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A US national randomized study to guide how best to reduce stigma when describing drug-related impairment in practice and policy

John F. Kelly[1,2], M. Claire Greene[3] & Alexandra Abry[1]

Department of Psychiatry, MA General Hospital, Recovery Research Institute, Boston, MA, USA,[1] Department of Psychiatry, Harvard Medical School, Boston, MA, USA[2] and Department of Psychiatry, Columbia University, New York, NY, USA[3]

ABSTRACT

Background and Aims Drug-related impairment is persistently stigmatized delaying and preventing treatment engagement. To reduce stigma, various medical terms (e.g. 'chronically relapsing brain disease', 'disorder') have been promoted in diagnostic systems and among national health agencies, yet some argue that over-medicalization of drug-related impairment lowers prognostic optimism and reduces personal agency. While intensely debated, rigorous empirical study is lacking. This study investigated whether random exposure to one of six common ways of describing drug-related impairment induces systematically different judgments. **Design, Setting and Participants** Cross-sectional survey, US general population, among a nationally representative non-institutionalized sample (n = 3635; 61% response rate; December 2019–January 2020). **Intervention** Twelve vignettes (six terms × gender) describing someone treated for opioid-related impairment depicted in one of six ways as a(n): 'chronically relapsing brain disease', 'brain disease', 'disease', 'illness', 'disorder' or 'problem'. **Measurements** Multi-dimensional stigma scale assessing: blame; social exclusion; prognostic optimism, continuing care, and danger (a = 0.70–0.83). **Findings** US adults [mean age = 47.81, confidence interval (CI) = 47.18–48.44; 52.4% female; 63.14% white] rated the same opioid-impaired person differently across four of five stigma dimensions depending on which of six terms they were exposed to. 'Chronically relapsing brain disease' induced the lowest stigmatizing blame attributions ($P < 0.05$); at the same time, this term decreased prognostic optimism [mean difference (MD) = 0.18, 95% CI = 0.05, 0.30] and increased perceived need for continuing care (MD = –0.26, 95% CI = –0.43, –0.09) and danger (MD = –0.13, 95% CI = –0.25, –0.02) when compared with 'problem'. Compared with a man, a woman was blamed more for opioid-related impairment (MD = –0.08, 95% CI = –0.15, –0.01); men were viewed as more dangerous (MD = 0.13, 95% CI = 0.06, 0.19) and to be socially excluded (MD = 0.16, 95% CI = 0.09, 0.23). **Conclusions** There does not appear to be one single medical term for opioid-related impairment that can meet all desirable clinical and public health goals. To reduce stigmatizing blame, biomedical 'chronically relapsing brain disease' terminology may be optimal; to increase prognostic optimism and decrease perceived danger/social exclusion use of non-medical terminology (e.g. 'opioid problem') may be optimal.

Keywords National, nationally representative, randomized controlled study, stigma, discrimination, vignettes.

Correspondence to: John F. Kelly, Recovery Research Institute, 151 Merrimac Street, 6th Floor, Boston, MA 02114, USA. E-mail: jkelly11@mgh.harvard.edu
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INTRODUCTION

Substance use disorders (SUD)—and opioid use disorders (OUD), in particular—are among the most stigmatized conditions in psychiatry and, indeed, throughout societies more generally [1–4]. Such stigma leads to fears of discrimination and negative repercussions that prevent or delay sufferers from seeking treatment leading to greater morbidity and mortality risk [5]. To help mitigate the negative personal and public health impact of stigma in relation to drug-related impairment, different medical terminology (e.g. 'chronically relapsing brain disease', 'disorder') has been adopted and deployed explicitly by US federal public health agencies [6] [e.g. National Institute on Drug Abuse (NIDA), National Institute on Alcohol Abuse and Alcoholism (NIAAA), Substance Abuse and Mental Health Services Administration (SAMHSA)], the American Psychiatric Association (APA)

[7] (e.g. substance use 'disorder' category in DSM-5) and prominent addiction-specific medical organizations [e.g. American Society of Addiction Medicine (ASMSA)] [8]. The belief is that greater emphasis on the brain-based and medical nature of drug-related impairment will reduce stigma. At the same time, others have vehemently objected to the over-medicalization of substance-related impairment [9–11], arguing that doing so may undermine personal agency and self-efficacy among sufferers, thereby reducing prognostic optimism and the likelihood that someone would initiate or persevere in salutary change efforts. While these issues remain hotly debated, there are no existing rigorous empirical data to inform the field about which terms may be optimal and under what circumstances.

The choice of language and terminology used is particularly important with regard to drug-related impairment, because whether or not we are aware of it, the use of certain terms can perpetuate stigmatizing attitudes that influence the selection and effectiveness of our social and public health policies for addressing them [12–14]. In fact, rigorous scientific investigations have now shown that certain common terms in the field used to describe individuals suffering from chronic drug-related impairment (e.g. 'substance abuser') may actually induce explicit and implicit cognitive biases that result in a perceived need for punishment rather than treatment [15–17]. Such research has made it difficult to trivialize and dismiss the terminology debate as merely 'semantics' or a linguistic preference for 'political correctness'.

Whereas several terms are used somewhat interchangeably across federal and state public health agencies, we are not aware of any rigorous research that may inform and guide the choice regarding which terms may be optimal in describing the phenomena of drug-related impairment itself. There have been recent efforts to re-assert the notion of addiction as a 'disease' characterized by brain-related structural deficits and functional impairment [18] (e.g. 'brain disease') or as a chronically relapsing variant thereof (e.g. 'chronically relapsing brain disease'). It has also been described more generally as simply a medical 'disease' or 'illness' without specific emphasis on the brain *per se*, and also as a 'disorder' as in the current fifth edition of the Diagnostic and Statistical Manual (DSM-5) of the American Psychiatric Association (AMA) [7]. It is also often referred to more generically as a 'problem' (e.g. a 'drug problem').

With the exception of the latter, most, if not all, these terms are used explicitly with the intention of placing the responsibility for addressing these problems squarely within the broad realm of medicine, psychiatry and public health, and to reduce blame and associated self- and public stigma in order that more people will seek and stay engaged with treatment [16,19]. Little is known, however, about any differential impact of the use of each of these commonly used terms when applied to drug-related impairment on well-studied dimensions of stigma, such as perceptions of blame, danger, social distance, treatment need and prognostic optimism. Although it is challenging to assess the impact of stigma directly, randomized experimental designs have been conducted to assess differences in attitudes that result from differential exposure to certain terminology typically presented within a vignette (e.g. Kelly & Westerhoff, 2010). Using this type of study design, compelling evidence has emerged from the mental health field that emphasizing more biomedically oriented genetic explanations of causes of mental illness may reduce blame attributions, but increase prognostic pessimism and perceptions of dangerousness [20] and that emphasizing brain-based neurobiological explanations for mental illness actually may increase perceptions of dangerousness, desire for social distance and pessimism about people's likelihood of recovering.

Although untested, it is thus conceivable that describing drug-related impairment as a 'chronically relapsing brain disease', while intended to diminish self-blame and stigma, may similarly increase perceptions that someone is chronically volatile and dangerous, thereby increasing attitudes of social exclusion and reducing beliefs that the affected person can recover. Knowledge of such attitudes are important, particularly in the general population, as public opinion can exert pressure for greater investment in therapeutic versus punitive criminal justice approaches to addressing drug-related impairment at local and national levels.

To this end, using a nationally representative sample of the US general population, this randomized study is intended to shed light upon this hotly debated issue of whether differential use of commonly used terms produce attitudinal differences across dimensions of stigma and perceptions governing the likelihood of recovery. Given the recent dramatic rise in opioid use disorder and overdose deaths in the United States and several other nations, in this study we test an example relating to opioid-related impairment, in particular. Specifically, the study tested whether (1) commonly used terminology differentially affected perceptions of stigma; (2) perceptions of stigma differed depending upon whether the opioid-impaired person being portrayed was depicted as a man or a woman; and (3) any observed stigma differences across terminology depended upon whether the portrayed opioid-impaired person was a man or a woman. It is hoped that this investigation will provide some empirical basis for the choice of terminology in our clinical practices with patients, families and colleagues, as well as in our broader public health and social policies and communication efforts.

METHOD

Participants

A nationally representative sample of non-institutionalized adults in the United States was recruited in partnership with Ipsos, an internationally recognized survey company, to participate in this experimental study. Participants enrolled in Ipsos' 'KnowledgePanel'—the largest probability-based on-line panel assembled via address-based sampling and representative of the United States population—were screened for eligibility in this study. The KnowledgePanel uses address-based sampling (ABS) to randomly select individuals from 97% of all US households based on the US Postal Service's Delivery Sequence File. If necessary, Ipsos provides individuals with a web-enabled computer and free internet service. Using this Ipsos is able to include households that (a) have unlisted telephone numbers, (b) do not have landline telephones, (c) are cellphone only, (d) do not have current internet access and (e) do not have devices to access the internet. This type of broad-scale sampling helps to redress socio-economic differences in landline telephone use and internet access. Ipsos' population-based probability sampling approach has been vetted and validated in dozens of published studies in the medical and behavioral health fields (e.g. *Journal of the American Medical Association*, *JAMA Internal Medicine*, *Journal of Consulting and Clinical Psychology*). Eligible people were adults aged 18 years and older and English-speakers. In order to produce unbiased estimates of population parameters from these respondents, survey data are weighted to account for selection probabilities, non-response and under-coverage. The sample is weighted to geo-demographic benchmarks obtained from the US Census Bureau's Current Population Survey (CPS), including gender, age, race/ethnicity, education, census region, household income, home ownership and metropolitan area. The resulting weights are used as a measure of size, which is then applied using probability-proportional-to-size, to select study-specific samples. After data are collected, design weights are adjusted to account for differential non-response using iterative proportional fitting (i.e. raking). Finally, outlier weights are trimmed and resulting weights are scaled to the total sample size of eligible participants.

The survey was pre-tested over 30 days in December 2019–January 2020 to estimate time to completion and identify potential pitfalls in the survey to be addressed. The official survey was administered over 16 days in February 2020. Of the 5998 participants who were sampled, 3635 completed the survey (61% completion rate). This response rate is comparable to most other current nationally representative surveys [e.g. National Epidemiologic Survey on Alcohol and Related Conditions–III (NESARC-III), 60.1% [21]; the 2018 National Survey on Drug Use and Health (NSDUH), 58.3%] [5].

Non-responders to the screening question were sent e-mail reminders on days 3, 7 and 11 of the survey period. The median time it took for participants to complete the survey was 8 minutes. Participants were able to refuse to respond to an item or skip it entirely. If they skipped the item, they were provided with a warning notification.

Procedures

Participants were randomized to receive one of 12 vignettes (six terms × gender) describing a person who had become increasingly involved with opioids and was currently receiving treatment wherein they were learning about the exact nature of their condition described in one of six different ways as: 'a chronically relapsing brain disease', 'a brain disease', 'a disease', 'an illness', 'a disorder' or 'a problem'. Vignettes also depicted the person as either male or female, but used the same gender-neutral name ('Alex') making for a total of 12 randomized cells (approximately $n = 300$ participants per cell). The vignette used was as follows:

> 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'ss 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).

Participants were asked to read their specific assigned vignette and then answered 27 stigma-related questions reliably clustered within five subscales (stigma-blame; social distance/exclusion; prognostic optimism, need for continuing care, perceived danger; $a = 0.70$–0.83). All study procedures were approved by the Massachusetts General Hospital Partners HealthCare Institutional Review Board. The study was not pre-registered on a publicly available platform, and thus results should be considered exploratory.

Measures

Demographic characteristics

Demographic data were derived from the Ipsos' existing KnowledgePanel sample of respondents (collected prior to the survey), as well as from our survey data for variables not assessed by Ipsos. Regarding existing demographic data, participants reported the following: (a) age, (b) sex

at birth, (c) level of education, (d) race/ethnicity, (e) marital status, (f) employment, (g) household income and (h) US census region.

Stigma and attributions

Twenty-seven questions covering multiple dimensions of stigma and attitudes towards opioid-related impairment were administered as part of the stigma and attribution assessment. The measure comprised five distinct scales, (a ranged from 0.70 to 0.83) including: (1) blame attribution (five items), (2) prognostic optimism (five items), (3) need for continuing care (three items), social distance (five items) and attribution (nine items; AQ-9 [22,23], $a = 0.72$). For each question, response options ranged from 'strongly disagree' to 'strongly agree' on a corresponding 1–6 scale. Apart from the AQ-9, most items were constructed as distinct scales for the purpose of the study by the first author and/or adapted from prior work [24]

Statistical analysis

We first described the distribution of demographic characteristics in our study population. In this sample we evaluated the internal consistency and construct validity of the 27-item stigma measure using exploratory factor analyses and Cronbach's alpha coefficient. Exploratory factor analysis of all 27 items was used to identify stigma subscales. First, a principal components analysis was used to determine the number of factors to extract. We plotted the eigenvalues on a scree plot to identify an inflection point that corresponded to the number of factors that explained a sufficient proportion of the variance (i.e. approximately 5% or greater) in stigma. Factor loadings were estimated using orthogonal or oblique rotation depending upon whether factors displayed a low or moderate/high intercorrelation, respectively. We eliminated items with low item-total correlations as well as low factor loadings ($\lambda < 0.35$) and high uniqueness. Total scores for each subscale were calculated as the sum of all retained items. Using unadjusted linear regression models, we estimated the mean difference (i.e. beta coefficient) in each of the final stigma subscales as a function of: (1) opioid-related impairment terminology, (2) gender of the vignette character and (3) gender of the vignette character stratified by opioid-related impairment terminology. In the opioid-related impairment terminology regression models, 'chronically relapsing brain disease' was included as the reference group. In the models examining stigma as a function of the gender of the vignette character in the full sample, and when stratified by opioid-related impairment terminology, female was the reference group. Given the potential for more subtle nuances to be obscured if a participant had a language other than English as a first language, we conducted a sensitivity analysis excluding all people who spoke a language other than English in their home to determine whether language fluency influenced the observed findings. All analyses were conducted in Stata version 14 and incorporated sampling weights.

RESULTS

Characteristics of study population

The sample included 3635 adults living in the northeast (17.5%), Midwest (20.8%), South, (37.9%), or Western (23.8%) region of the United States. On average, participants were 47.8 years of age and most were female at birth (52.4%), non-Hispanic white (63.1%), married (54.9%), had at least some college education (61.0%), were working (59.6%) and reported an income ≥ US$50 000 (68.3%; Table 1).

Psychometrics of the stigma and attribution scales

We extracted five factors based on the eigenvalues, scree plot and variance explained in the overall stigma construct (see Supporting information, Appendix S1). Of the 27 items, three were initially dropped due to low factor loadings and high uniqueness (items 1, 13, 15). Oblique rotation was used to estimate the factor loadings due to the moderate–high correlation of extracted factors. Low internal consistency of the 'need for continuing care' subscale resulted in the removal of two additional items displaying low item-total correlations (items 17 and 19; see Table 2 for list of all items). Final stigma subscale reliability coefficients are shown also in Table 2).

Differences in stigma and attitudes toward opioid-related impairment in the US adult population as a function of terminology and gender

Main effect of terminology

Relative to participants who were randomized to receive the vignette describing the opioid-impaired person as having a 'chronically relapsing brain disease', participants whose vignette included any of the other five terms (brain disease, disease, illness, disorder, problem) reported significantly higher levels of blame attribution toward the individual with the opioid-related impairment (Table 3). We identified a relationship suggesting that blame attributions were highest for individuals with a 'problem' or 'disease', moderate blame attribution for individuals with an 'illness' or 'disorder' and lower levels of blame attribution for individuals with a 'brain disease' followed by the lowest levels of blame attribution for individuals with a 'chronic relapsing brain disease' (Fig. 1).

Of note, participants who were randomized to receive the vignette describing the depicted person as having an opioid 'problem' were more likely to attribute more

Table 1 Characteristics of study population

	Weighted n = 3635
Age, mean (95% CI)	47.81 (47.18,48.44)
Sex at birth, Pct (95% CI)	
Male	47.60 (45.86,49.34)
Female	52.40 (50.66,54.14)
Education, Pct (95% CI)	
Less than high school	10.60 (9.39,11.95)
High school	28.31 (26.77,29.91)
Some college	27.77 (26.25,29.33)
Bachelor's degree or higher	33.32 (31.76,34.92)
Race/ethnicity, Pct (95% CI)	
White, non-Hispanic	63.14 (61.36,64.90)
Black, non-Hispanic	11.82 (10.65,13.09)
Other, non-Hispanic	7.19 (6.22,8.31)
Hispanic	16.44 (15.04,17.95)
2+ races, non-Hispanic	1.40 (1.16,1.69)
Marital status, Pct (95% CI)	
Married	54.92 (53.16,56.67)
Widowed	4.14 (3.55,4.83)
Divorced	9.81 (8.88,10.83)
Separated	1.93 (1.49,2.49)
Never married	22.71 (21.15,24.35)
Living with partner	6.50 (5.61,7.51)
Work/employment, Pct (95% CI)	
Not working	40.45 (38.76,42.17)
Working	59.55 (57.83,61.24)
Income greater than or equal to $50 000, Pct (95% CI)	
No	31.75 (30.11,33.43)
Yes	68.25 (66.57,69.89)
Region, Pct (95% CI)	
Northeast	17.46 (16.21,18.79)
Midwest	20.78 (19.45,22.18)
South	37.94 (36.24,39.66)
West	23.82 (22.37,25.33)

Pct = percent; CI = confidence interval.

personal blame for the opioid impairment; however, at the same time they were more likely to view that same person more positively in terms of viewing them as being less dangerous, viewing that person as being more able to recover from their opioid impairment and less likely to need continuing care than those participants who were randomized to the term 'chronically relapsing brain disease'. In addition to characters portrayed as having a 'problem', characters described as having a 'disorder' or 'brain disease' were also perceived as less likely to require continuing care relative to characters portrayed as having a 'chronically relapsing brain disease'. We did not find any significant differences in perceptions of need for social distance as a function of the different vignette terms.

Main effect of gender

When comparing the effect of gender of the character portrayed in the vignette (collapsing across terminology), we found that, when the person with the opioid-related impairment was described as a male, participants attributed significantly less blame, but a desire for greater social distance and expressed higher levels of perceived dangerousness relative to participants who were randomized to a vignette with a female character exhibiting opioid-related impairment. We did not identify significant differences in prognostic optimism or need for continuing care between participants who were randomized to a vignette with a female versus male character with opioid-related impairment.

Effect of gender by terminology

We further examined whether gender modified the effects of exposure to the opioid-related impairment terms (or null effects) observed in the main effects analysis (Table 3; Fig. 2). We found that decreased blame attribution toward male characters relative to female characters with opioid-related impairment was observed only when the term 'chronically relapsing brain disease' was included in

Table 2 Internal consistency and construct validity of 27-item stigma measure and subscales

Exploratory factor analysis loadings (pattern matrix)	*Social distance*	*Danger*	*Prognostic optimism*	*Blame*	*Need for continuing care*	*Uniqueness*
1. Alex would benefit tremendously from medications to stop his/her opioid use	−0.013	0.047	0.023	−0.129	0.171	0.937
2. I feel angry at Alex	−0.110	0.677	−0.019	0.055	−0.069	0.593
3. Alex is very likely to be able to maintain recovery over the next 12 months	0.058	−0.064	0.726	−0.062	−0.050	0.501
4. I believe Alex is dangerous	−0.044	0.651	−0.100	−0.011	0.040	0.569
5. Alex will be able to control his/her opioid use if he/she puts his/her mind to it	−0.028	0.170	0.580	0.168	0.045	0.632
6. I would be happy to have Alex as a neighbor	0.654	0.113	−0.126	−0.106	−0.083	0.400
7. Alex will need lifelong support to sustain his/her recovery	−0.001	0.019	−0.093	0.079	0.704	0.548
8. I would be glad to have Alex marry into my family	0.821	0.019	0.000	−0.099	−0.045	0.338
9. Alex will be able to maintain recovery over the next 3 months	−0.161	−0.094	0.460	0.012	0.101	0.621
10. I think Alex should be forced into treatment with his/her doctor even if he/she does not want to	−0.019	0.500	0.121	−0.045	0.112	0.746
11. I think it would be best for Alex's community if he/she were put away in long term residential treatment	−0.013	0.636	0.017	−0.096	0.023	0.590
12. I would like to help Alex	0.363	0.104	−0.062	−0.015	−0.266	0.695
13. Alex is not personally to blame for his/her opioid addiction	0.216	0.238	0.026	0.309	−0.078	0.702
14. I would be happy to have Alex as a babysitter for my children	0.787	−0.170	0.058	0.078	0.205	0.471
15. I feel pity for Alex	0.107	0.037	0.011	0.171	−0.246	0.855
16. I think that it is Alex's own fault that he/she is in the present condition	0.102	0.519	0.152	0.232	0.054	0.641
17. It is critical for Alex to receive continuing care with a psychiatrist	0.079	−0.005	0.072	−0.022	0.610	0.608
18. Alex will definitely be able to maintain recovery for the rest of his/her life	−0.022	0.034	0.745	−0.090	−0.069	0.454
19. After finishing treatment, Alex will always experience opioid cravings to varying degrees	−0.019	−0.119	0.143	0.012	−0.516	0.724
20. Alex's opioid addiction is definitely genetic in origin	−0.021	−0.029	−0.031	0.720	0.040	0.501
21. I would be happy to have Alex as my primary care doctor	0.758	−0.119	0.068	0.093	0.143	0.494
22. I feel scared of Alex	0.086	0.438	−0.012	−0.171	0.048	0.729
23. Alex's opioid addiction is entirely due to a chemical imbalance in the brain	0.004	0.004	−0.119	0.519	−0.050	0.697
24. I would like to have Alex as a co-worker	0.671	0.101	−0.055	0.017	−0.057	0.414
25. There is no doubt that Alex will be able to live a normal life after treatment	−0.049	−0.076	0.602	−0.065	−0.087	0.596
26. I would try to stay away from Alex	0.309	0.458	−0.070	−0.151	−0.009	0.517
27. Alex's opioid addiction is extremely likely to be inherited	−0.054	−0.064	−0.021	0.705	0.043	0.526
Items included based on EFA	6, 8, 12, 14, 21, 24	2, 4, 10, 11, 16, 22, 26	3, 5, 9, 18, 25	20, 23, 27	7, 17, 19	
Original internal consistency	0.83	0.76	0.76	0.70	0.63	
Deleted items	–	–	–	–	17,19	
Final internal consistency	0.83	0.76	0.76	0.70	–	

EFA = Exploratory factor analysis.

Table 3 Differences in stigma and attribution as a function of opioid use disorder terminology and gender

Main effect: term		*Blame*	*Prognostic optimism*	*Need for continuing care*	*Social distance*	*Perceived danger*
Ch (ref)	Mean (SE)	4.13 (0.05)	3.70 (0.05)	4.79 (0.06)	4.17 (0.04)	2.75 (0.04)
Br	Mean (SE)	4.27 (0.04)	3.75 (0.04)	4.62 (0.06)	4.19 (0.04)	2.74 (0.04)
	Mean diff (95% CI)	**0.14 (0.02, 0.27)**	0.06 (−0.07, 0.18)	**−0.18 (−0.34, -0.01)**	0.02 (−0.09, 0.14)	−0.01 (−0.12, 0.10)
Di	Mean (SE)	4.44 (0.04)	3.74 (0.04)	4.73 (0.06)	4.20 (0.04)	2.71 (0.04)
	Mean diff (95% CI)	**0.32 (0.19, 0.44)**	0.04 (−0.08, 0.16)	−0.06 (−0.22, 0.10)	0.03 (−0.09, 0.15)	−0.04 (−0.15, 0.06)
Il	Mean (SE)	4.38 (0.04)	3.75 (0.04)	4.68 (0.06)	4.21 (0.04)	2.73 (0.04)
	Mean diff (95% CI)	**0.25 (0.13 0, 0.37)**	0.06 (−0.06, 0.18)	−0.11 (−0.27, 0.06)	0.04 (−0.07, 0.16)	−0.02 (−0.13, 0.08)
Do	Mean (SE)	4.37 (0.05)	3.75 (0.04)	4.60 (0.07)	4.16 (0.04)	2.69 0(.04)
	Mean diff (95% CI)	**0.25 (0.11, 0.38)**	0.05 (−0.07, 0.17)	**−0.19 (−0.36, –0.02)**	−0.01 (−0.13, 0.11)	−0.06 (−0.17, 0.05)
Pr	Men (SE)	4.49 (0.05)	3.87 (0.05)	4.53 (0.06)	4.07 (.05)	2.62 (.04)
	Mean diff (95% CI)	**0.37 (0.24, 0.50)**	**0.18 (0.05, 0.30)**	**−0.26 (−0.43, –0.09)**	−0.10 (−0.22,0.03)	**−0.13 (−0.25, –-0.02)**
Main effect: gender						
Female (ref)	Mean (SE)	4.39 (0.03)	3.79 (0.03)	4.66 (0.04)	4.09 (0.02)	2.64 (0.02)
Male	Mean (SE)	4.31 (0.03)	3.73 (0.03)	4.66 (0.04)	4.25 (0.03)	2.77 (0.02)
	Mean diff (95% CI)	**−0.08 (−0.15, –0.01)**	−0.06 (−0.13, 0.01)	0.00 (−0.10, 0.10)	**0.16 (0.09, 0.23)**	**0.13 (0.06, 0.19)**
Stratified analyses						
Ch						
Female (ref)	Mean (SE)	4.26 (0.07)	3.67 (0.06)	4.76 (0.08)	4.10 (0.06)	2.70 (0.05)
Male	Mean (SE)	3.98 0(.07)	3.72 (0.07)	4.83 (0.08)	4.24 (0.06)	2.81 (0.06)
	Mean diff (95% CI)	**−0.28 (−0.46, –-0.09)**	0.04 (−0.14, 0.22)	0.07 (−0.16, 0.30)	0.14 (−0.03, 0.31)	0.11 (−0.05, 0.26)
Br						
Female (ref)	Mean (SE)	4.22 (0.06)	3.83 0(.06)	4.75 (0.08)	4.06 (0.06)	2.69 (0.06)
Male	Mean (SE)	4.32 (0.06)	3.68 (0.06)	4.48 (0.09)	4.32 (0.05)	2.80 (0.05)
	Mean diff (95% CI)	0.10 (−0.07, 0.28)	−0.15 (−0.32, 0.02)	**−0.26 (−0.50, –0.02)**	**0.25 (0.09, 0.41)**	0.11 (−0.04, 0.27)
Di						
Female (ref)	Mean (SE)	4.52 (0.06)	3.77 (0.06)	4.71 (0.08)	4.11 (0.06)	2.60 (0.05)
Male	Mean (SE)	4.37 (0.06)	3.70 (0.06)	4.75 (0.08)	4.28 (0.06)	2.81 (0.05)
	Mean Diff (95% CI)	−0.15 (−0.32, 0.02)	−0.07 (−0.23, 0.10)	0.04 (−0.19, 0.27)	**0.17 (0.01, 0.34)**	**0.21 (0.06, 0.35)**
Il						
Female (ref)	Mean (SE)	4.37 (0.06)	3.74(0.06)	4.63 (0.09)	4.12 (0.06)	2.65 (0.05)
Male	Mean (SE)	4.38 (0.06)	3.76 (0.06)	4.74 (0.08)	4.30 (0.05)	2.81 (0.05)
	Mean diff (95% CI)	0.02 (−0.15, 0.18)	0.02 (−0.14, 0.18)	0.11 (−0.13, 0.35)	**0.19 (0.03, 0.34)**	**0.16 (0.01, 0.30)**
Do						
Female (ref)	Mean (SE)	4.42 (0.07)	3.83 (0.06)	4.60 (0.09)	4.11 (0.05)	2.67 (0.05)

(*Continues*)

Table 3. (Continued)

Main effect: term		*Blame*	*Prognostic optimism*	*Need for continuing care*	*Social distance*	*Perceived danger*
Male	Mean (SE)	4.33 (0.07)	3.66 (0.06)	4.60 (0.09)	4.21 (0.07)	2.72 (0.06)
	Mean diff (95% CI)	−0.09 (−0.28, 0.09)	−0.17 (−0.34, 0.00)	−0.01 (−0.26, 0.25)	0.09 (−0.08, 0.26)	0.05 (−0.10, 0.20)
Pr						
Female (ref)	Mean (SE)	4.55 (0.06)	3.88 (0.06)	4.52 (0.09)	4.02 (0.07)	2.55 (0.05)
Male	Mean (SE)	4.44 (0.07)	3.87 (0.07)	4.55 (0.09)	4.13 (0.07)	2.69 (0.06)
	Mean diff (95% CI)	−0.11 (−0.30, 0.07)	−0.02 (−0.20, 0.16)	0.03 (−0.23, 0.28)	0.11 (−0.08, 0.30)	0.13 (−0.03, 0.29)

Ch = chronically relapsing brain disease; Br = brain disease; Di = disease; Il = illness; Do = disorder; Pr = problem; SE = standard error; CI = confidence interval; diff = difference. Bold mean differences indicate statistical significance ($p < .05$).

the vignette. Specifically, participants were less likely to attribute blame to males with a chronically relapsing brain disease relative to females with a chronically relapsing brain disease. We did not identify any significant differences in blame attribution by gender when other terms were included in the vignettes.

We found that males with a brain disease were significantly less likely to be perceived to need continuing care relative to females with a brain disease. Across all terms, participants expressed a desire for increased levels of social distance from males relative to females exhibiting opioid-related impairment; however, this was only statistically significant when the opioid-related impairment was referred to as a 'brain disease', a 'disease' or an 'illness'. Males with a 'disease' or 'illness' were also perceived as more dangerous relative to females whose opioid impairment was described as a 'disease' or an 'illness'. Results of the sensitivity analysis restricting our sample to participants who reported English as the primary language spoken at home (84.7% of the sample) did not reveal notable differences in the pattern of effects of gender or term on the stigma and attribution subscales.

DISCUSSION

Using a large nationally representative sample of the US general population and a randomized design, our study examined the impact of exposure to different common terms used to describe someone suffering from opioid-related impairment (i.e. 'chronically relapsing brain disease', 'brain disease', 'disease', 'illness', 'disorder', 'problem') on perceptions of several dimensions of stigma (e.g. blame, dangerousness), treatment need and prognostic optimism. Findings were nuanced with differential effects observed across terminology, gender and dimensions of stigma.

In terms of the main effect of terminology, perhaps the most notable finding was that whereas there were beneficial stigma-reducing effects observed for certain terms on certain stigma dimensions, there was not one clear single term that produced beneficial effects across all dimensions of stigma, treatment need and prognostic optimism. Specifically, exposure to the 'chronically relapsing brain disease' term was associated with the lowest levels of stigmatizing blame attributions; in fact, exposure to any other term was associated with a significant increase in stigmatizing blame although, intriguingly, the blame effect was related in a linear ordinal fashion with 'problem', resulting in the greatest stigmatizing blame attribution. In contrast, study participants who were exposed to the person described as having an opioid 'problem' compared to 'chronically relapsing brain disease' exhibited the strongest beliefs that the person could recover (Fig. 1), were less dangerous and less likely to require continuing care. These findings support the use of the 'chronically relapsing brain disease'

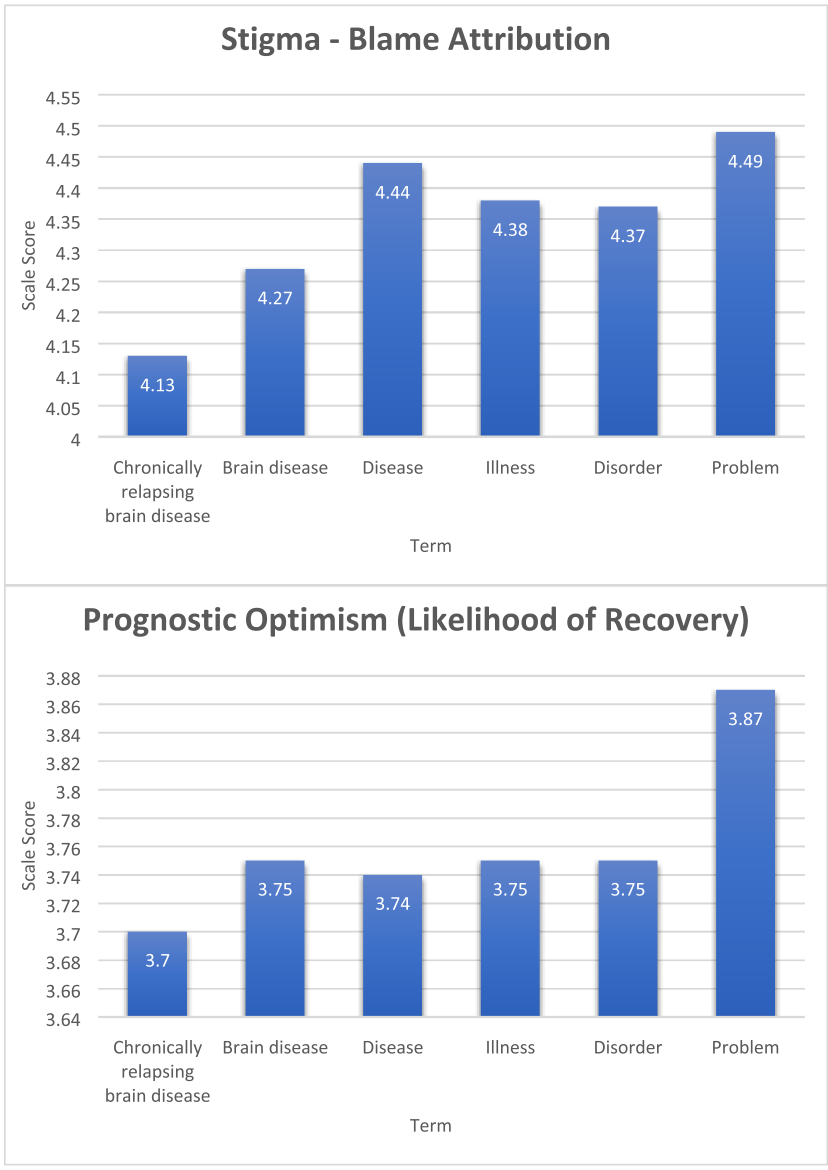

Figure 1 Contrary effects of the same terminology: 'Chronically relapsing brain disease' decreases blame (top figure) but also decreases prognostic optimism (bottom figure). [Colour figure can be viewed at wileyonlinelibrary.com]

term to reduce stigmatizing blame, but simultaneously suggest that this may not be the best term to use to convey the more positive notion that someone with opioid-related impairment is approachable and can recover; in that case, the less medical and more generic, 'problem' term may be optimal.

In terms of gender of the subject, compared to a man, a woman exhibiting opioid-related impairment was judged significantly more harshly—as more to blame. Conversely, when study participants were exposed to a male versus a female character, they seemed more afraid and rated both social distance and danger higher for a man than a woman with the same level of opioid-related impairment. It is perhaps expected that a man would be viewed as more dangerous and for people to want to stay further away from a man than a woman due to greater perceived aggression, but it is noteworthy that a woman was judged more harshly and more personally to blame for exhibiting opioid-related impairment than a man.

Aspects of this pattern became clearer and more pronounced when examining the results of the stratified models. When described using the 'chronically relapsing brain disease' terminology women may be viewed as more personally responsible, suggesting a potentially harsher and less forgiving social stance against women—even when exhibiting the same level of opioid-related impairment. This may be a case of socially stereotyped exonerating expectations that 'boys will be boys' (i.e. 'bad' behavior is to be expected and is excusable) and that 'girls should behave', thereby implicitly assigning greater levels of expected pre-programmed externalizing behavior and impulsivity regarding male behavior. However, the pattern

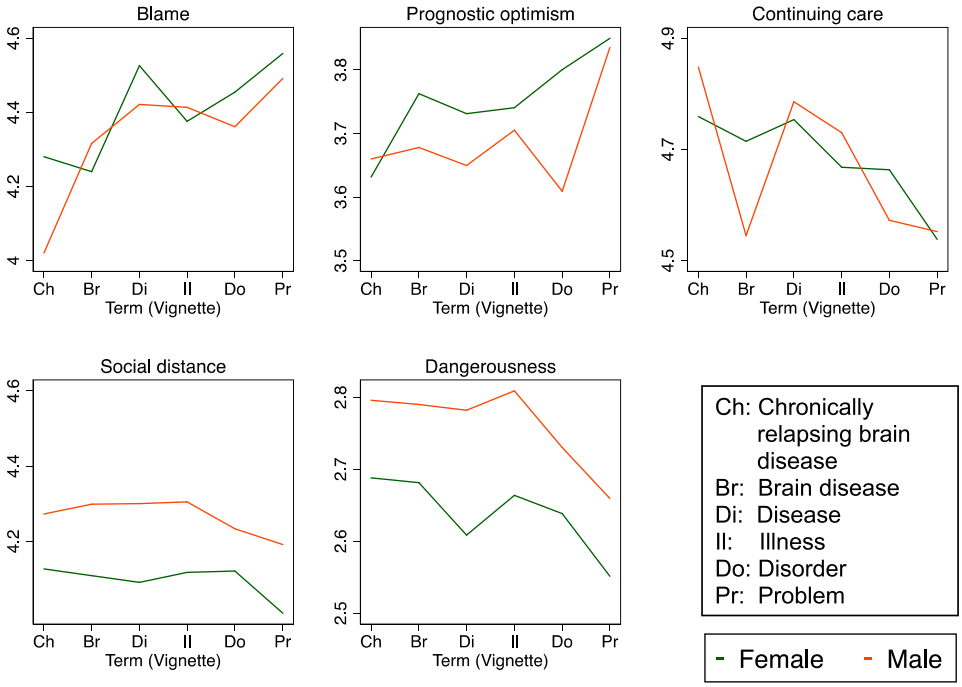

Figure 2 Levels of different type of stigma as a function of opioid-related impairment terminology and gender. [Colour figure can be viewed at wileyonlinelibrary.com]

is complex, as although men may be viewed less harshly for exhibiting opioid-related impairment when described in that manner, they are more likely to be viewed as more dangerous and thus socially ostracized and excluded overall compared to women.

Limitations

Observed differences were small in absolute magnitude, and the extent to which such differences may translate into actual real-world differences in terms of behavior of the general population is not known; for example, whether this would mean voting for a particular policy measure or not (e.g. increased appropriation for treatment). The set of six terms used as the levels of the independent variable is highly applicable within a US English-speaking cultural context; applicability in other cultures could vary. It would be very helpful to know also what terms drug-impaired person themselves would regard as either helping or discouraging them. Future research should examine this. Also, we used opioid-related impairment in this study as a specific example of 'drug-related' impairment—we do not know the extent to which observed differences in the stigma dimensions would generalize to other substances. Also, although the focus here was to examine general (main) effects in response to certain commonly used terminology, this pattern of findings could be moderated by specific respondent characteristics (e.g. personal history of a substance problem), which is worthy of further investigation. Finally, we explored the covariance and internal consistency of items to identify meaningful subscales; however, this 27-item measure has not been previously validated. We summed the item scores within each subscale for this analysis to be consistent with the way these items have been previously scored, which may have also introduced measurement error. Further research exploring the measurement and criterion validity of these stigma subscales is needed to confirm their ability to assess substance use stigma and related attitudes.

Implications for practice and policy

In summary, findings suggest that there may not be one single recommended term that can be applied across the board to meet all desired clinical and public health goals when attempting to reduce stigma. Choice of terminology may depend on the purpose of communication: to reduce stigmatizing blame, the more biomedical 'chronically relapsing brain disease' terminology may be optimal; to increase prognostic optimism and decrease perceived danger and social exclusion of affected people's use of non-medical terminology (e.g. 'opioid problem') may be optimal. Findings also suggest that women may be judged more harshly than men, possibly due to broad cultural sex-based stereotypes governing differential acceptability of opioid-related impairment; and men, overall, may have more difficulty being trusted and reintegrating into society due to greater fears that they present more danger.

Declaration of interests

We have no conflicts of interest to report. Dr. John Kelly has received funding from the United States national institutes

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Author contributions

John Kelly: Conceptualization; data curation; funding acquisition; investigation; project administration; writing-original draft; writing-review & editing. **M. Claire Greene:** Formal analysis; methodology; writing-review & editing. **Alexandra Abry:** Project administration; resources; writing-review & editing.

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Appendix S1 Demographic covariate balance across experimental conditions (survey-weighted).

