program, Indiana University School of Medicine, Indianapolis, IN, U.S.A
[c] Department of Biostatistics, Indiana University School of Medicine, Indianapolis, IN, U.S.A
Corresponding Author: Annalee Johnson-Kwochka, Indiana University-Purdue University Indianapolis, Office LD120A, 402 North Blackford Street, Indianapolis, IN, 46202, U.S.A, email: anvjohns@iu.edu

---

This is the author's manuscript of the article published in final edited form as:

Johnson-Kwochka, A., Aalsma, M. C., Monahan, P. O., & Salyers, M. P. (2021). Development and examination of the attribution questionnaire-substance use disorder (AQ-SUD) to measure public stigma towards adolescents experiencing substance use disorders. Drug and Alcohol Dependence, 221, 108600. https://doi.org/10.1016/j.drugalcdep.2021.108600

Abstract

Background: Public stigma may significantly impact adolescents with substance use disorders (SUDs), leading to limited treatment accessibility and utilization. However, few measures have been validated to assess public SUD stigma towards adolescents. In this study we developed the Attribution Questionnaire-Substance Use Disorder (AQ-SUD) by modifying the Attribution Questionnaire, a commonly used measure of public mental illness stigma. We examined 1) the psychometric properties of the AQ-SUD with supporting data from other stigma scales and 2) preliminary data on adults' perceptions of public stigma toward adolescents with SUDs.
Methods: Adult participants (n = 304) were randomly assigned to one of four vignettes about an adolescent with a specific SUD diagnosis (opioid, marijuana, alcohol, and stimulant use disorders). Participants completed the AQ-SUD and three other measures of public stigma designed to assess convergent and divergent validity.
Results: Analyses indicated that the modified AQ-SUD has good psychometric properties, and revealed a four-factor structure: negative emotions, assessment of responsibility, social disengagement, and lack of empathy. Additional public stigma scales demonstrated good psychometrics and provided evidence of both convergent and divergent validity for the AQ-SUD Preliminary analysis of public stigma towards adolescents with a SUD suggests that attitudes about marijuana use disorder differ significantly from attitudes about other SUDs.
Conclusions: This study is the first to modify and validate a measure designed to assess perceptions of public SUD stigma towards adolescents, the AQ-SUD. Preliminary analyses suggest that adults view adolescent marijuana use disorders as less severe compared to other SUDs, which may have implications for adults' motivation to support youth in seeking treatment.

Keywords
Stigma; adolescents; substance sue disorder; public stigma; discrimination; policy attitudes; public opinion

1. Introduction

In the United States, approximately 1.3 million adolescents struggle with a substance use disorder (SUD) annually (Center for Behavioral Health Statistics and Quality, 2015). It is critical to appropriately treat SUDs during adolescence, as untreated SUDs increase the likelihood of cognitive, physical, and psychosocial problems (Gil et al., 2004; Tapert et al., 2001), as well as involvement with the juvenile justice system (Doran et al., 2012). However, only 10% of adolescents with SUDs receive treatment each year (Mericle et al., 2015). Explanations for this treatment gap include few local treatment options, unsupportive parents, and high treatment cost (Winters et al., 2018). Public stigma, or negative attitudes towards people experiencing SUDs, may also contribute to scarce treatment availability and low treatment engagement among adolescents. Multiple studies find that stigma correlates with increased support for punitive and discriminatory policies towards people with SUDS (Barry et al., 2014; Kennedy-Hendricks et al., 2017) and decreased public support for public health measures like expanding Medicaid benefits to cover SUD treatment (Kennedy-Hendricks et al., 2017). In terms of treatment engagement, Keyes and colleagues (2010) find that individuals with alcohol use disorder who perceive higher stigma were less likely to utilize treatment services.

1.1 Attribution Model of public mental illness stigma.

Research on public SUD stigma is limited; however, existing literature on public mental health stigma is quite extensive. One model used to understand the role of public mental health stigma is the Attribution Model of public mental illness stigma (Corrigan et al., 2003). This model suggests that attributions about the causes of mental illness and negative outcomes of mental illness (e.g. violence, criminal behavior) impact public mental health stigma. That is, attributions of causes and negative outcome contribute to negative emotional reactions (e.g., fear,

pity), which then lead to discriminatory behaviors. The Attribution Model, when applied to mental illness, has been supported by a number of studies (Corrigan et al., 2014; Lee et al., 2014; Schomerus et al., 2012; Sousa et al., 2012). The application of this model to public SUD stigma is limited; for example, belief in biogenetic causes of SUDs has been associated with increased social disengagement from people with SUDs (Larkings and Brown, 2018; Schomerus et al., 2014).

1.2 Attribution Model of public substance use disorder stigma.

There are important differences between public stigma associated with mental illness and SUD disorder diagnoses; Lloyd's (2013) review of stigmatization of problematic drug users suggests that people with SUDs may experience more blame for their illness compared to people with mental illness. Applying the Attribution Model to SUDs, different substances may lead to differing levels of stigma. For example, Perry and colleagues (2019) find that while Americans do not hold people with opioid use disorder responsible for their illness, the public endorses high levels of social exclusion and perceptions of incompetence. Conversely, examination of attitudes toward marijuana users finds a low desire for social exclusion and little support for coercive treatment of people with marijuana use disorder (Brown, 2015).

While there is increasing recognition of the need to measure SUD stigma, few measures of public SUD stigma exist (Brown, 2011; Corrigan et al., 2017; Wakeman and Rich, 2018). The majority of existing measures have been adapted from measures of public mental illness stigma without systematic evaluation or validation for public SUD stigma. Research indicates that the basic underpinnings of public mental illness stigma can be applied to SUDs (Corrigan et al., 2005, 2006; Harnish et al., 2016). However, there may be additional negative stereotypes associated with SUDs accounting for pronounced aspects of public stigma that are not assessed

by existing measures of public mental illness stigma (Corrigan et al., 2017; Nieweglowski et al., 2019). For example, SUDs have been associated with additional stereotypes about being a criminal, associated with feelings of disgust, and inability to care for themselves (Nieweglowski et al., 2017, 2019). Thus, it is necessary to tailor existing measures of mental illness stigma to better address public stigma related to SUDs. In addition, to our knowledge, no public stigma measures have been validated to measure attitudes about adolescents with SUDs, and no studies have examined public stigma towards adolescents experiencing SUDs. It may be important to examine adults' attitudes about adolescents, since adult family members and others (e.g., teachers, physicians) play an essential role in facilitating appropriate treatment (McWhirter, 2008); current research suggests that positive parental support is related to decreased substance use (Wills et al., 2004).

1.4 The current study.

This study has three aims. First, we draw from recent exploratory research on the nature of public SUD stigma (Nieweglowski et al., 2017, 2019) to tailor a commonly used measure of public mental illness stigma, the Attribution Questionnaire, for the purpose of examining attitudes about adolescents experiencing specific SUDs. Second, we examine psychometric evidence for the validity of the tailored Attribution Questionnaire-Substance Use Disorder (AQ-SUD), as well as three additional measures of public stigma. Finally, we present exploratory findings on the characteristics of public SUD stigma toward adolescents.

2. Methods

2.1 Procedures

This was a cross-sectional study using an experimental design in which participants were recruited via Amazon Mechanical Turk (MTurk), an internet marketplace often used to gather

research data in the behavioral sciences. The “survey about substance use disorders,” asked prospective participants to give their opinion about SUDs. After providing informed consent, participants answered demographic questions and were randomly assigned by Qualtrics to one of four vignettes about an adolescent, “Derek,” with a SUD. The vignettes differed by diagnosis (i.e., opioid use disorder, marijuana use disorder, stimulant use disorder, alcohol use disorder). After reading the vignette, participants completed measures described below via an online survey in Qualtrics (*Qualtrics*, 2005). After the survey, participants were assigned a code verifying completion, and were paid $2.00. Participants whose responses passed attention and quality checks were paid an additional $0.20. Average completion time was 10 minutes, so compensation translated to approximately $12/hour. In accordance with the declaration of Helsinki, all procedures were approved by the University’s IRB.

2.2 Participants

Participants were required to be at least 18 years old, reside in the United States, speak English, and have a high MTurk approval rating (i.e., 80% of previously completed tasks were high-quality). For inclusion in the analysis, participants were required to pass attention checks (e.g., questions prompting the participant to select “5” as the answer) and a manipulation check (i.e., asking participants to identify the SUD diagnosis described in the vignette) embedded in the Qualtrics survey. These checks are sufficient to gather quality data in MTurk research (Kees et al., 2017). Of 355 total participants, 304 (85.6%) provided correct answers to attention and quality checks, consistent with rates found in MTurk studies with similar vignette methodologies (Corrigan et al., 2018; Fischer et al., 2020). We performed analyses on data from these 304 participants; missing data was minimal and was deleted listwise in each analysis. Of the 304 participants, 80 were randomized to the vignette about opioid use disorder, 88 to marijuana use

disorder, 68 to stimulant use disorder, and 68 to alcohol use disorder. The quality pass rate did not differ across diagnostic conditions ($\chi^2 = 0.9$, $df = 3$, $p = .826$).

2.3 Measures

Our primary measure of public SUD stigma is a modification of the Attribution Questionnaire, which is grounded in theory. For validation purposes, we chose measures based on the recommendation to include measures of stereotypes, prejudice, and discrimination when assessing stigma (Fox et al., 2018). Each measure was modified in consultation with recent literature (Corrigan et al., 2017; Nieweglowski et al., 2017, 2019) and via collaborative review from the study authors, who are subject-matter experts in stigma, SUDs, and measurement development.

2.3.1 *Public Substance Use Disorder Stigma*.

The Attribution Questionnaire-27 (AQ-27), a widely used measure of public mental illness stigma, is a 27-item questionnaire that presents a vignette about a man (Harry) with schizophrenia and asks participants to answer questions scored across 9 subscales: *Blame, Anger, Pity, Help, Dangerousness, Fear, Avoidance, Segregation, and Coercion*. Each item is scored on a 9-point Likert scale from 1 (not at all) to 9 (very likely). The AQ-27 is theoretically driven (Corrigan et al., 2003; Lee et al., 2014) and has been shown to be reliable and valid (Pinto, Hickman, Logsdon, & Burant, 2012). In a sample of college students, the AQ-27 demonstrated good test-retest reliability across subscales ($r > .75$), and convergent validity with measures of social distance (Brown, 2008).

To modify this measure into the AQ-SUD, we first removed 7 items that performed poorly or were redundant in a previous confirmatory factor analysis (CFA) of the measure (Johnson-Kwochka et al., in press) to improve overall psychometric quality and reduce

participant burden. We removed one item that was not relevant to attitudes about adolescents (i.e., “If I were a landlord, I probably would rent an apartment to Derek”). Next, we developed 7 new items to reflect additional stereotypes associated with SUDs (Nieweglowski et al., 2019, 2017) and edited the text of existing items to reflect SUDs rather than severe mental illness (SMI) diagnoses, testing a total of 24 items (see Table 4 for all tested items). We also drafted new vignettes about an adolescent (Derek) with a SUD diagnosis (i.e., opioid use disorder, alcohol use disorder, stimulant use disorder, or marijuana use disorder). Prior studies using the Attribution Questionnaire (AQ) have used a variety of vignettes to manipulate different aspects of the vignette subjects’ demographics (i.e., manipulating sex, race, age, or diagnosis; Corrigan et al., 2005; Rao et al., 2007; Sattler et al., 2017; Sousa et al., 2012); our vignettes were based on the original version (Corrigan et al., 2003), and were equivalent on all aspects (i.e., sex, race, age) except for diagnosis (See Supplementary Material for vignettes).

2.3.2 *Desired Social Distance*.

The Social Distance Scale (SDS) is another commonly used measure of public stigma, often utilized to approximate behavioral avoidance of people with SMI (Link et al., 1987; Penn et al., 1994). The SDS asks participants to rate 7 items on a Likert scale from 1 (Definitely willing) to 4 (Definitely unwilling). We modified the scale by replacing the words “severe mental illness” with “substance use disorder.” The sum of ratings equals the social distance score, with higher scores representing greater desire for distance from people with a SUD.

2.3.3 *Familiarity with Substance Use Disorders*.

We measured participants’ familiarity with SUDs by modifying the Level of Contact Report (LOR) that describes 11 situations that vary in intimacy with persons with SMI (replaced with “substance use disorder”).Items vary from least intimate contact (“I have observed, in passing, a person that I believe had a substance use disorder”), to medium intimacy (“I have

worked with a person who had a substance use disorder at my place of employment") to high intimacy ("I have a substance use disorder"). Participants were asked to indicate which situations they have experienced. When the LOR was developed, the 11 situations were ranked in order of intimacy of contact. Inter-rater reliability for rank-order was high; the mean correlation between raters was .83 (Holmes et al., 1999). A subsequent sample of 100 research participants validated the rank order (Corrigan, Green, Lundin, Kubiak, & Penn, 2001).

2.3.4 *Causal Beliefs about Substance Use Disorders*.

Because beliefs in biogenetic causes of SUDs have been linked with higher stigma (Larkings and Brown, 2018), we asked participants to rate the extent to which they believe each of 10 possible items cause a substance use disorder; each situation (including "stressful life event," "grown up in a broken home," and "brain disease") was rated on a 5-point scale (from 1, "certainly not a cause" to 5, "certainly a cause"). Schomerus and colleagues (2014) developed this scale with relevance to vignettes describing alcohol use disorder, schizophrenia, and depression. Their exploratory factor analysis revealed a 3-factor structure: current stress, childhood adversities, and biogenetic causes.

2.4 Analyses

To describe the sample, we computed summary statistics for demographic variables. To describe relationships between variables and assess convergent and discriminant validity of each measure, we computed a Spearman correlation matrix. We also examined internal consistency for each measure using Cronbach's alpha.

To examine the factor structure of our modified version of the AQ, we conducted exploratory factor analysis (EFA) in SPSS (version 26) using Maximum Likelihood estimation (Osborne et al., 2008), and a Promax rotation. Although subscales exist for the original AQ, prior

studies have identified different numbers of factors (Brown, 2008), and new items were added that did not conceptually map onto existing subscales. The number of factors retained was determined by examining the scree plot (Osborne et al., 2008). We then removed items that had < .5 factor loading on their main factor or > .33 factor loading on other factors (Tabachnick and Fidell, 2012). Subscales were derived by summing items allocated to each factor. After determining the factor structure, we examined internal consistency of subscales and inter-item correlations (r) to identify low-performing or redundant items (e.g., removing one of two items on the same subscale when $r > .8$), thereby reducing participant burden.

We examined preliminary findings on SUD stigma. We computed summary statistics to describe participants' familiarity with SUDs, desire for social distance from people with SUDs, endorsement of public stigma, and endorsement of specific causes of SUDs across diagnostic categories. Using ANCOVA analyses, we examined differences in the Attribution Questionnaire and its subscales by vignette diagnosis (i.e., type of substance used). We included race, gender, and familiarity with SUDs as covariates. When ANCOVA omnibus tests were significant, we conducted post-hoc analyses using Tukey-Kramer tests to examine pairwise differences between means while controlling experiment-wise alpha at 0.05. We considered $p < .05$ significant for all analyses.

3. Results

3.1 Participant Demographics

Among 304 participants, 187 (61.5%) were male, 252 (82.9%) were White or Caucasian, and 39 (12.8%) were Hispanic. Participant's average age was 37.2 (SD = 10.97), and 171 (56.3%) indicated that they were currently married or living as married. One hundred and ninety-seven (64.8%) reported their annual income as less than $50,000 per year, and 175 (57.6%) had

at least a bachelor's degree. Two hundred and seventy-nine (91.8%) reported that they were currently employed. There were no differences in demographics between groups assigned to different vignettes.

3.2 Measurement Validation

3.2.1 Public Substance Use Disorder Stigma.

EFA of the AQ-SUD revealed a four-factor structure. Twenty-four items were included in the pilot test; we removed one item with a > .33 cross-loading on two factors, three items with < .50 factor loading on their primary factor, and two items that had inter-item correlations greater than $r = .80$ with another item in their primary factor (both on factor 1). We retained 18 items and identified four subscales from the factors, each demonstrating good variance explained and internal consistency; *negative emotions* (36.52%; $\alpha = .92$), *assessment of responsibility* (16.36 %; $\alpha = .84$), *lack of empathy* (11.53%; $\alpha = .86$), and *social disengagement* (6.34%; $\alpha = 82$). Primary factor loadings for retained items are available in Table 2 (see Table 4 for piloted items and reasons for removal).

3.2.2 Convergent and Divergent Validity of the AQ-SUD

The SDS demonstrated convergent validity indicated by high correlation with the *social disengagement* subscale ($r = .79$, $p < .001$) and the *lack of empathy* subscale ($r = .27$, $p < .001$) on the AQ-SUD; see Table 1 for full results. Consistent with prior literature showing that increased familiarity with mental illness is associated with lower stigma[57] and supporting divergent validity, we found that higher scores on the LOR were associated with lower scores on the *assessment of responsibility* subscale ($r = -.21$, $p < .001$) and with total stigma on the AQ-SUD ($r = -.18$, $p = .001$).

3.3 Preliminary Findings on SUD Stigma

3.3.1 *Descriptive statistics*.

In terms of familiarity with SUDs, 133 participants (43.8%) had a relative who has a SUD, 23 (7.6%) live with someone who has a SUD, and 28 (9.2%) have a SUD themselves. Participants scored an average of M = 2.9 (SD = 0.8) on the SDS; see Table 3. For the Causal Beliefs measure, participants reported similar scores on current stress (M = 3.6, SD = 0.7), childhood adversities (M = 3.9, SD = 0.8), and biogenetic causes (M = 3.4, SD = 0.9).

3.3.2 Public SUD Stigma by Diagnosis.

We performed ANCOVA analyses to examine differences in public stigma (on the AQ) by diagnosis in the vignette. While we found no differences in Social Disengagement ($F(6, 297) = 1.32$, $p = .276$, Partial $\eta^2 = 0.13$), significant differences were revealed on all other subscales: Negative Emotions ($F(6, 297) = 3.14$, $p = .006$, Partial $\eta^2 = 0.59$), Assessment of Responsibility ($F(6, 297) = 3.72$, $p = .001$, Partial $\eta^2 = 0.70$), and Lack of Empathy ($F(6, 297) = 5.18$, $p < .001$, Partial $\eta^2 = 0.93$). Post hoc tests showed that participants who read about an adolescent (Derek) with marijuana use disorder reported significantly lower negative emotions compared to those who read about opioid use disorder (p = .003). Participants who read about marijuana use disorder also reported significantly greater belief that Derek was responsible for his illness when compared to those who read about opioid use disorder ($p = .022$) or stimulant use disorder ($p = .001$). Finally, marijuana use disorder garnered significantly less pity or concern compared to all three other diagnoses (opioids, $p < .001$, alcohol, $p = .001$, stimulants, $p < .001$). The ANCOVA results are available in Table 3; covariates included in the models (race, gender, and familiarity with SUDs) were not significant.

4. Discussion

4. 1. The AQ-SUD

Despite growing concern about SUD stigma (Corrigan et al., 2017; Nieweglowski et al., 2019, 2017), few measures of public stigma towards people with SUDs have been well-developed, and none specifically evaluate adolescents. Our modified version of the Attribution Questionnaire, the AQ-SUD, was tailored specifically to SUDs and addresses multiple facets of public stigma. The Affect and Social Distance Scales identified by Brown (2011) reflect singular dimensions of SUD stigma, and were not modified to include additional affective or stereotypic aspects of stigma associated with SUDs.

Each subscale of the AQ-SUD revealed good internal consistency. The *lack of empathy* and *social disengagement* subscales demonstrated respectable convergent validity by correlating positively with the SDS. The *assessment of responsibility* subscale demonstrated divergent validity by correlating negatively with the LOR, indicating that people who were more familiar with SUDs were less likely to assign personal responsibility for illness to someone with an SUD. The *negative emotions* subscale did not demonstrate clear convergent or divergent validity through correlations with other measures; it is possible that this subscale, which is composed of ideas about anger, dangerousness, and criminality, is too general.

We reduced participant burden (compared to the 27-item version of the AQ) by eliminating items that had greater than $r = .80$ correlations with other items in the same subscale. In addition, three items were removed because they loaded onto both the *negative emotions* and *social disengagement* subscales (see Table 4, items 11, 14, and 23). Items 11 and 14 assess attitudes about coercive treatment, although it appears that they also activated attitudes about dangerousness.

The factor structure revealed by our EFA is similar to Brown's (2008) EFA of the AQ-27, measuring public stigma towards an individual with schizophrenia. Brown posited a 4-factor

structure of *fear/dangerousness*, *help/interact*, *forcing treatment*, and *negative emotions*, although the EFA revealed two additional subscales, *responsibility* and *empathy*, that lacked adequate psychometric properties. Items added to capture additional stereotypes about adolescents with SUDs did not change the overall factor structure, but may have strengthened the relevance of the *lack of empathy* and *assessment of responsibility* subscales in this study. It is also possible that *lack of empathy* and *assessment of responsibility* are more relevant to SUD compared to other mental illness diagnoses; exploratory research suggests that blame may be a more significant concern for people experiencing SUDs (Lloyd, 2012). Overall, this factor structure suggests that public information campaigns and anti-stigma trainings addressing SUD stigma might be modelled after existing campaigns to fight stigma towards mental illness, although tailored to address sentiments about blame and assessment of responsibility that may be more relevant to SUDs

4. 2. Preliminary findings on public stigma by diagnosis.

Preliminary analysis of the AQ-SUD revealed significant differences by SUD diagnosis. Our findings suggest that adults have different attitudes about adolescents with marijuana use disorder compared to other SUDs (especially opioid use disorder), exhibiting less pity, fewer negative emotions, and a belief that the adolescent with marijuana use disorder was more responsible for his illness compared to adolescents with other SUDs. Although there is little research on these constructs with adolescents, these findings are consistent with prior work suggesting that adult marijuana users are overall less stigmatized than adult heroin users, and that among participants who believed that marijuana use could have severe implications for one's health and daily functioning, public stigma was higher (Brown, 2015). Given that the vignettes used in this study controlled for the severity of the illness, by indicating that Derek's substance

use has significantly impacted his life, these results suggest that adults may view marijuana use disorders as less problematic compared to other SUDs that cause similar levels of impairment. Adults are essential participants and motivators in SUD treatment for adolescents; if adults do not view a youth's marijuana use as problematic, even when it is negatively affecting the youth's life, it may be more difficult for that youth to access and engage in appropriate treatment (McWhirter, 2008).

4. 3. Strengths and limitations.

This was the first study to systematically validate measures of public SUD stigma against adolescents, and exploratory analysis indicates differences in the AQ-SUD by diagnosis. Although our analysis was limited to attitudes about adolescents with SUDs, the AQ-SUD could easily be adapted to assess stigma related to adults with SUDS, given the strengths of vignette research to efficiently assess attitudes about people with differing characteristics.

There are limitations to conducting experimental research with vignettes; attitudes that participants express towards vignette subjects with SUDs may not be the same as expressed towards substance users in their own lives (Hughes and Huby, 2004). The participant sample was drawn from MTurk, and we utilized quality and validity checks to eliminate low-quality data, thereby addressing a limitation of data collection through MTurk (Kennedy et al., 2020); however, it is possible that some data was attained from inattentive participants. In addition, MTurk only allows adults to participate in research, so we were unable to examine attitudes that adolescents have about other adolescents with SUDs. However, adults' attitudes are highly relevant, given that adults make substance-use treatment related policy and it is necessary for adults, particularly parents, to facilitate or encourage adolescent SUD treatment.

4.4 Future directions.

As is common with measurement development, the AQ-SUD may require further modification and validation. Specifically, it will be important to further examine the *negative emotions* subscale to assess whether it should be broken down into more specific components (i.e., assessment of dangerousness, support for coercive treatment). Future research with the AQ-SUD should also take advantage of the strengths of vignette research to include vignettes about both adults and adolescents, allowing researchers to gain a better understanding of how public attitudes differ towards people with SUDs of different ages. Additional research should also seek to examine public stigma among adolescents themselves, in addition to assessing attitudes among important adults; existing research suggests that adolescents have highly stigmatized views and attribute blame to peers who struggle with alcohol abuse (Corrigan et al., 2005), but also that friends' substance-using behavior is the greatest predictor of an adolescent's use of different substances over time (Branstetter, Low, & Furman, 2011).

In clinical and organizational practice, this scale may be useful for assessing negative attitudes or stereotypes that important adults (e.g., probation officers, medical and mental health providers, teachers, parents) endorse regarding adolescents with SUDs. With additional validation, utilizing this scale provides an opportunity to intervene upon negative attitudes that may harm adolescents' development or progress in treatment.

References

Barry, C.L., McGinty, E.E., Pescosolido, B.A., Goldman, H.H., 2014. Stigma, discrimination, treatment effectiveness, and policy: Public views about drug addiction and mental illness. PS 65, 1269–1272. https://doi.org/10.1176/appi.ps.201400140

Branstetter, S.A., Low, S., Furman, W., (2011. The influence of parents and friends on adolescent substance use: a multidimensional approach, Journal of Substance Use 16, 150-160, https://doi.org/10.3109/14659891.2010.519421

Brown, S.A., 2008. Factors and measurement of mental illness stigma: A psychometric examination of the Attribution Questionnaire. Psychiatric Rehabilitation Journal 32, 89–94. https://doi.org/10.2975/32.2.2008.89.94

Brown, S.A., 2015. Stigma towards marijuana users and heroin users. Journal of Psychoactive Drugs 47, 213–220. https://doi.org/10.1080/02791072.2015.1056891

Brown, S.A., 2011. Standardized measures for substance use stigma. Drug and Alcohol Dependence 116, 137–141. https://doi.org/10.1016/j.drugalcdep.2010.12.005

Center for Behavioral Health Statistics and Quality, 2015. Behavioral health trends in the United States: Results from the 2014 National Survey on drug use and health (No. HHS publication no. SMA 15-4927, NSDUH series H-50). Substance Abuse and Mental Health Services Administration, Rockville, MD.

Corrigan, P., Green, A., Lundin, R., Kubiak, M.A., Penn, D.L., 2001. Familiarity with and social distance from people who have serious mental illness. PS 52, 953–958. https://doi.org/10.1176/appi.ps.52.7.953

Corrigan, P., Hafeez, M., Alkhouja, M., 2018. How does immigration status affect the public stigma of behavioral health disorders? Journal of Public Mental Health 17, 195–199. https://doi.org/10.1108/JPMH-04-2018-0026

Corrigan, P., Markowitz, F.E., Watson, A., Rowan, D., Kubiak, M.A., 2003. An Attribution Model of Public Discrimination Towards Persons with Mental Illness. Journal of Health and Social Behavior 44, 162–179. https://doi.org/10.2307/1519806

Corrigan, P., Schomerus, G., Shuman, V., Kraus, D., Perlick, D., Harnish, A., Kulesza, M., Kane-Willis, K., Qin, S., Smelson, D., 2017. Developing a research agenda for understanding the stigma of addictions Part I: Lessons from the mental health stigma literature. The American Journal on Addictions 26, 59–66. https://doi.org/10.1111/ajad.12458

Corrigan, P.W., Lurie, B.D., Goldman, H.H., Slopen, N., Medasani, K., Phelan, S., 2005. How adolescents perceive the stigma of mental illness and alcohol abuse. PS 56, 544–550. https://doi.org/10.1176/appi.ps.56.5.544

Corrigan, P.W., Mittal, D., Reaves, C.M., Haynes, T.F., Han, X., Morris, S., Sullivan, G., 2014. Mental health stigma and primary health care decisions. Psychiatry Research 218, 35–38. https://doi.org/10.1016/j.psychres.2014.04.028

Corrigan, P.W., Watson, A.C., Miller, F.E., 2006. Blame, shame, and contamination: The impact of mental illness and drug dependence stigma on family members. Journal of Family Psychology 20, 239–246. https://doi.org/10.1037/0893-3200.20.2.239

Doran, N., Luczak, S.E., Bekman, N., Koutsenok, I., Brown, S.A., 2012. Adolescent substance use and aggression: A review. Criminal Justice and Behavior 39, 748–769. https://doi.org/10.1177/0093854812437022

Fischer, M.W., Johnson-Kwochka, A.V., Firmin, R.L., Sheehan, L., Corrigan, P.W., Salyers, M.P., 2020. Patient, client, consumer, or service user? An empirical investigation into the impact of labels on stigmatizing attitudes. Psychiatr Rehabil J. https://doi.org/10.1037/prj0000406

Fox, A.B., Earnshaw, V.A., Taverna, E.C., Vogt, D., 2018. Conceptualizing and measuring mental illness stigma: The mental illness stigma framework and critical review of measures. Stigma Health 3, 348–376. https://doi.org/10.1037/sah0000104

Gil, A.G., Wagner, E.F., Tubman, J.G., 2004. Associations between early-adolescent substance use and subsequent young-adult substance use disorders and psychiatric disorders among a multiethnic male sample in south florida. Am J Public Health 94, 1603–1609. https://doi.org/10.2105/AJPH.94.9.1603

Harnish, A., Corrigan, P., Byrne, T., Pinals, D.A., Rodrigues, S., Smelson, D., 2016. Substance use and mental health stigma in veterans with co-occurring disorders. Journal of Dual Diagnosis 12, 238–243. https://doi.org/10.1080/15504263.2016.1245066

Holmes, P.E., Corrigan, P.W., Williams, P., Canar, J., Kubiak, M.A., 1999. Changing Attitudes About Schizophrenia. Schizophrenia Bulletin 25, 447–456.

Hughes, R., Huby, M., 2004. The construction and interpretation of vignettes in social research. SWSSR 11, 36–51. https://doi.org/10.1921/swssr.v11i1.428

Johnson-Kwochka, A., Minor, K. S., Ashburn-Nardo, L., Wu, W., Stull, L. G., & Salyers, M. P., 2020. A new look at the Attribution Model of mental illness stigma. The Journal of Stigma and Health, manuscript in press.

Kees, J., Berry, C., Burton, S., Sheehan, K., 2017. An analysis of data quality: Professional panels, student subject pools, and Amazon's Mechanical Turk. Journal of Advertising 46, 141–155. https://doi.org/10.1080/00913367.2016.1269304

Kennedy, R., Clifford, S., Burleigh, T., Waggoner, P. D., Jewell, R., & Winter, N. J. G., 2020. The shape of and solutions to the MTurk quality crisis. Political Science Research and Methods 8, 614–629. https://doi.org/10.1017/psrm.2020.6

Kennedy-Hendricks, A., Barry, C.L., Gollust, S.E., Ensminger, M.E., Chisolm, M.S., McGinty, E.E., 2017. Social Stigma Toward Persons With Prescription Opioid Use Disorder: Associations With Public Support for Punitive and Public Health–Oriented Policies. PS 68, 462–469. https://doi.org/10.1176/appi.ps.201600056

Keyes, K.M., Hatzenbuehler, M.L., McLaughlin, K.A., Link, B., Olfson, M., Grant, B.F., Hasin, D., 2010. Stigma and Treatment for Alcohol Disorders in the United States. Am J Epidemiol 172, 1364–1372. https://doi.org/10.1093/aje/kwq304

Larkings, J.S., Brown, P.M., 2018. Do biogenetic causal beliefs reduce mental illness stigma in people with mental illness and in mental health professionals? A systematic review. International Journal of Mental Health Nursing 27, 928–941. https://doi.org/10.1111/inm.12390

Lee, A., Laurent, S., Wykes, T., Kitchen Andren, K., Bourassa, K., McKibbin, C., 2014. Genetic attributions and mental illness diagnosis: Effects on perceptions of danger, social distance, and real helping decisions. Social Psychiatry & Psychiatric Epidemiology 49, 781–789. https://doi.org/10.1007/s00127-013-0764-1

Link, B. G., Cullen, F. T., Frank, J., & Wozniak, J. F., 1987. The social rejection of former mental patients: understanding why labels matter. American Journal of Sociology 92,

1461–1500.

Lloyd, C., 2013. The stigmatization of problem drug users: A narrative literature review. Drugs: Education, Prevention and Policy 20, 85–95. https://doi.org/10.3109/09687637.2012.743506

Mericle, A.A., Arria, A.M., Meyers, K., Cacciola, J., Winters, K.C., Kirby, K., 2015. National Trends in Adolescent Substance Use Disorders and Treatment Availability: 2003–2010. Journal of Child & Adolescent Substance Abuse 24, 255–263. https://doi.org/10.1080/1067828X.2013.829008

McWhirter, P.T., 2008. Enhancing adolescent substance abuse treatment engagement. Journal of Psychoactive Drugs 40, 173–182. https://doi.org/10.1080/02791072.2008.10400628

Nieweglowski, K., Corrigan, P.W., Tyas, T., Tooley, A., Dubke, R., Lara, J., Washington, L., Sayer, J., Sheehan, L., Team, T.A.S.R., 2017. Exploring the public stigma of substance use disorder through community-based participatory research. Addiction Research & Theory 26, 323–329. https://doi.org/10.1080/16066359.2017.1409890

Nieweglowski, K., Dubke, R., Mulfinger, N., Sheehan, L., Corrigan, P.W., 2019. Understanding the factor structure of the public stigma of substance use disorder. Addiction Research & Theory 27, 156–161. https://doi.org/10.1080/16066359.2018.1474205

Osborne, J.W., Costello, A.B., Kellow, J.T., 2008. Best Practices in Exploratory Factor Analysis, in: Best Practices in Quantitative Methods. SAGE Publications, Inc., 2455 Teller Road, Thousand Oaks California 91320 United States of America, pp. 86–99. https://doi.org/10.4135/9781412995627.d8

Penn, D.L., Guynan, K., Daily, T., Spaulding, W.D., Garbin, C.P., Sullivan, M., 1994. Dispelling the stigma of schizophrenia: what sort of information is best? Schizophr Bull 20, 567–578.

Perry, B., Pescosolido, B.A., Krendl, A., 2019. The unique nature of public stigma toward opioid use disorders: A national study (SSRN Scholarly Paper No. ID 3420405). Social Science Research Network, Rochester, NY. https://doi.org/10.2139/ssrn.3420405

Pinto, M.D., Hickman, R., Logsdon, M.C., Burant, C., 2012. Psychometric Evaluation of the Revised Attribution Questionnaire (r-AQ) to Measure Mental Illness Stigma in Adolescents. J Nurs Meas 20, 47–58.

Qualtrics, 2005. . Qualtrics, Provo, Utah, USA.

Rao, D., Feinglass, J., Corrigan, P., 2007. Racial and ethnic disparities in mental illness stigma. The Journal of Nervous and Mental Disease 195, 1020. https://doi.org/10.1097/NMD.0b013e31815c046e

Sattler, S., Escande, A., Racine, E., Göritz, A.S., 2017. Public stigma toward people with drug addiction: A factorial survey. Journal of Studies on Alcohol & Drugs 78, 415–425. https://doi.org/10.15288/jsad.2017.78.415

Schomerus, G., Matschinger, H., Angermeyer, M.C., 2014. Causal beliefs of the public and social acceptance of persons with mental illness: a comparative analysis of schizophrenia, depression and alcohol dependence. Psychological Medicine 44, 303–314. https://doi.org/10.1017/S003329171300072X

Schomerus, G., Schwahn, C., Holzinger, A., Corrigan, P.W., Grabe, H.J., Carta, M.G., Angermeyer, M.C., 2012. Evolution of public attitudes about mental illness: A systematic

review and meta-analysis. Acta Psychiatrica Scandinavica 125, 440–452. https://doi.org/10.1111/j.1600-0447.2012.01826.x

Sousa, S. de, Marques, A., Rosário, C., Queirós, C., 2012. Stigmatizing attitudes in relatives of people with schizophrenia: aAstudy using the Attribution Questionnaire AQ-27. Trends in Psychiatry and Psychotherapy 34, 186–197. https://doi.org/10.1590/S2237-60892012000400004

Tabachnick, B.G., Fidell, L.S., 2012. Using Multivariate Statistics, 6 edition. ed. Pearson, Boston.

Tapert, S.F., Aarons, G.A., Sedlar, G.R., Brown, S.A., 2001. Adolescent substance use and sexual risk-taking behavior. Journal of Adolescent Health 28, 181–189. https://doi.org/10.1016/S1054-139X(00)00169-5

Wakeman, S.E., Rich, J.D., 2018. Barriers to medications for addiction treatment: How stigma kills. Substance Use & Misuse 53, 330–333. https://doi.org/10.1080/10826084.2017.1363238

Wills, T. A., Resko, J. A., Ainette, M. G., Mendoza D, 2004. Role of parent support and peer support in adolescent substance use: a test of mediated effects. Psychol Addict Behav. 18, 122-134. https://doi.org/10.1037/0893-164X.18.2.122

Winters, K.C., Botzet, A.M., Stinchfield, R., Gonzales-Castaneda, R., Finch, A.J., Piehler, T.F., Ausherbauer, K., Chalmers, K., Hemze, A., 2018. Adolescent Substance Abuse Treatment: A Review of Evidence-Based Research, in: Leukefeld, C.G., Gullotta, T.P. (Eds.), Adolescent Substance Abuse: Evidence-Based Approaches to Prevention and Treatment, Issues in Children's and Families' Lives. Springer International Publishing, Cham, pp. 141–171. https://doi.org/10.1007/978-3-319-90611-9_5

Table 1. Correlations between key variables across diagnostic groups

	1	2	3	4	5	6	7	8	9
1. LOR[1]									
2. SDS[2]	.06								
3. Current Stress[3]	.06	-.18**							
4. Childhood Adversities[3]	.05	-.09	.59**						
5. Biogenetic Causes[3]	.09	-.23**	.49**	.25**					
6. Neg. Emotions[4]	-.10	-.14**	.03	-.10	.12*				
7. Responsibility[4]	-.21**	.03	-.03	-.06	-.08	.53**			
8. Lack of Empathy[4]	-.04	.27**	-.40**	-.31**	-.32**	.07	.30**		
9. Social Disengagement[4]	.05	.79**	-.19**	-.04	-.20**	-.17**	-.11**	.18**	
10. Total Stigma[4]	-.18**	.09	-.06	-.15*	-.03	.86**	.78**	.39**	.05

Note: * < .05, ** < .01

[1] Level of Contact Report; 1 – 11, higher scores indicate greater familiarity

[2] Social Distance Scale; 1 – 4, higher scores indicate greater desire for social distance

[3] Causal Beliefs about Substance Use Disorders; 1 – 5, higher scores indicate greater endorsement

[4] Attribution Questionnaire; 1 – 9, higher scores indicate greater stigma

Table 2. Attribution Questionnaire – Substance Use Disorders

AQ Items		Primary Factor Loading
Item	**Text**	
Factor 1 – Negative Emotions		
2	How angry would you feel at Derek?	.63
6	I would feel disgusted by Derek	.74
8	How dangerous would you feel Derek is?	.83
10	I don't think Derek will ever overcome his illness	.68
11	I would feel threatened by Derek	.97
12	I think Derek should be considered a criminal	.74
13	How scared of Derek would you feel?	.94
16	If I were in charge of Derek's treatment, I would force him to live in a group home	.62
Factor 2 – Assessment of Responsibility		
5	I would think that it was Derek's own fault that he is in the present condition	.72
7	How controllable, do you think, is the cause of Derek's present condition?	.76
15	How responsible, do you think, is Derek for his present condition?	.74
18	I don't think Derek is working hard enough to overcome his illness	.63
Factor 3 – Lack of Empathy		
4	I would feel pity for Derek.	.70
14	How much sympathy would you feel for Derek?	.79
17	How much concern would you feel for Derek?	.85
Factor 4 – Social Disengagement		
1	I want my children to be friends with Derek	.80
3	If I were an employer, I would interview Derek for a Job.	.84
9	I would allow my kids to ride the school bus with Derek every day.	.69

Note: All items are scored 1 (not at all) – 9 (very much), with higher scores indicating greater stigma. Items in Lack of Empathy and Social Disengagement are reverse-scored.

Table 3. Means and Differences in Stigma by Diagnosis

Differences in stigma by diagnosis

	Opioids (N = 80)		Stimulants (N = 68)		Alcohol (N = 69)		Marijuana (N = 88)						
	M	SD	M	SD	M	SD	M	SD	Range	*f*	*df*	*p*	Partial η^2
Negative Emotions[1]	4.50	2.26	3.81	1.92	4.01	1.82	**3.60**	**2.24**	1.0-8.75	3.13	6, 297	.006	.059
Assessment of Responsibility[2]	5.39	1.96	5.06	1.84	5.54	1.76	**6.11**	**1.95**	1.25-9.0	3.70	6, 297	.001	.070
Lack of Empathy[3]	2.87	1.50	3.21	1.74	3.31	1.97	**4.29**	**2.07**	1.0-9.0	5.07	6, 297	<.001	.093
Social Disengagement[3]	5.91	2.39	6.32	2.02	6.31	2.08	5.77	2.22	1.0-9.0	1.30	6, 297	.276	.013

Means of supporting scales

	M	SD	Range	α
Social Distance Scale[4]	2.95	0.81	1.0-4.0	0.92
Current Stress[5]	3.62	0.76	1.0-5.0	0.72
Biogenetic Causes[5]	3.40	0.94	1.0-5.0	0.70
Childhood Adversities[5]	3.91	0.84	1.0-5.0	0.69

Note: Covariates included in the models were race, gender, and familiarity with mental illness.

[1] Negative Emotions: mean of 8 Attribution Questionnaire items scored 1-9, higher scores indicate greater endorsement of stigmatizing beliefs.

[2] Assessment of Responsibility: mean of 4 Attribution Questionnaire items scored 1-9, higher scores indicate greater endorsement of stigmatizing beliefs.

[3] Lack of Empathy and Social Disengagement: mean of 3 Attribution Questionnaire items scored 1-9, higher scores indicate greater endorsement of stigmatizing beliefs.

[4] Social Distance: mean of 6 items scored 1 – 4, higher scores indicate greater desire for social distance.

[5] Causes of SUDs: mean of 3 items scored 1-5, higher scores indicate greater belief in this factor as a cause of SUDs.

Table 4. Attribution Questionnaire – Substance Use Disorders: Pilot Items

AQ Items		
Item	**Text**	**Notes**
1	I would feel aggravated by Derek.	Removed; correlation > .8 with item 3
2	I want my children to be friends with Derek.	New item
3	How angry would you feel at Derek?	
4	If I were an employer, I would interview Derek for a Job.	
5	I would feel pity for Derek.	
6	I would think that it was Derek's own fault that he is in the present condition.	
7	I would feel disgusted by Derek.	New item
8	How controllable, do you think, is the cause of Derek's present condition?	
9	How irritated would you feel by Derek?	Removed; correlation > .8 with items 1 and 3
10	How dangerous would you feel Derek is?	
11	How much do you agree that Derek should be forced into treatment with his doctor, even if he does not want to?	New item; Removed – factor loading < .5 on primary factor & factor loading > .33 on two factors
12	I would allow my kids to ride the school bus with Derek every day.	
13	I don't think Derek will ever overcome his illness.	New item
14	How much do you think a treatment facility, where Derek can be kept away from his neighbors, is the best place for him?	Removed – factor loading < .5 on primary factor
15	I would feel threatened by Derek.	
16	I think Derek should be considered a criminal.	New item
17	How scared of Derek would you feel?	
18	How certain would you feel that you would help Derek?	Removed – factor loading > .33 on two factors
19	How much sympathy would you feel for Derek?	
20	How responsible, do you think, is Derek for his present condition?	
21	If I were in charge of Derek's treatment, I would force him to live in a group home	
22	How much concern would you feel for Derek?	
23	I wouldn't trust Derek to take care of himself as well as other adolescents.	New item; Removed – factor loading < .5 on primary factor
24	I don't think Derek is working hard enough to overcome his illness.	New item