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Testing the mixed-blessings model: What is the role of essentialism for stigmatizing attitudes towards schizophrenia?

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Abstract

It is well established that emphasizing a biogenetic etiology of mental health problems in anti-stigma interventions inadvertently increases potentially stigmatizing attitudes. The "mixed-blessings" model suggests that biogenetic explanations and greater stigma are linked by essentialism. The present study tests this hypothesis experimentally. In this online experiment, 367 subjects read either a biogenetic or a psychosocial explanation for the etiology of schizophrenia, followed by a vignette describing an individual who has schizophrenia. Subsequently, we measured (a) causal beliefs on the etiology of schizophrenia (as a manipulation check), (b) the degree of essentialist beliefs (mediator), (c) the extent to which subjects subscribed to assumptions of dangerousness, (d) prognostic pessimism, and (e) desire for social distance. Subjects reported a stronger agreement with the etiology they had been presented. Against our expectations, this did not result in higher levels of stigmatizing attitudes in the biogenetic vignette group. Correspondingly, mediation through essentialism could not be tested. In the psychosocial vignette group, biogenetic causal beliefs were associated with a stronger desire for social distance. Essentialist thinking fully mediated this effect. The evidence we found for the assumptions of the mixed-blessings extended to the psychosocial vignette group only. We explain this by the subjects' different readiness to subscribe to biogenetic and psychosocial causal beliefs. We argue that the same levels of essentialism between the experimental groups contributed to the equal levels of stigmatizing attitudes. This underlines the fundamental importance of essentialism in stigma, going beyond a role in the psychological effects of biogenetic causal models.

Keywords Stigma · Essentialism · Schizophrenia · Genetics

Introduction

Dispelling the shame and fear associated with mental disorders has been a common goal of research on stigmatization. Which path it is that best leads us there is, however, still controversial. Attribution theory (Weiner, 1995) described that assumptions we make about the cause of a condition impacts our emotions and behavior towards those affected. In application of this theory, approaches described as "medicalization" and "geneticization" (Phelan, 2005) emphasized biogenetic factors like chemical imbalance, brain diseases, and genetic heredity in the etiology of mental disorders to arrive at more favorable attributions. This "mental illness is an illness like any other" approach (Read et al., 2006) was supposed to lower attributions of causal responsibility, thus alleviating blame, and thereby leading to more positive emotions and less discriminatory behavior towards those affected (Corrigan, 2000; Kvaale, Gottdiener, & Haslam, 2013a; Weiner, 1995). The hopes placed on these approaches, however, were not fulfilled, as evidence for a "dark side" (Haslam & Kvaale, 2015) of biogenetic explanations accumulated: it was associated with higher levels of fear and rejection (Dietrich et al., 2004; Speerforck et al., 2014), and perceiving mental illness to be more severe and persistent (Phelan, 2005). This became particularly meaningful, as advances in the neurobiology and genetics of mental disorders gave rise to a predominance of biogenetical explanations (Haslam & Kvaale, 2015; Schomerus et al., 2012). When reviewing public

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attitudes about various mental health diagnoses, Schomerus et al. (Schomerus et al., 2012) found a sharp decline in the acceptance of people with a diagnosis of schizophrenia between 1990 and 2006 while at the same time, the endorsement of genetic inheritance and brain disease as explanations for mental disorders increased.

Causal Beliefs, Biogenetic Interventions, and Stigmatization

To clarify the interplay of biogenetic concepts with the varied facets of stigma, Kvaale et al. carried out two meta-analytic reviews (Kvaale, Gottdiener, & Haslam, 2013a; Kvaale, Haslam, & Gottdiener, 2013b). The first analysis examined correlational studies on the naturally occurring associations between *causal beliefs* and stigmatizing attitudes for various mental health diagnoses among laypeople (Kvaale, Gottdiener, & Haslam, 2013a). The second analysis (Kvaale, Haslam, & Gottdiener, 2013b) summarized those studies in which a biogenetic causal explanation had been induced by an experimental manipulation (subsequently called biogenetic *interventions*). Hence, while the studies aggregated in the former meta-analysis are to some degree prone to reversed or reciprocal causation (i.e., stigmatizing attitudes promote the assumption of biogenetic causation, e.g., as an attempt to justify discriminating behavior), the latter allows for more clear-cut conclusions regarding causation. Following the predominant view, stigmatization was conceptualized as a multifaceted construct, encompassing the tendency to blame affected people for their problems, a perception of dangerousness and unpredictability, and the belief that they are unlikely to recover ("prognostic pessimism") (Corrigan et al., 2001; Link & Phelan, 2001). Both biogenetic causal *beliefs* and *interventions* were associated with a reduced tendency to blame people with mental disorders. The favorable effects of biogenetic beliefs on blame, however, did not appear to translate to greater acceptance of people with mental disorders. In contrast, biogenetic causal beliefs were related to stereotyping people with mental disorders as dangerous, as well as an increased desire for distance from individuals diagnosed with schizophrenia (Kvaale, Gottdiener, & Haslam, 2013a). Biogenetic interventions increased prognostic pessimism and endorsement of the stereotype that people with psychological problems were dangerous. Interestingly, biogenetic interventions did not typically affect the desire for social distance (Kvaale, Haslam, & Gottdiener, 2013b).

The Mixed-Blessings Model

Connecting these empirical findings with an existing sociological concept, Haslam et al. proposed the "mixed-blessings" model of biogenetics and stigma (Haslam & Kvaale, 2015). In this hypothesis-generating publication, they stated that biogenetic explanations reduced one facet of stigma – blame – due to attributions of uncontrollability. In contrast, however, the three other aspects - desire for social distance, prognostic pessimism, and perceived dangerousness - were increased. To explain how biogenetic explanations encourage these stigmatizing attitudes, he proposed the concept of "psychological essentialism".

The Concept of Essentialism

Essentialism has become popular in social sciences and cultural studies in connection with the critique of social categories (Rothbart & Taylor, 1992). Rothbart et al. observed that, although social categories should be considered artifacts, people commonly perceive them as having deep inherent similarities and rich inductive potential. The concept of essentialism has been refined with different focuses: *psychological* essentialism described the psychological tendency to assume an underlying, often invisible essence that makes things what they are (Medin & Ortony, 1989). Dar-Nimrod et al. (Dar-Nimrod & Heine, 2011) defined *genetic* essentialism, whereby people tend to overweigh genetic attributions compared with competing attributions even in cases of weak genetic explanation, which are by far more common. This would lead them to perceive conditions as immutable, having a specific etiology, and being homogeneous, discrete, and natural. Psychological essentialism is increasingly shaped by genetic essentialism, due to the predominant focus of public opinion and research on this etiology of mental disease (Haslam et al., 2000; Schomerus et al., 2012).

Present Study

The goal of our study was to put the hypothesized mixed-blessings model to an experimental test. We suggest that providing biogenetic explanations for the symptoms of schizophrenia leads to greater stigma. We furthermore hypothesize that this increase is due to a rise of essentialist attitudes towards the person diagnosed with schizophrenia. An experimental study by Bennet et al. (Bennett et al., 2008), which had confirmed the unfavorable effect of biogenetic explanations on attitudes towards people diagnosed with schizophrenia, served as a starting point for our study.

Following the classic definition according to which mediators explain how external events take on internal psychological significance (Baron & Kenny, 1986), we conceptualized essentialist thinking as the mediator variable, through which causal explanations of schizophrenia are transformed into attitudes towards people diagnosed with schizophrenia. Interventions that attribute mental disorders to a biogenetic etiology (subsequently called "biogenetic interventions") have been linked to essentialist beliefs about mental disorders by two studies, lending support for the a-path of the proposed

mediation (Boysen, 2011; Boysen & Gabreski, 2012). Essentialist beliefs and stigmatizing attitudes have also been associated, thereby supporting the assumptions regarding the b-path of the proposed mediation: college students who endorsed essentialist beliefs harbored consistently more stigmatizing attitudes in three different studies (Howell et al., 2011). Our study was conducted to test the indirect effect of biogenetic explanations on stigmatizing attitudes via essentialist thinking within one study design.

Hypotheses

Although Kvaale et al.'s analysis of the effects of biogenetic interventions on stigma results in diverse findings (Link & Phelan, 2001), in conclusion, it suggests that stronger assumptions of dangerousness and prognostic pessimism should be expected in the biogenetic interventions group compared to the psychosocial interventions group (Hypotheses 1a and 2a). We expected mediation through essentialist beliefs of the effect of the biogenetic intervention on assumptions of dangerousness and prognostic pessimism (Hypotheses 1b and 2b). In recognition of the meta-analytic findings (Kvaale, Haslam, & Gottdiener, 2013b), we did not expect an effect of causal explanation on the desire for social distance. However, as this particular attitude is deemed one of the crucial facets of stigmatizing attitudes, we wanted to examine its association with existent biogenetic concepts and essentialism. Kvaale's meta-analytic findings of the association of biogenetic causal beliefs with stigmatizing attitudes (Haslam & Kvaale, 2015) give reason to hypothesize a positive correlation of biogenetic causal beliefs with a desire for social distance (Hypothesis 3a). Again, we expected mediation through essentialist beliefs of this association (Hypothesis 3b).

Method

Design

The study was conducted online in a one-factorial between-groups experimental vignette design. The independent variable, causal explanation, had two conditions, biogenetic and psychosocial. Subsequently, we measured the participants' causal beliefs regarding schizophrenia as manipulation checks. The three dependent variables, all considered to be potentially stigmatizing attitudes, were: its perceived dangerousness, prognostic pessimism regarding a potential recovery, and desire for social distance to an affected individual. Essentialist thinking was examined as a mediator variable.

Sample

To recruit for this online study, we shared the link via the mailing list of Justus-Liebig-University of Gießen and regional Facebook groups with a "Search and Find"-subject, placed an advertisement on the website of the magazine "Psychologie Heute" [Psychology Today] and passed it on to acquaintances asking for further distribution. No participation fee was offered.

The invitation text used for recruitment included the topic of the study ("attitudes towards people with schizophrenia") and remarked that it was aimed at participants of all ages, and no previous knowledge would be required. The data were collected anonymously. There were no exclusion criteria for participation. After the first half of the survey period, only 25% of participants were male, so from this point on, we added the remark that only male participants were being sought. Data were collected from January 10, 2017, and up to and including February 7, 2017.

The study material consisted of two texts and three questionnaires. It was carried out online via the internet platform www.soscisurvey.de. Except for demographic questions, all questions had to be answered in order to successfully complete the survey. In a debriefing presented after completion of the survey, we revealed the goal of the study.

The online experiment was started by 434 and completed by 384 subjects (88%, 287 women, 106 men). Of these, we excluded 17 subjects (7 male, 10 female) because they spent implausibly little time reading the information text (<18 s) or the schizophrenia vignette (<25 s). The minimal reading time was calculated based on the limit of 600 words per minute for proper comprehension of text (Howell et al., 2011). After these exclusions, 367 cases (96%) remained in the sample. On average, participants required 9.75 min ($SD = 2.66$) for the entire study.

Of the 367 participants, 99 (27%) were men and 268 (73%) women. 177 (48%) were assigned to the biogenetic, 190 (52%) to the psychosocial condition. The gender ratio did not differ between the experimental conditions ($\chi^2(1) = .59$, $p = .44$). The age of participants ranged from 14 to 64 years (median = 28.0), with 75% of the participants being 36 years or younger. The majority of participants had graduated from high school, 73% after 13 years (German "Abitur"), 13% after 12 years (German "Fachhochschulreife"). Most participants were currently studying (47%) or employed (42%). 58% of the participants reported contact with people diagnosed with schizophrenia or problems similar to those described in the vignette. 22% reported contact in the closer family or circle of friends, 24% in the wider social network, and 17% in a professional context. Contact with those affected did not differ between the experimental conditions ($\chi^2(1) = .47$, $p = .50$). 38% of the participants had already been treated for mental health problems, 13% as inpatients.

Material

The experiment began with a brief text defining schizophrenia according to the DSM-5-criteria (Falkai et al., 2015). For a better understanding of the medical terminology, each symptom was explained, and an example was provided (A1).

Independent Variable - Etiological Intervention

The following segment consisted of the manipulation of the independent variable, "etiological explanation" The text presented scientific evidence favoring either a biogenetic (A2) or a psychosocial (A3) etiology. The assignment to the experimental conditions was randomized. Afterward, five corresponding factors were listed, e.g., "disorders of transmitters in the brain" in the biogenetic condition or "growing up in a big city" in the psychosocial condition.

Vignettes

The experiment continued with a case vignette of a person diagnosed with schizophrenia (approximately 250 words, A4). The use of vignettes has a long tradition in psychiatric attitude research and allows for a standardized presentation of a disorder. The vignette was consistent with the diagnostic criteria of schizophrenia in the DSM-5 (Falkai et al., 2015), had undergone validation by blinded experts in psychopathology and had been used in earlier surveys (Schomerus et al., 2014). The gender of the person described in the vignette varied at random.

Manipulation Checks – Causal Beliefs

To evaluate the effect of the etiological explanation on the subjects' causal beliefs, we used the homonymous scale by Schomerus et al. (Schomerus et al., 2014). It lists ten possible causes for a condition, each of which has to be rated on a five-point Likert scale anchored with 1 = "certainly a cause" and 5 = "certainly not a cause". Causes comprised biogenetic causes (for example, "brain disease "or "heredity") and psychosocial causes (for example, "work related stress" or "grew up in a broken home").

Mediator Variable – Essentialism

To measure the hypothesized moderator variable, we used a modified version of the *Essentialist Beliefs Scale* (EBS) *(*Haslam et al., 2000*;* Haslam et al., 2002*)*. The EBS comprises two factors, "natural kinds" and "entitativity". Natural kinds captures a notion, by which categories are naturally occurring, sharply bounded, unalterable and historically persisting matters of kind, whose members share necessary properties (Haslam et al., 2000). It combines the items "judged naturalness", "necessary characteristics", "immutability", "discreteness", and "historical stability". Entitativity constitutes an understanding of social categories as distinctively cohering around an underlying core, and having a homogeneity that makes category membership a rich source of inferences. It combines the items "informativeness", "uniformity", "inherence", and "exclusivity". For our analyses, we used EBS total scores. The eight items were translated into German and, because the original version uses general statements about unspecified "social categories", matched to the diagnosis of schizophrenia as presented in the vignette. For example, the item assessing discreteness was phrased: "How accurate is the statement 'schizophrenia is a category with sharp and clear-cut boundaries, so that people are either affected by the condition or not'?". Items were rated on a seven-point Likert scale between the endpoints 1 (completely false) and 7 (completely true). Omitting the item on immutability since prognostic pessimism was among our outcome variables, our translation matched the first version of the EBS (Haslam et al., 2000), which does not contain this congruency.

Dependent Variable - Attitudes

To measure participants' attitudes towards individuals diagnosed with schizophrenia, we used three subscales of the attitude questionnaire (Bennett et al., 2008). The subscales were "Assumptions of Dangerousness" (8 items, e.g., "he should be detained in a hospital to ensure the public's safety"), "Recovery Potential" (5 items, e.g., "she will always be 'schizophrenic'. Even if her symptoms disappear they could come back at any time"), and "Desire for Social Distance" (8 items, e.g., "I would be happy to sit next to her on the bus"). The second subscale was reverse coded and used as a measure for prognostic pessimism. We translated the total of 21 items into German. While the original questionnaire asked for attitudes towards a male person, we matched the gender to the one used in the vignette. The statements were worded in a positive and negative direction in equal parts. High values indicated a high level of negative attitudes.

Social Demographics

A short demographic questionnaire asked for participants' age, sex, and whether they had ever known anybody diagnosed with schizophrenia. In addition, we asked for their own previous history as an out- or inpatient due to mental health problems.

Data Analysis

We used IBM® SPSS Statistics 21.0 for the statistical analysis. For the manipulation control and hypothesis-testing regarding group differences, we calculated Student's *t*-tests

(two-sided significance level $\alpha = .05$). For significant between-group effects, the effect size measure Hedges' g was calculated using Lakens' spreadsheet, Version 4.2 (Lakens, 2013). Although in mediation theory a significant mediation may be present even in the case of a non-significant association of biogenetic intervention and attitudes (MacKinnon, 2017), we did not calculate mediation models in this case, as this would not have been adequate for our objective to examine the mixed-blessings model, which states that if biogenetic interventions generate increased stigma this can be explained by increased essentialist explanations, rather than that the effect of biogenetic intervention would always be mediated by essentialism.

In the case of significant t-values for either the dependent variables or the mediator, a mediation analysis was carried out. In the case of non-significant between-group effects, two-sided correlation analyses were performed as post-hoc exploratory comparisons to check for any association between self-reported causal beliefs, essentialist thinking, and attitudes in each experimental group. 5000 bootstrap samples were selected for the 95% confidence intervals. For the post-hoc correlation analyses, p values were adjusted for multiple comparisons using the Holm-Bonferroni method.

To test the hypothesis that biogenetic causal beliefs are associated with a stronger desire for social distance (H3a), we calculated Pearson correlation coefficients. Subsequently, a mediation analysis was performed for testing H3b, using the *PROCESS* tool, Version 3.4.1 (Hayes, 2018; Hayes & Matthes, 2009). For hypothesis 3, we examined both experimental groups separately, as they had undergone different experimental manipulations and therefore could not be treated as one homogenous sample anymore. 10,000 bootstrap samples were used to compute confidence intervals. Heteroscedasticity-consistent standard errors were requested, as recommended by Hayes and Cai (Hayes & Cai, 2007). Non-standardized regression coefficients are reported.

Results

Manipulation Checks and Other Group Differences

Subjects in the psychosocial condition agreed more strongly with psychosocial causal beliefs than those in the biogenetic condition, $t(365) = -3.51$, $p = .001$; Table 1). Conversely, subjects in the biogenetic condition reported stronger agreement with biogenetic explanations, $t(364) = 6.06$, $p < .001$, degrees of freedom reduced due to inhomogeneity of variance. In general, mean biogenetic beliefs were higher than mean psychosocial causal beliefs, although this effect was not significant in the psychosocial vignette group, $t(176) = 10.82$, $p < .001$ and $t(189) = 1.10$, $p = .14$. Essentialist beliefs did not differ between the two groups (Table 1).

Hypothesis Testing

Group Differences in Perceived Dangerousness and Prognostic Pessimism (H1 and H2)

The dependent variables did not differ between the groups (perceived dangerousness: $t(365) = -0.11$, $p = .913$; prognostic pessimism: $t(365) = 0.28$, $p = .783$ (rejection of Hypotheses 1a and 2a). Since the null hypotheses regarding group differences in stigmatizing attitudes were maintained, the mediation hypotheses H1b and H2b could not be tested because the effect they refer to was absent (see methods for rationale).

Group Differences in the Desire for Social Distance (H3a)

In the biogenetic vignette group, there was no correlation between biogenetic causal beliefs and any of the attitudes, notably not "desire for social distance" ($r(175) = .10$, $p = .196$), thereby not supporting hypothesis 3a. In this group, higher levels of psychosocial causal beliefs were associated with less prognostic pessimism, $r(175) = -.31$, $p_{Holm} = .0002$. Essentialist beliefs were associated with assumed dangerousness, $r(175) = .26$, $p_{Holm} = .002$ (Table 2).

In the psychosocial vignette group, biogenetic causal beliefs were positively related to desire for social distance as hypothesized, $r(188) = .18$, $p_{Holm} = .015$ (supporting Hypothesis 3a). They were also associated with assumptions of dangerousness, $r(188) = .26$, $p_{Holm} = .0012$. Essentialist beliefs were associated with higher levels of all of the three stigmatizing attitudes (social distance: $r(188) = .32$, $p_{Holm} = 2.40*10^{-5}$, danger: $r(188) = .35$, $p_{Holm} = 3.32*10^{-6}$, pessimism $r(188) = .32$, $p_{Holm} = 2.7*10^{-5}$).

Mediation Analysis (H3b)

In the psychosocial vignette group, an effect of biogenetic causal beliefs on desire for social distance was observed, $c = 0.19$, CI [.02, .36], $p = .027$. Biogenetic causal beliefs significantly predicted essentialism, $a = 0.21$ [.07, .36], $p = .004$. Essentialist thinking significantly predicted the desire for social distance, $b = 0.33$ [.17, .48], $p = .0001$. The mediation analysis showed a full mediation of the association of biogenetic causal beliefs on the desire for social distance through essentialist thinking, indirect effect $ab = .07$ [.02, .14], no significant direct effect, $c' = 0.12$ [−.04, .28], $p = .15$ (Fig. 1). The indirect effect is in line with Hypothesis 3b. The amount of variance in the desire for social distance explained by the mediation model was 11.5%.

Table 1 Group differences in causal beliefs, essentialism, and attitudes towards schizophrenia

	Vignette group					
	Bio (n=177) M (SD)	Stress (n=190) M (SD)	M_{diff} [95% CI]	t	p	Hedge's g
Causal Belief						
Bio	3.94 (0.74)	3.45 (0.83)	.49 [.33, .66]	6.06	<.001	0.62
Stress	3.09 (0.70)	3.36 (0.76)	−.27 [−.42, −.12]	−3.51	.001	−0.36
Essentialism	3.36 (0.84)	3.40 (0.81)	−.04 [−.21,.12]	−0.52	.61	ns
Attitudes						
Danger	2.73 (0.57)	2.74 (0.63)	−.01 [−.13,.12]	−0.11	.91	ns
Pessimism	2.66 (0.50)	2.65 (0.53)	.01 [−.09,.12]	0.28	.78	ns

Stress/Bio = psychosocial/biogenetic vignette group. Essentialism = EBS total score. *Belief Stress/Bio*: biogenetic/psychosocial causal beliefs. *Danger* = assumptions of dangerousness, *Pessimism* = prognostic pessimism. CI = Confidence interval. ns: not significant, therefore no effect size measure reported

Discussion

Table 3 provides an overview of the hypotheses and results. After reading either a biogenetic or a psychosocial causal explanation for schizophrenia in our vignette-experiment, subjects reported a stronger agreement with the etiology they had been presented. Against our expectation, this did not lead to higher levels of perceived dangerousness and prognostic pessimism in the biogenetic intervention condition. As an unfavorable effect of a biogenetic intervention on stigmatizing attitudes was absent in our experiment, the mediation-hypotheses of essentialism for this association was not applicable. In the psychosocial vignette group, biogenetic causal beliefs were associated with a stronger desire for social distance, and essentialist thinking fully mediated this effect.

Causal Interventions and Attitudes

Our findings further challenge the assumption that experimentally induced biogenetic explanations in general foster stigmatizing attitudes. As Kvaale et al. point out (Kvaale, Haslam, & Gottdiener, 2013b), the heterogeneity of effects in their meta-analysis (only 6 out of 16 studies showing significant differences for perceived dangerousness, and only 2 out of 10 for prognostic pessimism) suggests multiple moderators of the association of causal explanation and stigma. Indeed, our convenience sample deviates considerably from the general population with regard to several moderators, such as age, education, and personal contact. Another reason for the rejection of an experimental effect might be the design of our experimental manipulation (cf. limitations for further discussion of both points).

Role of Essentialism

We found a pervasive positive association of essentialism with all three facets of stigmatizing attitudes in the psychosocial group and assumptions of dangerousness in the biogenetic group. This indicates a role of essentialist thinking for the social acceptance of people diagnosed with schizophrenia that is not congruent with *biogenetic* essentialism. It might be adequate to conceptualize essentialism as an independent predictor of stigmatizing attitudes rather than a mediator of the effect of biogenetic causal explanations. In our experiment,

Table 2 Pearson correlations of causal beliefs, essentialism, and attitudes

Group		Social Distance	Danger	Pessimism	Essentialism
Bio	Belief Bio	.10 [−.05,.23]	.11 [−.00,.07]	.04 [−.01,.18]	.05 [−.12,.22]
	Belief Stress	−.11 [−.27,.07]	.03 [−.00,.07]	−.31*** [−.06,.24]	−.01 [−.17,.15]
	Essentialism	.12 [−.02,.26]	.26**[.00,.07]	.09 [−.00,.07]	1
Stress	Belief Bio	.18* [.02,.32]	.26**[.12,.40]	.12 [−.00,.07]	.22**[.08, .35]
	Belief Stress	−.09 [−.24,.33]	−.03 [−.19,.13]	−.12 [−.31,.06]	−.05 [−.23,.13]
	Essentialism	.32*** [.18, .45]	.35*** [.22,.48]	.32*** [−.00,.33]	1

Stress/Bio = psychosocial/biogenetic vignette group, Essentialism = EBS total score, *Belief Bio/Stress* = biogenetic/psychosocial causal beliefs, *Social Distance* = desire for social distance, *Danger* = assumptions of dangerousness, *Pessimism* = prognostic pessimism, *Squared brackets*: 95% confidence interval,*/**/*** = p < .05, < .01, < .001 (2-sided)

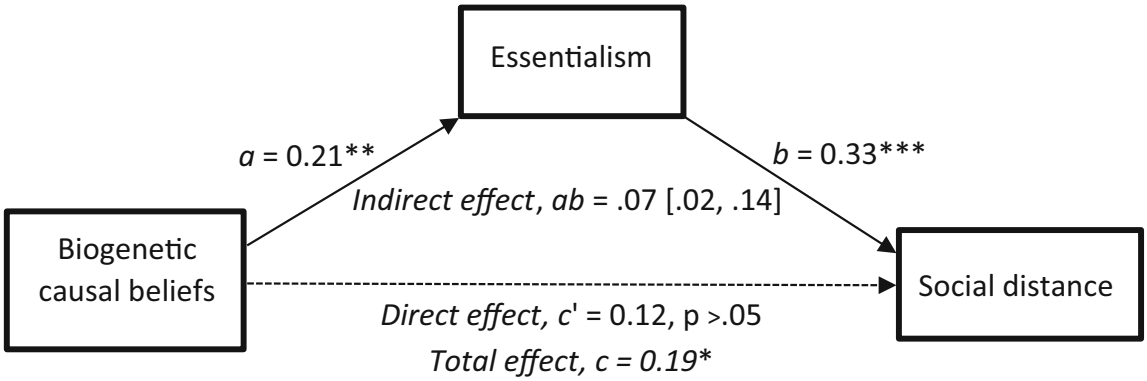

Fig. 1 Mediation through essentialism in the psychosocial vignette group. *Essentialism*: EBS total score, *Social Distance* = desire for social distance,*/**/***: p < .05, < .01, < .001

subjects in the psychosocial condition exhibited the same degree of essentialist beliefs as subjects in the biogenetic condition. It has been hypothesized before that psychosocial factors such as childhood trauma, an etiologic factor comprised in the psychosocial version of our intervention, might equally have the potential to trigger essentialist beliefs about others, as they cannot be reversed and induce life-lasting psychological consequences (Schomerus et al., 2014). The equal distribution of essentialism could have contributed to the equal levels of stigmatizing attitudes between the two experimental groups.

Causal Beliefs and Attitudes

A closer look at group differences resulting from the experimental manipulation provides a possible explanation for this differential effect. Mean biogenetic beliefs in the biogenetic vignette group were higher than mean psychosocial beliefs in the psychosocial group (Table 1), indicating that the biogenetic manipulation was more readily accepted. This is consistent with the observation of biogenetic essentialism that biogenetic concepts catch on more easily as they play to a bias in human cognition, favoring deterministic attributions. Accordingly, the lower standard deviation of biogenetic beliefs in the biogenetic vignette group compared with the psychosocial vignette group shows that providing biogenetic explanations resulted in a "consolidating effect" in causal beliefs. In contrast, providing psychosocial explanations emphasized the variation in causal beliefs. To put it differently, whereas the biogenetic intervention leveled out differences in causal beliefs and resulting attitudes, the psychosocial intervention augmented them. Some subjects in the psychosocial vignette group persisted in their "essentialist" beliefs in a biogenetic etiology, although the experimental manipulation had suggested otherwise. Correspondingly, they hold on to more negative attitudes towards the subject described in the vignette. We propose that this differential effect of the biogenetic and psychosocial manipulation accounts for the between-group difference of causal beliefs and desire for social distance in our experiment.

Limitations

The two major limitations of our study lie in the design of our experimental manipulation and in the fact that the experiment is limited to the diagnosis of schizophrenia. Although the group differences in etiological beliefs do indicate a successful experimental manipulation, the fact that both "intervention-hypotheses" H1a and H2a are rejected by our findings - whereas we find evidence for an association of biogenetic causal beliefs with desire for social distance (H3a) - could mean that our experimental manipulation design was not sufficiently impactful to shift attitudes to a meaningful degree in the direction of the concept they promoted. The vignettes consisted of a mere listing of etiological factors and did not

Table 3 Overview of the results of the hypothesis testing

	Association-Hypotheses	Association w/	Results	Mediation-Hypotheses	Results
Biogenetic Interventions	H1a	assumptions of dangerousness	rejected	H1b	n/a
	H2a	prognostic pessimism	rejected	H2b	n/a
Biogenetic Beliefs	H3a	desire for social distance in psychosocial intervention group	confirmed	H3b	confirmed

w/= with, n/a = mediation hypothesis was not applicable because we found no association of biogenetic causal interventions whose mediation through essentialism could be tested

provide additional support to make its statements more persuasive. This is especially important in a condition like schizophrenia, which is explained in a more biogenetic way by laypeople than many other disorders. Future research on this issue should employ interventions designed in a more convincing way, e.g., quoting research to support their statements, are more colorful and graphic or provide an individual example to be more relatable. Furthermore, we will expand the testing of the mixed-blessings model to other psychiatric diagnoses such as depression or substance use disorders that are less predominantly viewed in a biogenetic way in future research, as effects might vary between diagnoses.

Other shortcomings of our sample merit discussion. The convenient sample at hand consists in its majority of young, female, above-average educated participants of which a considerable number report prior personal contact with people diagnosed with schizophrenia. This limits generalization from this sample. For example, having a disproportionate amount of personal and professional contact with people diagnosed with schizophrenia is associated with lower stigma towards those affected (Mittal et al., 2016). In any case, previous personal experience is likely to be more attitude forming than brief experimental manipulation. Subjects might even participate in the experiment to express their view on this personally meaningful topic rather than being receptive to experimental manipulation.

The effect sizes we report for biogenetic beliefs on stigmatizing attitudes are only small effects, underlining the importance of considering a broad variety of other factors to gauge an intervention with regard to stigma. Also, the general objections against vignette experiments apply to our study. From the critics' point of view, "all talk is cheap", as the hypothetical choices carry no real costs and are therefore apt for inferences on stated only, not actual behavior (Hainmueller et al., 2015). Also, vignette experiments are prone to many different sources of response bias, e.g., hypothetical bias, social desirability bias, and acquiescence bias (Hainmueller et al., 2015; Phelan, 2005).

Summary

Our experimental test of the mixed-blessings model presents mixed results. On the one hand, we confirmed that essentialist beliefs mediate the effects of biogenetic causal beliefs on the desire for social distance after an intervention that suggested a psychosocial etiology. On the other hand, our hypotheses regarding an experimental effect of causal explanations on the other facets of stigma were rejected. "The devil is in the details" when assessing the stigmatizing implications of an intervention, as others have recently pointed out (McGinty & Barry, 2020). This is certainly true for our results. We argue that our differential findings can be accounted for by the subjects' different readiness to subscribe to biogenetic and psychosocial causal beliefs for schizophrenia. We deduce this from the importance of essentialism for stigmatizing attitudes, which is confirmed by our findings. How much an intervention might reinforce essentialist concepts seems to be a fruitful question to assess the stigmatizing potential of an intervention. The destigmatizing effect of continuum beliefs can be understood as an example of how an essentialist perspective is loosened up by relating to an experience as resembling to one's own, thus reducing the perception of otherness. An essentialist view constitutes a typical example of a categorical conception of mental disease. In continuum beliefs, mental diseases are framed rather as differences on an interval scale of behavior (Corrigan et al., 2017), that are not foreign to "normal" experience. Understanding psychosis as a continuum has not only been supported experimentally (van Os et al., 2009). It has also repeatedly been shown to reduce stigmatizing behavior such as social distance (Angermeyer et al., 2014; van Os et al., 2009). Specifically for psychosis, continuum and essentialist beliefs have been shown to be inversely correlated (Schlier et al., 2016).Therefore, we believe they constitute a good leverage point to put our findings into praxis.

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Code Availability Syntax-files for IBM® SPSS Statistics 24 available from the corresponding author (DD) upon request.

Declarations

Conflicts of Interest/Competing Interests The authors declare that there is no conflict of interest.

Ethics Approval Not applicable.

Consent to Participate Written informed consent was obtained from all patients before enrolment. Consent for publication: Written informed consent was obtained from all patients before enrolment.

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