**To help or hinder: Do the labels and models used to describe problematic substance use influence public stigma?**

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**Abstract**

**Objectives:** Problematic substance use is one of the most stigmatised health conditions, leading research to examine how the labels and models used to describe it influence public stigma. Two recent studies examine whether beliefs in a disease model of addiction influence public stigma but result in equivocal findings – in line with the mixed-blessings model, Kelly et al. (2021) found that whilst the label ‘chronically relapsing brain disease’ reduced blame attribution, it decreased prognostic optimism and increased perceived danger and need for continued care, however, Rundle et al. (2021) conclude absence of evidence. The current study therefore aims to isolate the different manipulations and measures used in these two studies to assess whether health condition (drug use vs. health concern), aetiological label (brain disease vs. problem), and attributional judgement (low vs. high treatment stability) influence public stigma towards problematic substance use. **Methods:** A sample of XXX participants were randomly allocated to one of eight vignette conditions that manipulated the aforementioned factors. They then completed self-report measures of discrete and general public stigma and an indirect measure of discrimination. **Results:** [HERE WE WILL DESCRIBE THE RESULTS]. **Conclusions:** This study advances knowledge regarding the labels and models that lessen or exacerbate the public stigma associated with substance use, with a view to informing public health strategies and stigma-reduction interventions.

**Key words:** problematic substance use; addiction; stigma; discrimination; vignettes; models of addiction; brain disease.

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Problematic substance use is one of the most heavily stigmatised health conditions (Kilian et al., 2021; Room et al., 2001; Schomerus et al., 2011). Public stigma is defined as the endorsement of negative attitudes held by members of the public against a specific group, which manifests in discrimination towards its members (Corrigan & Watson, 2002; Corrigan & Rao, 2012). For example, individuals diagnosed with a substance use disorder (SUD) are routinely viewed as dangerous, unpredictable, helpless, and non-human (Dyregrov & Bruland-Selseng, 2020; Nieweglowski et al., 2017). Such public stigma can contribute to self-stigma for the substance user, causing feelings of marginalisation and social exclusion (Maurage et al., 2012; Pescosolido et al., 2010), hindering attempts to reduce consumption (Hammarlund et al., 2018), and acting as a barrier to help-seeking and treatment (Keyes et al., 2010; Yang et al., 2017). Research also suggests that healthcare practitioners can display stigmatising attitudes towards those seeking treatment support for substance misuse (Janulis et al., 2013; Luoma et al., 2007), which may result in suboptimal care (van Boekel et al., 2013), diagnostic overshadowing (Palmer et al., 2009), and less efficacious treatment (Andréasson et al., 2013).

In an effort to inform public health strategies (i.e. public framing around ‘addiction’) and interventions (i.e. stigma reduction), research has therefore examined the factors that may exacerbate or lessen perceptions of problematic substance use. Some of these efforts center on how the different aetiological labels and models used to describe substance misuse (e.g., labelling addiction as a *brain disease* vs. *problem*) influence public stigma (e.g., Kruis et al., 2020; Lebowitz & Appelbaum, 2017; Wiens & Walker, 2015; see Hall et al., 2015; Kvaale et al., 2013 for reviews). Two recent studies by Kelly et al. (2021) and Rundle et al. (2021), however, have resulted in somewhat equivocal findings, making it difficult to provide any clear recommendations and to end the use of stigmatising terminology in the field (Atayde et al., 2021). A closer look at these studies reveals that whilst both aimed to assess how the brain disease model of addiction influences public stigma, they included different and additional methodological factors that could explain their discrepant findings. The current study aims to isolate these factors to examine how they may exacerbate or lessen stigmatising perceptions of problematic substance use.

In the study conducted by Kelly et al. (2021), participants (*n* = 3635) were presented with one of twelve vignettes describing a man or woman being treated for opioid-dependence which was defined as either a ‘chronically relapsing brain disease’, ‘brain disease’, ‘disease’, ‘illness’, ‘disorder’ or ‘problem’ (see File S1). In line with the ‘mixed-blessings’ model (Haslam & Kvaale, 2015), findings indicated that while the label ‘chronically relapsing brain disease’ was associated with lower stigmatising blame attributions compared to all other labels, it was associated simultaneously with decreased prognostic optimism (personal agency) and increased perceptions of danger and need for continuing care. Findings from this study suggest that there may not be one single term that can reduce all dimensions of stigma. Kelly et al. state “to reduce stigmatizing blame, biomedical ‘chronically relapsing brain disease’ terminology may be optimal; to increase prognostic optimism and decrease perceived danger […] use of non-medical terminology (e.g., ‘opioid problem’) may be optimal” (pp. 1757).

Rundle et al. (2021) assessed whether public stigma differs for substance use disorders relative to other health conditions and whether this was moderated by people’s pre-existing beliefs about different aetiological models of addiction. Participants (*n* = 872) were given a vignette which described an individual experiencing difficulty in their daily routine and who was diagnosed with one of four health conditions: an alcohol use disorder (AUD), major depressive disorder (MDD), co-occurring AUD and MDD, or diabetes. Findings indicated that public stigma was highest for the diagnosis of AUD followed by AUD/MDD compared to both the MDD and diabetes conditions. Furthermore, endorsement of the psychological and nature models of addiction were associated with lower public stigma, and endorsement of the moral model was related to higher stigma. However, against both the author’s predictions and the findings from Kelly et al. endorsement of the disease model was not associated with public stigma. Rundle et al. suggest that “a straightforward interpretation of this finding is that disease beliefs do not relate to public stigma toward AUD'' but “considering that this effect is null, we are unable to suggest that the disease [model] does in fact not relate to public stigma ratings” (pp. 845).

These two studies therefore had a common goal - they aimed to examine whether beliefs in a disease model of addiction (whether manipulated or measured) influence public stigma, yet they come to different conclusions. Whilst Kelly et al. (2021) demonstrate that the aetiological label of ‘chronically relapsing disease’ differentially affects stigmatising attitudes towards problematic substance use, Rundle et al. (2021) conclude absence of evidence (but importantly not evidence of absence). A closer look at the vignettes used in both of these studies reveal that the ‘brain disease’ model factor is not the only variable manipulated; in other words, additional methodological factors may have influenced stigmatising perceptions[[1]](#footnote-1). We now describe each of these to provide a rationale for their inclusion in the current study.

The first difference is that the vignettes employed in each study differ based on the **health condition** described. Specifically, Rundle et al. (2021) compare the public stigma ascribed to problematic substance use (AUD) with other health conditions (e.g., diabetes) whereas this control comparison is absent within the study by Kelly et al (2021). Indeed, research indicates that the general public ascribe greater stigma to problematic substance use compared to other mental and physical health conditions (Kilian et al., 2021; Room et al., 2001; Schomerus et al., 2011) and this comparison may therefore explain why Rundle et al. found larger effect sizes for stigmatising perceptions compared to Kelly et al. (2021). Furthermore, it is conceivable that the aetiological label of ‘brain disease’ interacts with the health condition described (e.g., drug use vs. health concern) to elicit stigmatising perceptions, further advancing our understanding of which terms to use or avoid. We first aim to isolate this factor to examine whether the health condition of ‘drug use’ compared to ‘health concern’ influences public stigma and whether this is exacerbated when drug use is labelled as a ‘brain disease’.

A second difference is that Kelly et al. manipulate different aetiological labels to describe substance misuse within the vignette itself (e.g., ‘chronically relapsing brain disease’ vs. ‘disease’ vs. ‘problem’) whereas Rundle et al. measure these beliefs indirectly through a general self-report questionnaire of addiction beliefs (e.g., “Addicts cannot control their addictive behaviour”). Providing an explicit explanation for the aetiology of problematic substance misuse may therefore directly influence stigmatising perceptions, and this may particularly be the case when participants believe that this messaging is relayed by a trusted professional (e.g., healthcare practitioner or scientist; Wiens & Walker, 2015; see also Bogren, 2019). Despite the brain disease model of addiction being contested and vehemently debated (see Hall et al., 2015; Hart, 2017; Heather et al., 2019; Heim et al., 2014; Heilig et al., 2021; Leshner, 1997; Kuorikoski & Uusitalo, 2018; Volkow et al., 2016), it has gained prominence in public understanding (Vederhus et al., 2016), likely because it is commonly defined in such a way by national organisations (NIAAA, 2021; NIDA, 2021) and endorsed by healthcare professionals (Lawrence et al., 2013; see also Hickman, 2014; Russell et al., 2011). We therefore assess whether the explicit aetiological label of ‘chronically relapsing brain disease’ elicits public stigma relative to the ‘problem’ label.

Third, although not considered in either of the studies, the vignettes include different information about treatment seeking and outcome and therefore provide variable scope for **attributional judgement.** In the vignette employed by Kelly et al. the substance user is described as receiving treatment with a high likelihood of success (“Alex is committed to doing all that they can to ensure success following treatment”). Conversely, in Rundle et al. the substance user is described as seeking treatment with a variable outcome (“The doctor tells John/Jane that this is potentially a long-term condition that could get worse over time, but that John’s/Jane’s condition could also improve if he/her starts treatment now”). While the former statement may initially seem innocuous, it ascribes some level of volitional control and temporal stability to problematic substance use (“high treatment stability”; for other examples, see Monk & Heim, 2011). In contrast, the statement in Rundle et al. is more circumspect, as it presents two possible outcomes - the behaviour either abates or persists long term (“low stability”). It may therefore be suggested that the two studies elicit different attributional judgements about problematic substance use (see Davies, 1997; Kingree et al., 1999) with this treatment information impacting public stigma towards addiction (Ashford et al., 2018; Cunningham & Godinho, 2021; McGinty et al., 2015; see also Romer & Bock, 2008).

Finally, both studies use different outcome measures to assess public stigma towards problematic substance use. Kelly et al. (2021) examined discrete elements of stigma, specifically social distance, perceived danger, prognostic optimism, blame attribution and continued care. Conversely, Rundle et al. measured perceived public, treatment, personal and discriminatory stigma and aggregate these into an index of general public stigma. The disease model of addiction, however, has been shown previously to differentially affect discrete elements of public stigma consistent with the mixed-blessings model (Haslam & Kvaale, 2015; Kvaale et al., 2013). For example, whilst it may lessen blame towards substance (mis)use, it appears to reduce ascriptions of agency and self-control. Furthermore, both studies are potentially limited by their reliance on self-report questionnaires, which are susceptible to social desirability biases when assessing sensitive attitudes (Nisbett & Wilson, 1977; Tourangeau & Yan, 2007). In order to overcome this limitation, the current study also employs an indirect measure of discrimination (Jones et al., 2021), which assesses the magnitude of financial rewards and punishments directed towards the person depicted in the vignette. Informing the inclusion of this measure, previous research has shown that the labels used to describe problematic substance use may induce cognitive biases that result in a perceived need for punishment rather than support (Ashford et al., 2019; Kelly et al., 2010; Kelly & Westerhoff, 2010).

**Study Overview & Hypotheses**

The current study aims to isolate factors which may exacerbate or lessen public stigma towards problematic substance use and explain further the different findings between Kelly et al. (2021) and Rundle et al. (2021). Specifically, it will examine whether **health condition** (drug use vs. health concern), **aetiological label** (brain disease vs. problem), and **attributional judgement** (low vs. high treatment stability) influence public stigma and discrimination towards problematic substance use. Given the mixed literature regarding whether the ‘brain disease’ label lessens or exacerbates public stigma, and the exploratory nature of the attributional judgement factor, we do not make any directional predictions. Instead, we have the following research questions:

RQ1: Does the health condition of ‘drug use’ or ‘health concern’ influence public stigma and discrimination?

RQ2: Does the aetiological label of ‘chronically relapsing brain disease’ or ‘problem’ influence public stigma and discrimination towards problematic substance use?

RQ3: Does attributional judgement - low versus high treatment stability - influence public stigma and discrimination towards problematic substance use?

Allowing for comparisons between Kelly et al. (2021) and Rundle et al. (2021), we examine whether these findings differ based on whether stigma is measured using discrete (Stigma & Attribution Assessment; Kelly et al., 2021) or aggregate outcome measures (Personal & Perceived Public Stigma Measure; Rundle et al., 2021), or with an indirect measure of discrimination (Financial Discrimination Task; Jones et al., 2021).

**Method**

## Transparency Statement

All materials, code and raw data will be made publicly available on the Open Science Framework: <https://osf.io/dk694/>. In the sections below, we report all manipulations, measures, and exclusions. This study meets the Level 6 of the PCI RR bias control (<https://rr.peercommunityin.org/help/guide_for_authors>).

## Design & Participants

This study comprises a 2 (health condition: drug use vs. health concern) x 2 (aetiological label: brain disease vs. problem) x 2 (attributional judgement: low vs. high treatment stability) between-participants design. To be eligible to take part, participants will confirm that they are aged 18 or above and that they do not have or know any close relatives with a previous or current substance use or psychiatric diagnosis. They will be recruited via research participation schemes (SONA Systems Ltd), Prolific Academic (<https://prolific.co/>; see Peer et al., 2017) and social media platforms (e.g., e.g., Twitter, Linkedin). Participants will be recompensed with either university course credits or the equivalent of £5.00 per hour.

*Sample size & power.* Our planned sample size is informed by the effect sizes obtained from Kelly et al. (2021) and Rundle et al. (2021) as well as time and funding constraints (see Lakens et al., 2021). For our main effects of interest (see “Vignette development” below), Kelly et al. observed a significant effect of Cohen’s *ds* ~ .15 for perceived danger, *ds* ~ .20 for prognostic optimism, *ds* ~ .30 for continuing care and *ds* ~ .43 for blame, whilst Rundle et al. observed an effect of *ds* ~ .1.03 for Stigma Ratings[[2]](#footnote-2). A power analysis based on the two one-sided tests procedure for equivalence testing (see Dienes, 2021; Lakens, 2017; Lakens, 2021) indicates that with 1,578 participants (*n*  = 789 per group) we will achieve 90% statistical power using the lower and upper equivalence bounds of −ΔL = -.20 and ΔU = .20 with alpha set at .01. This is within our resources and allows us to detect and reject the second smallest effect size from Kelly et al. (2021). Note that effect sizes of *ds* =/> .20 have also been found in meta-analyses assessing the influence of the brain disease model on public stigma (Kvaale et al., 2013) and therefore a null result with the planned sample size would also yield informative results with respect to the presence or absence of effect size estimates provided by this meta-analysis. The final sample size comprised XXX participants (*M*age = , *SD* = % female, % White British), which had XX power to detect effects of XX. The study was ethically approved by each institution and all participants will provide informed consent.

**Measures**

***Vignette development***

To decide on the independent factors to manipulate in the current study, we evaluated the largest mean difference between the vignette conditions used in two previous study’s respective outcome measures (i.e. vignettes eliciting the highest relative to lowest public stigma). In Rundle et al. the largest difference was between the health condition “alcohol use disorder” relative to “diabetes”. In Kelly et al. this was between the aetiological label “chronically relapsing brain disease” relative to “problem”. Each vignette also differed on attributional judgement, providing either low or high stability for treatment seeking and outcome, so we also included this factor. We therefore selected the vignette from Kelly et al. and incorporated additional manipulations by Rundle et al.**[[3]](#footnote-3)**. Participants were randomised to one of eight conditions with the manipulated factors of health condition (underlined/green), aetiological label (highlighted bold/red), and attributional judgement (italics/purple):

'Alex was having serious trouble at home and work because of theirincreasingdrug use / health concern. They*are* *now in a treatment program / have now visited a doctor* where they are learning from staff that their drug use / health concernis best understood as a **chronically relapsing brain disease / problem** that often impacts multiple areas of one's life. *Alex is committed to doing all that they can to ensure success following treatment / The doctor tells Alex that this is potentially long-term and could get worse over time, but could also improve if they start treatment now.* In the meantime, they have been asked to think about what they have learned with regard to understanding their drug use / health concern as a **chronically relapsing brain disease/problem.**

***Stigma and Attribution Assessment***

The Stigma and Attribution Assessment (Kelly et al., 2021) will assess multiple dimensions of stigma towards problematic substance use. This 22-item questionnaire comprises five subscales including social distance (e.g., I would be happy to have Alex as a neighbour”), perceived danger (“I believe Alex is dangerous”), prognostic optimism (“Alex will be able to maintain recovery over the next three months”), blame attribution (“Alex’s opioid addiction is definitely genetic in origin”) and need for continued care (“Alex will need lifelong support to sustain their recovery”). Kelly et al. found that all subscales resulted in acceptable internal reliability (*a >* 0.70) [REPORT CURRENT STUDY HERE]. Responses are recorded on a scale of 1 (Strongly disagree) to 6 (Strongly agree) and summed to create a total score for each subscale. Note that some of these questions will be adapted for the ‘health concerns’ vignette condition. Higher scores correspond to greater danger and continued care, whereas lower scores correspond to greater social distance, lower blame, and lower prognostic optimism.

***Personal & Perceived Public Stigma Measure***

The Personal & Perceived Public Stigma Measure (Rundle et al., 2021) will measure public stigma. This 23-item questionnaire comprises four subscales including perceived public stigma (“People like them should feel embarrassed about their situation”), perceived treatment stigma (“Opportunities would be limited if people knew they received treatment”), personal stereotypical/prejudicial stigma (“How likely is it they would do something violent to themselves?”), and personal discriminatory stigma (“I would be willing to befriend them” [reverse scored]). Rundle et al. found that these subscales resulted in acceptable internal reliability (*a* >.70) [REPORT CURRENT STUDY HERE]. Responses are recorded on a scale of 1 (lower endorsement) to 4 (higher endorsement) and summed to create a total score. Higher scores correspond to greater stigmatising perceptions.

***Financial Discrimination Task***

Participants will finally complete the Financial Discrimination Task (Jones et al., 2021) to assess whether they discriminate against “Alex” based on their assigned vignette condition. This task mimics a learning platform named “Psy-Learn”, which informs participants that they will observe the cognitive performance of a ‘learner’ and provide small financial rewards or punishments depending on their performance. Participants can also decide whether participants should be permitted to continue to the next stage of the course (akin to denial or progression of a service, often used in hypothetical stigma paradigms: see Swami & Monk, 2013). This sham platform shows the performance of the individual in the vignette on six cognitive trials, which include an assessment of speeded-reaction time, a word anagram, and a memory test. After each question, the participant is then shown the correct answer, the learner’s response, and a statement highlighting whether the learner was ‘correct’ or ‘incorrect’. Participants are instructed to distribute a monetary reward for correct performance and a punishment for incorrect performance ranging from 0- to 100-pence on a sliding scale (see Figure 1). The task is programmed so that the learner always gets 50% of the answers correct. Two dependent variables are computed from the task: monetary reward summed across the three correct answers (+0 pence- 300 pence) and punishment summed across the three incorrect answers (-0 pence, 300 pence). Lower rewards and greater punishment correspond to greater discriminatory behaviour, respectively. Our team’s previous research indicates that participants are more likely to discriminate learner’s from stigmatised groups (weight-related bias, addiction-related bias; Jones et al., 2021; Pennington et al., *in prep*).

*Figure 1.*

An example of the trial procedure from the Financial Discrimination Task.



**Manipulation & Attention Checks**

Following the Financial Discrimination Task, participants will be asked three manipulation check questions relating to their allocated vignette condition. Specifically, they will be asked, “At the start of this study, you were given a description of a person named Alex. Was Alex described as having: (1) ‘drug use’ or ‘health concerns’? (2) a ‘chronically relapsing brain disease’ or ‘problem’? and were they (3) ‘now in a treatment program’ or ‘visiting a doctor?’, selecting their answers via drop-down boxes. To disguise this manipulation check, participants will also be asked “what gender was the person in the vignette?” (male/female). To control for careless responding (see Jones et al., 2021), we will also employ two attention checks. First, participants will answer the multiple-choice question “What planet do you live on?” (Earth, Mars, Mercury, Saturn: see Robinson et al., 2021) which is endorsed by Prolific Academic as an ethically viable question (see also Curran & Hauser, 2019). This will occur as part of the demographic assessment of participants. Second, we will monitor implausible completion times by assessing any responses that are <3*SD* of the average completion time. Any participant who fails either of the two attention checks or two out of three of the manipulation checks will be excluded.

**Procedure**

Participants are instructed to complete the study in a quiet space without distractions and the entire experiment will be hosted by Inquisit Web (v.5 Millisecond, Seattle). After providing informed consent, participants will be allocated randomly (via Inquisit) to one of the eight vignette conditions, which remain on the screen for a minimum of 60 seconds. They will then complete the Stigma & Attribution Assessment (Kelly et al., 2021), and the Personal & Perceived Stigma Measure (Rundle et al., 2021), administered in a randomised order between participants, and finally the Financial Discrimination Task (Jones et al., 2021).

**Analytic Strategy**

**Confirmatory Analyses**

To allow for comparisons between the current study and that of Kelly et al. (2021) and Rundle et al. (2021), we will conduct the following analyses on the five discrete subscales of the Stigma & Attribution Assessment and the total score from the Personal & Perceived Public Stigma Measure. We will then conduct the same analyses on the reward and punishment indices of the Financial Discrimination Task.

To assess RQ1, we will conduct independent *t-*tests to assess whether health condition (drug use vs. health concern) influences public stigma and discrimination.

To assess RQ2, we will conduct independent *t*-tests to assess whether aetiological label (brain disease vs. problem) influences public stigma and discrimination. Here we will focus on the “drug use” health condition only.

To assess RQ3, we will conduct independent *t*-tests to assess whether attributional judgement (low vs. high stability) influences public stigma and discrimination. Here we will focus on the “drug use” health condition only.

Given the number of analyses, we will set a conservative alpha (*p* < .01) to denote statistical significance. Each test will be followed up with equivalence tests (see Dienes, 2021; Lakens, 2017) with detailed analyses reported in supplementary materials. Equivalence tests use the two one-sided tests procedure to statistically reject the presence of effects large enough to be considered worthwhile. We will use the upper and lower equivalence bounds of −Δ*L* = -.20 and Δ*U* = .20 based on the effect size that our design was sufficiently powered to detect. Equivalence will be asserted if, given *α* = .01, the 99% confidence interval of the mean difference lies within this equivalence region and rejected if the 99% CI lies outside of this region.

**Potential Exploratory Analyses**

It is also possible that these factors may interact with each other (e.g., a 2-way interaction between aetiological label and attributional judgement for the drug use health condition); however, given the number of planned comparisons, interaction effects aligning with the research questions will be reported only within exploratory/supplementary analyses.

**Results**

**Discussion**

The choice of aetiological labels and models used to describe problematic substance use are important because they can perpetuate stigmatising attitudes and influence the selection and effectiveness of public health policies (Kelly et al., 2021; see also Kelly, 2004). Two recent studies are laudable for bringing these discussions to the forefront, but their equivocal findings may lead to contrasting suggestions as to which terms to use or avoid. The current study therefore aimed to isolate the different factors manipulated in each of these studies to assess whether **health condition** (drug use vs. health concern), **aetiological label** (brain disease vs. problem), and **attributional judgement** (low vs. high treatment stability) influence public stigma and discrimination towards problematic substance use.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Question** | **Hypothesis** | **Sampling plan** | **Analysis Plan** | **Rationale for deciding the sensitivity of the test for confirming or disconfirming the hypothesis** | **Interpretation given different outcomes** | **Theory that could be shown wrong by the outcomes** |
| RQ1: Does the health condition of ‘drug use’ or ‘health concern’ influence public stigma and discrimination?  | The health condition of ‘drug use’ will elicit significantly greater stigma and discrimination compared to ‘health concern’. | A sample size of 1,578 participants will be recruited, allowing for >90% statistical power to conduct equivalence tests on the upper and lower equivalence bounds of −ΔL = -.20 and ΔU = .20 with *a* = .01. Sensitivity power analyses will be conducted in the event we do not hit this target, indicating the effect size we were powered to detect. | Independent samples t-tests will be conducted to examine differences between the ‘drug use’ and ‘health concern’ conditions on the Stigma & Attribution Assessment (subscales), the Personal & Perceived Public Stigma Measure (total score) and the Financial Discrimination Task (reward and punishment indices). Equivalence tests will then be conducted using the upper and lower bound of Cohen’s *ds* = -/+ .20  | A significant difference (*p* < .01) will indicate that health condition (drug use vs. health concern) influences public stigma and/or discrimination.Equivalence tests will inform us whether the observed effect sizes lie inside or outside of the equivalence bounds.  | If this effect is significant, then it will provide support for previous findings suggesting that drug use is more stigmatised compared to other health conditions. If this effect is non-significant then we equivalence tests will inform us whether the observed effect is statistically equivalent or inconclusive.  | Research indicates that problematic substance use is one of the most heavily stigmatised health conditions (Kilian et al., 2021; Room et al., 2001; Schomerus et al., 2011) with individuals diagnosed with a substance use disorder (SUD) routinely viewed as dangerous, unpredictable, helpless, and non-human (Dyregrov & Bruland-Selseng, 2020; Nieweglowski et al., 2017). If the findings of this analysis are equivalent, then this would suggest that future research is required to assess whether problematic substance use is heavily stigmatised compared to general health concerns and the effect sizes that are deemed meaningful within this research field.  |
| RQ2: Does the aetiological label of ‘chronically relapsing brain disease’ or ‘problem’ influence public stigma and discrimination?  | Non-directional: There is mixed evidence regarding whether the ‘disease’ label exacerbates or lessens stigma, and the findings may differ based on discrete elements of stigma measured, which we aim to test.  | As above. | Independent samples t-tests will be conducted to examine differences between the ‘brain disease’ and ‘problem’ aetiological label on the same measures as above. Equivalence tests will then be conducted using the upper and lower bound of Cohen’s *ds* = -/+ .20. | A significant main effect (*p* < .01)will indicate that aetiological label (brain disease vs. problem) influences public stigma (on either of the stigma questionnaires) and/or discrimination. Comparisons will be made to Kelly et al. (2021) and Rundle et al. (2021).Equivalence tests will inform us whether the observed effect sizes lie inside or outside of the equivalence bounds.  | If different effects are observed between the two self-report questionnaires, then this will suggest that one may be better at detecting public stigma compared to the other. Specifically, it is possible that the Stigma & Attribution Assessment (Kelly et al., 2021) will result in different findings to the Personal & Perceived Public Stigma Measure (Rundle et al., 2021) because the former assesses discrete elements of stigma whereas the latter is more general. This will inform future research of what measures may be best suited to examining stigma. If this effect is only found for the indirect discrimination measure, then this may suggest that such measures are better suited than self-reports, which are susceptible to socially desirable responses. | The mixed-blessings model (Haslam & Kvaale, 2015) suggests that the disease model may lower stigmatising perceptions of blame but decrease prognostic optimism (personal agency) and increase perceptions of danger and need for continuing care (see Kelly et al., 2021). If the findings from this analysis are equivalent, then future research would be required to test support for the mixed-blessings model.  |
| RQ3: Does attributional judgement - high versus low treatment stability - influence public stigma and discrimination?  | Non-directional.  |  As above.  | Independent samples t-tests will be conducted to examine differences between “low” and “high” treatment stability (attributional judgement) on the same outcome measures as above. Equivalence tests will then be conducted using the upper and lower bound of Cohen’s *ds* = -/+ .20.  | A significant main effect (*p* < .01) will indicate that attributional judgement (low vs. high treatment stability) influences public stigma and/or discrimination. This factor was manipulated between Kelly et al. (2021) and Rundle et al. (2021) but not explicitly considered. Equivalence tests will inform us whether the observed effect sizes lie inside or outside of the equivalence bounds.  | This is an exploratory factor given that previous research has not explicitly examined whether attributional judgement influences public stigma and discrimination towards problematic substance use. If this is significant then it would suggest that future research should consider how descriptions of treatment stability (low vs. high) can influence public perceptions.  | Previous research has shown that attributional judgement affects how individuals who use substances perceive themselves (self-image bias; Monk & Heim, 2013). However, to our knowledge this has not been tested on public stigma and discrimination.  |

**Supplementary Material**

**File S1: Vignette manipulations**

S1.1: The following vignette was used in **Kelly et al. (2021),** which described someone treated for opioid-related impairment explained in one of six ways (highlighted in bold-purple). We additionally proposed that attributional judgement was high, with the individual committed to successful treatment (highlighted in italics/red).

Alex was having serious trouble at home and work because of (his/her) increasing opioid use. (He/She) is now in a treatment program where (he/she) is learning from staff that (his/her) drug use is best understood as a (**chronically relapsing brain disease/brain disease/disease/illness/disorder/problem**) that often impacts multiple areas of one's life. *Alex is committed to doing all that (he/she) can to ensure success following treatment.* In the meantime, (he/she) has been asked by (his/her) counselor to think about what (he/she) has learned with regard to understanding (his/her) opioid use as a (chronically relapsing brain disease/brain disease/disease/illness/disorder/problem).

S1.2: The following vignettes were used in **Rundle et al. (2021),** which described someone diagnosed with one of four health conditions (AUD, AUD-MDD, MDD, diabetes). Attributional judgement was low, with the individual’s treatment motivation and outcome being uncertain (highlighted in italics/red).

For the past several months, John/Jane has been suffering from tiredness, low energy and difficulty carrying out his daily routines. Several times, he/she has tried to motivate himself/herself but continues to have difficulty keeping up with his/her work and family obligations. Recently, the only thing that has made John/Jane feel better is **drinking alcohol/avoiding work and social activities and drinking alcohol/avoiding work and social activities/eating food, especially sugary foods**. John’s/Jane’s wife/husband has noticed his/her behaviour becoming worse over the last few months and urges him/her to go to a doctor. At his/her doctor’s visit, John/Jane is diagnosed with an **alcohol use disorder (a dependence on alcohol)/clinical depression and an alcohol use disorder (a dependence on alcohol)/clinical depression/diabetes**. *The doctor tells John/Jane that this is potentially a long-term condition that could get worse over time, but that John’s/Jane’s condition could also improve if he/she starts treatment now.*

**File S2: Outcome measures**

**Stigma & Attribution Assessment (Kelly et al., 2021)**

Participants respond on a scale of 1 (Strongly disagree) to 6 (Strongly agree).

Participants respond on a scale of 1 (Strongly disagree) to 6 (Strongly agree).

1. I feel angry at Alex.
2. Alex is very likely to be able to maintain recovery over the next 12 months.
3. I believe Alex is dangerous.
4. Alex will be able to control their opioid use if they put their mind to it.
5. I would be happy to have Alex as a neighbor.
6. Alex will need lifelong support to sustain their recovery.
7. I would be glad to have Alex marry into my family.
8. Alex will be able to maintain recovery over the next 3 months.
9. I think Alex should be forced into treatment with their doctor even if they do not want to.
10. I think it would be best for Alex's community if they were put away in long term residential treatment.
11. I would like to help Alex.
12. I would be happy to have Alex as a babysitter for my children.
13. I think that it is Alex's own fault that they’re in the present condition.
14. Alex will definitely be able to maintain recovery for the rest of their life.
15. Alex's opioid addiction is definitely genetic in origin.
16. I would be happy to have Alex as my primary care doctor.
17. I feel scared of Alex.
18. Alex's opioid addiction is entirely due to a chemical imbalance in the brain.
19. I would like to have Alex as a co‐worker.
20. There is no doubt that Alex will be able to live a normal life after treatment.
21. I would try to stay away from Alex.
22. Alex's opioid addiction is extremely likely to be inherited.

**Scoring:** Social distance: Q5, Q7, Q11, Q12, Q16, Q19. Danger: Q1, Q3, Q9, Q10, Q13, Q17, Q21; Prognostic optimism: Q2, Q4, Q8, Q14, Q20; Blame [termed ‘blame attribution’]: Q15, Q18, Q22, Need for continued care: Q6.

The following questions have been adapted for the “health concern” vignette condition:

4. Alex will be able to control their health concern if they put their mind to it.

15. Alex’s health concern is definitely genetic in origin.

18. Alex’s health concern is entirely due to a chemical imbalance in the brain.

22. Alex’s health concern is extremely likely to be inherited.

**Personal & Perceived Public Stigma Measure (Rundle et al., 2021)**

Participants respond on a scale of 1 (lower endorsement) to 4 (higher endorsement).

1. People like them should feel embarrassed about their situation.
2. People like them should feel afraid to tell others about their situation.
3. They have little hope of ever being accepted into the community.
4. Members of their family would be better off if their situation was kept secret.
5. Getting treatment would make them an outsider in the community.
6. If people know they were in treatment, they would lose friends.
7. Opportunities would be limited if people knew they received treatment.

1 = Strongly agree, 2 = Agree, 3 = Disagree, 4 = Strongly disagree

1. How likely is it that they would do something violent to others.
2. How likely is it they would do something violent to themselves.

1 = Very likely, 2 = Somewhat likely, 3 = Not very likely, 4 = Not at all likely

1. People like them are just as intelligent as everyone else\*.
2. People like them are more creative than others.
3. People like them who have jobs are just as productive as others\*.
4. People like them are unpredictable.
5. People like them are just as trustworthy as anyone else\*.
6. People like them are hard to talk to.
7. Being around them would make me feel uncomfortable.
8. Being around them would make me feel nervous.

1 = Strongly agree, 2 = Agree, 3 = Disagree, 4 = Strongly disagree

1. I would be willing to have them as a neighbour\*.
2. I would be willing to socialise with them\*.
3. I would be willing to have them care for my children\*.
4. I would be willing to befriend them\*.
5. I would be willing to work with them\*.
6. I would be willing to have them marry someone I know\*.

1 = Definitely willing, 4 = Definitely unwilling

**Scoring:** \* = reversed. Perceived public stigma: Q1, Q2, Q3, Q4; Perceived treatment stigma: Q5, Q6, Q7; Personal stereotypical stigma: Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17; Personal discriminatory stigma: Q18, Q19, Q20, Q21, Q22, Q23.

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1. Another difference is that the two studies include different *substances* within the vignette: Kelly et al. opioid use, Rundle et al. alcohol use. Research has consistently shown that both alcohol use and substance use disorder are heavily stigmatised (Kilian et al., 2021) so we do not expect this to explain the different findings. In the current study, we therefore do not manipulate the substance itself. [↑](#footnote-ref-1)
2. *ds* from Kelly et al. are perceived danger, 0.13 / 0.87 = 0.15; prognostic optimism, 0.18 / 0.87 = 0.21; continuing care, 0.26 / 0.87 = 0.30; and blame, 0.37 / 0.87 = 0.43 (Pooled SD was calculated as SQRT of N = 300 \* SE = .05). *ds* from Rundle et al., stigma ratings = 11.49 / 11.12 (Pooled SD = (10.98 + 11.26)/2). [↑](#footnote-ref-2)
3. We use the gender-neutral pronouns of they/them compared to he/she from Kelly et al. (as Kelly et al. also manipulated the gender of the person depicted in the vignette). [↑](#footnote-ref-3)