Does selectively endorsing different approaches to treating mental illness affect lay beliefs about the cause and course of mental illness?

Clodhna O’Connor*, Sarah Vaughan

School of Psychology, University College Dublin, Dublin, Ireland

A R T I C L E   I N F O

Keywords:
Major Depressive Disorder
Generalized Anxiety Disorder
Schizophrenia
treatment
causal attributions
illness perceptions

A B S T R A C T

The current paper reports three experimental studies that investigate how selectively emphasising different treatment approaches (biological, psychological or social) for mental health difficulties affects lay beliefs about those illnesses. Online experimental vignettes exposed participants to different treatment narratives for a clinical case of Major Depressive Disorder (Study 1; n=164), Generalized Anxiety Disorder (Study 2; n=173) and Schizophrenia (Study 3, n=170). Measures of causal attributions and illness perceptions assessed effects on beliefs about the causes and course of the illness. Emphasising psychological treatment of Major Depressive Disorder promoted more causal attributions to personal weakness, while endorsing biological treatment weakened confidence in individual control over the course of the illness. For Generalized Anxiety Disorder, stressing social treatment encouraged more causal attributions to personal weakness and lifestyle factors. Causal attributions for Schizophrenia did not shift according to treatment modality, but highlighting biological treatment made the symptoms appear more treatable, while emphasising psychological treatment made the illness seem more personally controllable. As lay understandings of the causes and course of mental illness have implications for help-seeking, treatment engagement and stigma, effects on illness beliefs may be an important consideration when endorsing a particular treatment approach in public discourse or clinical communication.

1. Introduction

Approaches to treating mental illness can be broadly segmented into biological (e.g. psychotropic medication), psychological (e.g. psychotherapy) and social (e.g. support groups) interventions. While the various treatment approaches can be complementary, their relative efficacy varies across diagnoses and patient characteristics (Bandelow et al., 2007; Cuijpers et al., 2013; Pilling et al., 2002). Beyond direct clinical outcomes, promoting particular treatment approaches may have ancillary effects on lay beliefs about the causes and course of mental illness, which could in turn have important implications for help-seeking, treatment engagement and stigma. The current paper reports the first experimental investigation of how selectively emphasising different treatment approaches for a range of mental health diagnoses (Major Depressive Disorder, Generalized Anxiety Disorder and Schizophrenia) affects lay beliefs about those illnesses.

In clinical practice, the most important consideration in selecting a treatment approach is its clinical efficacy. However, the potential repercussions of treatment selection extend beyond symptom reduction to cognitive representations of the illness itself. For instance, a person offered pharmaceutical treatment for low mood may infer that their depressive symptoms are biological in origin (Buus et al., 2012). Such possible effects are not limited to persons directly receiving mental health treatment, but generalise to the wider public. Disseminating information that emphasises the efficacy of particular treatment approaches (for example, in media reports or popular entertainment narratives) may influence public beliefs about the relevant mental illness. Previous general population studies show that emphasising different causes of mental illness affects people’s treatment preferences; for example, reading endorsements of biological causes of depression increases preference for biomedical and reduces preference for psychotherapeutic or lifestyle interventions (Deacon and Baird, 2009; Nolan and O’Connor, 2019; Phelan et al., 2006). No research has tested the reverse direction of this treatment-attrition relationship – that is, whether endorsing the efficacy of particular treatment approaches affects lay beliefs about the causes of mental illness.

Understanding the factors that shape lay beliefs about mental illness is important because these beliefs have repercussions in several

* Corresponding author at: School of Psychology, University College Dublin, Belfield, Dublin 4, Ireland.
E-mail address: Clodhna.OConnor1@ucd.ie (C. O’Connor).

https://doi.org/10.1016/j.psychres.2021.113726

Received 18 August 2020; Accepted 11 January 2021
Available online 13 January 2021

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domains. First, lay beliefs can influence attitudes to help-seeking and treatment engagement. The Self-Regulation Model (Leventhal et al., 1984) has been widely used to study several dimensions of illness beliefs, including treatability, control and timeline of the illness. Applications of this model to mental health conditions show that perceiving an illness as chronic, consequential, treatable, and under personal control predicts greater help-seeking, active coping and treatment engagement (Baines and Wittkowski, 2013). Aetiological beliefs about the origins (’causal attributions’) of mental illness represent one dimension of the Self-Regulation Model, which has been particularly intensively studied. Research shows that attributing mental illness to biological causes can reduce self-blame (Lee et al., 2016), but also impede treatment engagement by promoting fatalistic attitudes regarding recovery (Deacon and Baird, 2009; Lam and Salkovskis, 2007; Schroder et al., 2020).

Second, lay beliefs may influence social responses to people experiencing mental illness. Greater perceived individual control over an illness may increase punitive judgements, since volitionality is a prerequisite for stigmatisation (Alicke, 2000; Weiner et al., 1989). Research confirms that attributing mental illness to individual behaviour (e.g. unhealthy lifestyles) predicts discriminatory attitudes (Stolzenburg et al., 2018), whereas biogenetic attributions may reduce blame by implying the outcomes were beyond the individual’s control (Kvaale et al., 2013; Lebowitz and Appelbaum, 2019; Loughman and Haslam, 2018). Yet research indicates biological attributions for mental illness are ultimately a ‘mixed blessing’ (Haslam and Kvaale, 2015) due to their concurrent tendency to increase fear, stereotyping and social distance (Kvaale et al., 2013; Lebowitz and Appelbaum, 2019; Loughman and Haslam, 2018). Similar ambivalence surrounds social attributions: while attributing mental illness to current stress is linked with more positive attitudes, attribution to childhood trauma is implicated in prejudice (Schomerus et al., 2014; Stolzenburg et al., 2018).

Third, lay beliefs about mental illness may have wider socio-political implications. There is extensive evidence that socio-economic disadvantage, environmental stress and interpersonal conflict trigger psychological and biological vulnerabilities that may result in serious mental health difficulties, including depression, anxiety and psychosis (Allen et al., 2014; World Health Organization, 2014). Critics of biomedical approaches argue that by focusing therapeutic attention on the decontextualized individual, pharmaceutical and psychotherapeutic treatments obscure the social, cultural, political and economic determinants of distress (Boyle and Johnstone, 2014; Halpin, 2020; Middleton and Moncrieff, 2019; Rose, 2019). While this critique is widespread, no empirical evidence has tested whether the promotion of biological or psychological therapy leads people to underestimate the social determinants of mental distress.

The current paper reports three studies that employ experimental vignettes to test the impact of selectively emphasising the efficacy of different treatment approaches (biological, psychological and social) on lay beliefs about mental illness. As previous research indicates that lay beliefs about mental illness differ across diagnoses (Baines and Wittkowski, 2013; Krendl and Freeman, 2019; Stolzenburg et al., 2018), the studies traverse three of the most well-known mental health diagnoses: Major Depressive Disorder, Generalized Anxiety Disorder and Schizophrenia. Results shed light on the range of outcomes that may result when clinicians, health authorities or public commentators selectively endorse a particular approach to treating mental illness.

2. Study 1: Treatment of Major Depressive Disorder

2.1. Method

2.1.1. Design

An online between-groups experimental study was conducted with a UK sample using a contrastive vignette method (Evans et al., 2015). Vignettes (see Supplementary Material) were designed based on ICD-10 diagnostic criteria and National Institute for Health and Care Excellence (NICE) treatment guidelines. The research received ethical approval from the University College Dublin Human Research Ethics Committee (ref. HS-20-36-O’Connor) Un.

2.1.2. Participants

An a priori power analysis indicated 53 participants per experimental condition would be required for an alpha of .05 with 95% power to achieve a medium effect size (f = .25). Participants were recruited via an online participant crowdsourcing platform (Prolific), with the study advertised as ‘research on attitudes and beliefs about mental illness’ and remunerated at the rate of £1.20. Recruitment was restricted to UK residents who spoke fluent English and were aged between 18-65 years. To guard against ‘bots’ or inattentive respondents, captcha and attention checks were embedded within the survey.

After exclusion of participants who failed the attention checks or exited prematurely, 164 participants remained. The majority were women (74.4%, n = 122) and identified their ethnicity as White (84.7%, n = 138). Participants were aged 18-64 with an average age of 32.43 years (SD = 10.6). Most (68.9%, n = 112) were in paid employment, while 15.2% (n = 25) were students and 14.6% (n = 24) unemployed. Under half (43.9%; n = 72) had achieved an undergraduate degree. Over half (55.5%, n = 91) personally knew someone who had a diagnosis of Major Depressive Disorder; 15.9% (n = 26) identified this person as themselves, 15.9% (n = 26) a family member, 15.2% (n = 25) a close friend and 5.5% (n = 9) a casual acquaintance.

2.1.3. Procedure

The survey was hosted on an online platform (Qualtrics), which randomly assigned participants to one of three experimental conditions. All participants first read a common description of a hypothetical gender-neutral target (‘Alex’) with symptoms and diagnosis of Major Depressive Disorder. The three experimental groups then read different passages that described how Alex’ symptoms had been effectively treated by either Biological (selective serotonin reuptake inhibitors [SSRIs]), Psychological (cognitive behavioural therapy [CBT]) or Social (group therapy) interventions. After the vignettes, an attention check verified recall of vignette content (e.g. the character’s name).

Lay beliefs about Alex’ illness were assessed by two validated measures:

- Causal attributions. Attritions regarding the causes of Alex’ symptoms were assessed via the Mental Illness Attribution Questionnaire (Knettel, 2019). This 53-item scale asked participants to rank the likelihood that a range of factors caused Alex’ mental health difficulties. Seventeen items assessed Social-Stress attributions (e.g. ‘Social injustice or discrimination’, α = .96), seven items Biological-Heredity (e.g. ‘Chemical imbalance in the brain’, α = .81), five Personal Weakness (e.g. ‘Lack of will or self-control’, α = .85), ten Supernatural (e.g. ‘Punishment from God’, α = .93), six Physical Health (e.g. ‘Contact with toxins or pollution’, α = .80), six Lifestyle (e.g. ‘Improper diet’, α = .83), and three Substance Use (e.g. ‘Drinking alcohol’, α = .85). An attention check (‘Please select 2 for this item’) was embedded in this scale. Items were presented in randomised order and completed on a 7-point Likert scale.

- Illness perceptions. Three subscales of the Revised Illness Perceptions Questionnaire (Moss-Morris et al., 2002) were adapted to explore participants’ beliefs about Alex’s illness. The Treatability subscale (α = .63) included four items assessing perceptions Alex’s symptoms could be controlled by appropriate treatment (e.g. ‘Treatment will be...
effective in resolving Alex’s problem’); higher scores indicate stronger treatability beliefs. The four items in the Timeline subscale (α = .64) measured perceived course of Alex’s illness (e.g. ‘Alex’s problem will last for a long time’); higher scores indicate perception of the symptoms as chronic rather than acute. Personal Control (α = .67) over the illness was assessed through four items (e.g. ‘Alex has the power to influence the problem’); higher scores indicate greater affordance of control to Alex. Items within the measure were randomised and responses made on a 7-point scale of agreement.

The questionnaire concluded by asking participants for demographic information and whether they or someone they knew had received a diagnosis of Major Depressive Disorder.

2.1.4. Analysis
Analysis was conducted using SPSS v24. Initial checks confirmed suitability for parametric analysis. Preliminary analysis explored sociodemographic equivalence of experimental conditions and demographic factors’ relationship with the dependent variables using independent samples t-tests, analysis of variance (ANOVA) and Pearson’s r. The effect of Treatment condition on dependent variables was examined using ANOVA, with significant effects followed up with post-hoc pairwise comparisons with Bonferroni corrections. Missing data were minimal (10 cases had one missing item) and excluded pairwise. Given the exploratory nature of the research, the analysis did not apply any corrections for multiple comparison, but measures of effect size were calculated throughout.

2.2. Results

2.2.1. Preliminary analyses

2.2.1.1. Demographic characteristics. Women were more likely to attribute the character’s mental illness to Social-Stress (M = 4.07, SD = 1.28) than men (M = 3.57, SD = 1.29), (t(161) = -2.18, p = .03). Women also made more attributions to Substance Use (M = 3.11, SD = 1.42) than men (M = 2.43, SD = 1.22), (t(161) = -2.76, p = .006). Older age significantly correlated with lower attribution to Social-Stress (r(162) = -.16, p = .046) and shorter Timeline (r(162) = -.18, p = .022). Ethnicity or education did not significantly affect responses (all p>.05).

2.2.1.2. Diagnosis experience. Participants with personal acquaintance with people diagnosed with Major Depressive Disorder made more attributions to Biological-Hereditary (M = 3.57, SD = 1.13) than those without experience (M = 3.21, SD = 1.07), (t(153) = 2.01, p = .046).

2.2.1.3. Experimental conditions. In total, 55 (33.5%) participants were assigned to the Biological condition, 53 (32.3%) Social and 56 (34.1%) Psychological. Chi-square tests identified no significant differences between the conditions in terms of gender, ethnicity, education or personal experience with the diagnosis, while a one-way ANOVA found no significant difference in age (all p>.05).

Table 1 presents descriptive statistics across experimental conditions. Across the sample, Social-Stress (M = 3.95, SD = 1.29) and Biological-Hereditary (M = 3.43, SD = 1.13) attributes were the most popular causal attributions, with attributions to Supernatural Forces (M = 1.36, SD = .81) and Physical Health (M = 1.87, SD = .95) attracting relatively little support. Table 2 displays correlations between dependent measures, showing significant positive correlations between many attributions including between Social-Stress and Biological-Hereditary (r(162) = .55, p<.001) and Social-Stress and Personal Weakness (r(162) = .40, p<.001).

2.2.2. Experimental analyses

2.2.2.1. Causal attributions. Treatment condition did not affect attributions to Social-Stress (F(2, 161) = .33, p = .719, η2 = .004), Biological-Hereditary (F(2, 161) = .08, p = .923, η2 = .001), Supernatural Forces (F(2, 161) = .53, p = .588, η2 = .01), Physical Health (F(2, 161) = .04, p = .965, η2 = .00), Substance Use (F(2, 161) = 1.03, p = .360, η2 = .01), or Lifestyle (F(2, 161) = .51, p = .602, η2 = .01). Treatment condition did significantly affect attributions to Personal Weakness, (F(2, 161) = 3.37, p = .037, η2 = .04). Post-hoc tests with Bonferroni corrections showed that while participants in the Psychological condition made more attributions to Personal Weakness than those in the Social (p = .069, d = .43) and Biological (p = .091, d = .40) conditions, these pairwise comparisons did not reach statistical significance.

2.2.2.2. Illness Perceptions. Treatment condition did not affect perceptions of Timeline (F(2, 161) = .80, p = .451, η2 = .01) or Treatability (F(2, 161) = .332, p = .725, η2 = .004). However, a significant effect emerged for judgements of Personal Control, (F(2, 161) = 3.94, p = .021, η2 = .05). Post-hoc tests showed the Biological condition was associated with significantly less belief in Personal Control than the Psychological condition (p = .039, d = .46) and marginally less than the Social condition (p = .062, d = .41).

3. Study 2: Treatment of Generalized Anxiety Disorder

3.1. Method

3.1.1. Participants
Participants were recruited in the same way as Study 1 (Study 1 participants could not complete Study 2). After data validation, Study 2 retained a sample of n = 173. The majority were female (68.8%, n = 119), White (88.4%; n = 153), university-educated (58.4%, n = 101) and employed (57.2%, n = 99), with an average age of 32.28 (SD = 10.36). Half (50.9%, n = 88) personally knew someone with a diagnosis.
of Generalized Anxiety Disorder; 18.5% (n = 32) identified this person as themselves, 9.8% (n = 17) a family member, 11.6% (n = 20) a close friend and 10.4% (n = 18) a casual acquaintance.

3.1.2. Procedure

The procedure was identical to Study 1, except the experimental vignettes (Supplementary Material) described a case of Generalized Anxiety Disorder.

3.1.3. Analysis

Analytic procedure was as for Study 1.

3.2. Results

3.2.1. Preliminary analyses

3.2.1.1. Demographic characteristics. Men were more likely to attribute the mental health difficulties to Personal Weakness (M = 2.97, SD = 1.17) than women (M = 2.19, SD = 1.11), t(167) = 4.12, p < .001. Men made more attributions to Physical Health (M = 2.38, SD = 1.75) than women (M = 1.75, SD = .86), t(167) = -2.759, p = .006. Men also made more attributions to Lifestyle (M = 3.20, SD = 1.01) than women (M = 2.77, SD = 1.06), t(167) = 2.44, p = .016. Minority ethnic participants made more attributions to Supernatural Forces (M = 1.85, SD = .96) than White participants (M = 1.36, SD = .75), t(170) = -2.59, p = .010. Minority ethnic participants were also more likely to attribute mental illness to Personal Weakness (M = 3.00, SD = 1.20) than White participants (M = 2.34, SD = 1.17), t(171) = -2.36, p = .020. Education and age did not significantly affect responses (all p > .05).

3.2.1.2. Diagnosis experience. Participants with personal acquaintance with people diagnosed with Generalized Anxiety Disorder made fewer attributions to Personal Weakness (M = 2.20, SD = 1.09) than those without personal experience (M = 2.60, SD = 1.26), t(164) = -2.22, p = .028. Participants with personal experience envisioned a longer perceived Timeline (M = 4.74, SD = .98) than those without personal experience (M = 4.39, SD = .92), t(164) = 2.35, p = .020.

3.2.1.3. Experimental conditions. The survey software randomly assigned 55 (31.8%) participants to the Biological condition, 60 (34.7%) to Social and 58 (33.5%) to Psychological. There were no significant differences between the conditions in terms of age, gender, ethnicity, education, or personal experience with the diagnosis (all p > .05).

Table 3 shows descriptive statistics across conditions. Correlations between the measures are available in Table 4.

3.2.2. Experimental analyses

3.2.2.1. Causal attributions. Treatment condition did not affect attributions to Social-Stress (F(2, 170) = 1.75, p = .177, \( \eta^2_p = .02 \)), Biological-Heredit (F(2, 170) = 1.48, p = .230, \( \eta^2_p = .02 \)), Supernatural Forces (F(2, 169) = 2.92, p = .056, \( \eta^2_p = .03 \)), Physical Health (F(2, 170) = 2.95, p = .055, \( \eta^2_p = .03 \)), or Substance Use (F(2, 170) = 1.21, p = .301, \( \eta^2_p = .01 \)). A significant effect of Treatment condition emerged for Personal Weakness (F(2, 170) = 3.91, p = .022, \( \eta^2_p = .04 \)). Post-hoc tests with Bonferroni corrections showed that the Social condition produced significantly more attributions to Personal Weakness than the Psychological condition (p = .044, d = .45), and marginally more than the Biological condition (p = .059, d = .42). Treatment condition also significantly affected attributions to Lifestyle (F(2, 170) = 4.79, p = .009, \( \eta^2_p = .05 \)). Post-hoc tests showed that participants in the Social condition made significantly more attributions to Lifestyle causes than the Psychological condition (p = .007, d = .57).

3.2.2.2. Illness perceptions. Treatment condition did not affect Illness Perceptions on the dimensions of Timeline (F(2, 169) = .56, p = .575, \( \eta^2_p = .01 \)), Treatability (F(2, 169) = .27, p = .764, \( \eta^2_p = .003 \)), or Personal Control (F(2, 169) = 3.36, p = .729, \( \eta^2_p = .004 \)).

4. Study 3: Treatment of Schizophrenia

4.1. Method

4.1.1. Participants

The same recruitment procedures used in Studies 1-2 generated a valid sample of 170 participants. The majority were female (77.6%, n = 132), White (85.9%; n = 146), employed (69.4%, n = 118) and university-educated (57.6%, n = 98), with average age 30.69 years (SD = 9.94). Approximately one-quarter (26.5%, n = 45) personally knew someone who had a diagnosis of Schizophrenia; 1.2% (n = 2) identified this person as themselves, 8.2% (n = 14) a family member, 3.5% (n = 6) a close friend and 14.1% (n = 24) a casual acquaintance.

4.1.2. Procedure

The procedure was identical to Studies 1-2, except the experimental vignettes (Supplementary Material) described a case of Schizophrenia. The accounts of Biological, Social and Psychological interventions were adapted to align with NICE guidelines for Schizophrenia (Olanzapine, family therapy or CBT).2

4.1.3. Analysis

Studies 1-2 analytic procedure was repeated.

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2 For ethical and ecological validity reasons, it was important to acknowledge the side-effects that frequently accompany antipsychotic medication (Kantrowitz and Citrome, 2008); to counterbalance this negative information in the other conditions, the Psychological and Social treatment vignettes added that the CBT and family therapy produced some personal and familial discomfort respectively.
4.2.1. Experimental conditions.

4.2.1.1. Demographic characteristics. Women were more likely to attribute the target’s difficulties to Substance Use ($M = 2.82, SD = 1.38$) than men ($M = 2.82, SD = 1.38$), $t(167) = -2.08, p < .001$. Men saw the target as having more Personal Control ($M = 5.46, SD = .84$) than women ($M = 5.04, SD = .90$), $t(167) = 2.53, p = .012$. Younger age correlated with greater perceived Personal Control ($r(168) = -.17, p = .026$). University-educated participants were more likely to attribute the illness to Biological-Heredity ($M = 4.54, SD = 1.04$) than non-university educated participants ($M = 4.13, SD = .99$, $t(167) = -2.64, p = .009$. Those without university-level education were more likely to make attributions to Personal Weakness ($M = 2.23, SD = 1.23$) than university-educated participants ($M = 1.80, SD = 1.13$, $t(168) = 2.38, p = .019$. Minority ethnic participants made more attributions to Supernatural Forces ($M = 1.90, SD = 1.06$) than White participants ($M = 1.24, SD = .69$, $t(168) = -4.42, p < .001$. White participants saw the illness as having a longer Timeline ($M = 5.33, SD = .99$) than minority ethnic participants ($M = 4.72, SD = .94$, $t(168) = 2.79, p = .006$).

4.2.1.2. Diagnosis experience. Participants who reported personal acquaintance with people with Schizophrenia diagnoses envisioned a shorter perceived Timeline ($M = 5.11, SD = 1.04$) than those without personal experience ($M = 5.55, SD = .83$, $t(165) = 2.52, p = .013$).

4.2.1.3. Experimental conditions. In total, 54 (31.8%) participants responded to the Biological condition, 59 (34.7%) Social and 57 (33.5%) Psychological. Preliminary tests identified no significant differences between the conditions in terms of age, gender, education or personal experience with the diagnosis (all $p > .05$. However, the groups were uneven on ethnicity distributions, $\chi^2 (170) = 6.83, p = .033$. Ethnicity (coded as binary White/Minority Ethnic due to the low Ns of the various non-White categories) was therefore included as a covariate in subsequent tests of the effects of condition.

Table 5 displays descriptive statistics across conditions. Correlations between measures are available in Table 6.

4.2.2. Experimental analyses.

4.2.2.1. Causal Attributions. Controlling for Ethnicity, Treatment condition did not affect attributions to Social-Stress ($F[2, 165] = 2.54, p = .082, \eta^2_p = .03$, Biological-Heredity ($F[2, 166] = .57, p = .568, \eta^2_p = .01$), Personal Weakness ($F[2, 166] = 1.11, p = .332, \eta^2_p = .01$), Supernatural Forces ($F[2, 166] = .02, p = .984, \eta^2_p = .00$), Physical Health ($F[2, 166] = .11, p = .870, \eta^2_p = .002$), Substance Use ($F[2, 166] = 1.22, p = .298, \eta^2_p = .01$) or Lifestyle ($F[2, 166] = .231, p = .794, \eta^2_p = .002$).

4.2.2.2. Illness Perceptions. Controlling for Ethnicity, Treatment condition did not affect Illness Perceptions on the dimensions of Timeline ($F[2, 166] = .32, p = .726, \eta^2_p = .004$). There was a significant difference between the conditions on Personal Control ($F[2, 166] = 3.63, p = .029, \eta^2_p = .04$). Post-hoc tests with Bonferroni corrections indicated the Psychological condition ascribed the target more control over their symptoms than the Social condition ($p = .027, d = .32$). The experimental conditions also significantly differed on Treatability ($F[2, 166] = 3.06, p = .049, \eta^2_p = .04$). Post-hoc tests indicated that participants in the Biological condition saw the problems as marginally more treatable than the Social condition ($p = .053, d = .44$).

5. Discussion

No previous research has studied how encountering information about the different approaches to treating mental illness affects lay beliefs about mental illness. The current research indicates that selectively
promoting specific treatment approaches is unlikely to transform lay beliefs in any global sense. However, the three studies revealed numerous effects on discrete beliefs about the causes and courses of different disorders. Emphasising psychological treatment of Major Depressive Disorder promoted causal attributions to personal weakness, while endorsing biological treatment weakened confidence in individual social treatment of anxiety disorders, may risk inadvertently implying biological treatment made the symptoms appear more treatable, while stressing social treatment encouraged more causal attributions to personal control over the course of the illness. For Generalized Anxiety Disorder, Depressive Disorder promoted causal attributions to personal weakness, different disorders. Emphasising psychological treatment of Major suggests the attribution-treatment relationship may be unidirectional: targeting affect belief in the biological or social causes of distress. This means does not necessarily strengthen belief in the biological (or social) mental illness can be effectively treated through biological (or social) treatment preferences (Deacon and Baird, 2009; Nolan and O’Connor, 2019; Phelan et al., 2006; Schweizer et al., 2010), but the reverse does not seem to apply. This provides preliminary evidence that concerns that biomedical approaches occlude the social causes of distress may be unfounded. Indeed, social attributions were the most strongly endorsed across all experimental conditions for both Major Depressive Disorder and Generalized Anxiety Disorder (and second only to biological attributions for Schizophrenia). This is particularly notable given evidence laypeople tend to underestimate the importance of social determinants of health (Haslam et al., 2018). The current research suggests there may be a degree of compartmentalisation in lay thinking about the social and biological causes vs. solutions of mental illness – that is, learning that metal illness can be effectively treated through biological (or social) means does not necessarily strengthen belief in the biological (or social) origins of mental illness. It is also worth noting that different forms of attribution are not mutually exclusive; for Major Depressive Disorder and Generalized Anxiety Disorder, social attributions were strongly positively correlated with biological attributions. This accords with suggestions that in lay understandings of mental illness, biological and social explanations are not configured as a single bipolar dimension, but orthogonal frameworks that are integrated together to form multifactorial common-sense explanations (Broer and Heerings, 2013; O’Connor and Joffe, 2013). As such, highlighting biological factors in the cause or resolution of mental health difficulties need not undermine public recognition of the social determinants of mental ill-health. An important contribution of the research is to highlight that the same treatment narratives may have disparate effects across diagnostic categories. Previous research indicates that stigma towards psychotic disorders is premised on a different network of beliefs than stigma towards mood and anxiety disorders (Krendl and Freeman, 2019). Similarly, in this research, while the pattern of results was relatively similar between Major Depressive Disorder and Generalized Anxiety Disorder,

### Table 5

Descriptive statistics across experimental conditions in Study 3.

| Variable             | Biological (n = 54) | Social (n = 59) | Psychological (n = 57) | Total sample (n = 170) |
|----------------------|--------------------|----------------|-----------------------|------------------------|
|                      | M  | SD | M  | SD | M  | SD | M  | SD | M  | SD |
| Causal attributions  |    |    |    |    |    |    |    |    |    |    |
| Social Stress        | 3.14 | 1.21 | 3.51 | 1.35 | 3.72 | 1.10 | 3.46 | 1.24 |
| Biological-Hereditry | 4.37 | 1.08 | 4.48 | .91 | 4.24 | 1.12 | 4.37 | 1.04 |
| Personal Weakness    | 1.76 | 1.03 | 2.02 | 1.32 | 2.16 | 1.18 | 1.98 | 1.19 |
| Supernatural Forces  | 1.27 | .66 | 1.34 | .69 | 1.41 | .79 | 1.34 | .71 |
| Physical Health      | 1.73 | .85 | 1.77 | .91 | 1.87 | .95 | 1.79 | .90 |
| Substance Use        | 3.03 | 1.28 | 3.40 | 1.37 | 3.22 | 1.34 | 3.22 | 1.33 |
| Lifestyle            | 2.25 | 1.05 | 2.33 | 1.11 | 2.42 | 1.04 | 2.33 | 1.07 |
| Illness Perceptions  |    |    |    |    |    |    |    |    |    |
| Timeline             | 5.38 | 1.07 | 5.20 | 1.02 | 5.15 | .93 | 5.24 | 1.01 |
| Treatability         | 5.80 | .67 | 5.47 | .81 | 5.57 | .77 | 5.61 | .76 |
| Personal Control     | 4.94 | .94 | 5.09 | .97 | 5.37 | .74 | 5.14 | .90 |

### Table 6

Correlations between dependent measures in Study 3.

|          | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   |
|----------|------|------|------|------|------|------|------|------|------|------|
| 1. Social-Stress | 1.00 |      |      |      |      |      |      |      |      |      |
| 2. Biological-Hereditry | .11  | 1.00 |      |      |      |      |      |      |      |      |
| 3. Personal Weakness | .56** | .00  | 1.00 |      |      |      |      |      |      |      |
| 4. Supernatural Forces | .34** | -.03 | .63** | 1.00 |      |      |      |      |      |      |
| 5. Physical Health | .48** | .12  | .58** | .62** | 1.00 |      |      |      |      |      |
| 6. Substance Use | .58** | .26** | .36** | .16  | .38** | 1.00 |      |      |      |      |
| 7. Lifestyle | .66** | .22** | .60** | .36** | .77** | .48** | 1.00 |      |      |      |
| 8. Timeline | .22** | .32** | -.22** | -.21** | -.14 | -.08 | .20** | 1.00 |      |      |
| 9. Treatability | .08  | .02  | .07  | .04  | -.16* | -.09 | -.16* | .12  | 1.00 |      |
| 10. Personal Control | .09  | .12  | .16* | .05  | -.06 | -.04 | .03  | -.01 | .33** | 1.00 |

* p < .05, ** p < .01
Schizophrenia diverged in numerous ways. For example, attributions for schizophrenia were dominated by biological causes, and were not mutable to the experimental manipulation. This reinforces the necessity for research on lay understandings and attitudes regarding mental illness to consider the unique contingencies of the labels and symptoms attached to particular diagnoses (Angermeyer and Matschinger, 2003; Krendl and Freeman, 2019; O'Connor et al., 2018).

5.1. Strengths and limitations

All three studies achieved well-powered samples, with data validated by embedded attention checks. Recruitment through online platforms typically produces more representative and attentive samples than traditional participant pools such as undergraduate students (Hauser and Schwarz, 2016; Palan and Schitter, 2018; Paolacci and Chandler, 2014). However, all studies showed an under-representation of men, ethnic minorities and non-university-educated participants. Analysis indicated that such demographic variables, particularly gender, did affect responses to the vignettes. As demographic profiles were generally stable across experimental conditions, these sampling biases did not compromise the core experimental question. However, future research should expand the pool of data collection to confirm results in more diverse samples.

Vignette methodology is a common approach to studying attitudes to mental illness (Angermeyer and Schomerus, 2017), offering a high degree of experimental control by contrasting similar vignettes differentiated by a single variable (Evans et al., 2015). Vignettes were devised based on formal diagnostic criteria and national treatment guidelines to ensure the narratives were clinically valid, realistic and ethical. However, responses to a single hypothetical clinical case inevitably have limited generalisability. Specific vignette features, beyond the core independent variable of treatment modality, could have influenced responses. An interesting avenue for future research could disentangle interactions between treatment narratives and character attributes, such as gender, socio-economic characteristics or symptom profiles. Additionally, reading short, fictional, text-based vignettes may have limited potency as an experimental intervention. Incorporation of photography or video (Dolphin and Hennessy, 2017; Sasson and Morrison, 2019) would increase the ecological validity of the vignette method and more closely approximate the real-world effects of encounters with mental health treatment modalities.

The research evaluated a comprehensive range of outcome variables capturing numerous dimensions of beliefs about mental illness. Much research on causal attribution conceptualises attribution in simplistic bifactorial models, usually social/biological or internal/external (Antaki, 1994). The seven factors contained within the Mental Illness Attribution Questionnaire (Knettel, 2019) represent a more comprehensive account of the nuanced and culturally variable attributes that occur in natural thought and conversation (Antaki, 1985). However, the inclusion of numerous outcome variables did increase the risk associated with multiple comparisons. While acceptable for an exploratory study of a topic with minimal prior research, this limitation and the borderline significance of several findings mean that results must be treated with appropriate caution until their replication in other studies. Additionally, the real-world implications of the effects on lay beliefs are unclear without direct measurement of other attitudinal or behavioural measures. Future research should confirm whether shifts in lay beliefs indeed mediate changes in stigmatising attitudes, help-seeking orientations or policy preferences.

While the effects obtained in this research are small and preliminary, they provide suggestive evidence that if public discourse or clinical communication selectively emphasises particular treatment approaches, there may be implications for certain lay beliefs about illness causes and course. The primary criterion for advocating any treatment should undoubtedly be its clinical efficacy. However, on this basis there is not always a clearly preferable approach: for example, meta-analyses suggest that for psychotherapeutic and pharmaceutical approaches have equivalent efficacy for depression (Cuijpers et al., 2013; Imel et al., 2008; Maat et al., 2006; Steiner et al., 2017). In such cases, effects on illness beliefs may be an additional consideration in making and framing endorsement of a particular treatment.

Funding

This research was supported by University College Dublin.

CRediT authorship contribution statement

Clodhna O’Connor: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Writing - original draft, Writing - review & editing. Sarah Vaughan: Investigation, Writing - original draft.

Declaration of Competing Interest

On behalf of all authors, the corresponding author states that there is no conflict of interest.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi: 10.1016/j.jpsychres.2021.113726.

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