

BJPpsych

The British Journal of Psychiatry

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BJP 2011, 199:367-372.

Access the most recent version at DOI: [10.1192/bjp.bp.110.085563](https://doi.org/10.1192/bjp.bp.110.085563)

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Review article

Biogenetic explanations and public acceptance of mental illness: systematic review of population studies

Matthias C. Angermeyer, Anita Holzinger, Mauro G. Carta and Georg Schomerus

Background

Biological or genetic models of mental illness are commonly expected to increase tolerance towards people with mental illness, by reducing notions of responsibility and blame.

Aims

To investigate whether biogenetic causal attributions of mental illness among the general public are associated with more tolerant attitudes, whether such attributions are related to lower perceptions of guilt and responsibility, to what extent notions of responsibility are associated with rejection of people who are mentally ill, and how prevalent notions of responsibility are among the general public with regard to different mental disorders.

Method

A systematic review was conducted of representative population studies examining attitudes towards people with mental illness and beliefs about such disorders.

Results

We identified 33 studies relevant to this review. Generally, biogenetic causal attributions were not associated with more tolerant attitudes; they were related to stronger rejection in most studies examining schizophrenia. No published study reported on associations of biogenetic causal attributions and perceived responsibility. The stereotype of self-responsibility was unrelated to rejection in most studies. Public images of mental disorder are generally dominated by the stereotypes of unpredictability and dangerousness, whereas responsibility is less relevant.

Conclusions

Biogenetic causal models are an inappropriate means of reducing rejection of people with mental illness.

Declaration of interest

None.

The impressive advances of neuroscience over the past two decades have fuelled hope that disseminating knowledge of the biological and genetic basis of mental illness will ultimately improve public attitudes towards people with mental illness and reduce stigma. Many anti-stigma initiatives, such as that launched by the US National Alliance for Mental Illness, portray mental disorders explicitly as medical diseases, for example major depression as 'a biological, medical illness',¹ or schizophrenia as an illness 'like many other medical illnesses such as cancer or diabetes'.² The expectation that biological or genetic (hereinafter referred to as 'biogenetic') causal models of mental illness have destigmatising consequences rests on two assumptions: first, that attributing the cause of a mental disorder to biogenetic factors will reduce ascriptions of responsibility and guilt to the affected person, since such causes are beyond the person's control; and second, that if people are held less responsible for their condition, they will experience less rejection by their social environment. This argument reflects attribution theory, which predicts that a stigmatised condition such as mental illness evokes more anger and rejection if it is perceived as controllable (and not controlling it is thus the fault of the ill person), whereas an uncontrollable condition may evoke more positive responses such as pity and help.^{3,4} Time trend analyses in Australia, the USA and Germany following up public attitudes towards mental illness and mentally ill people have demonstrated an overall rise in biological causal attributions over the past two decades: increasingly, mental disorders such as depression or schizophrenia are attributed to brain disease, chemical imbalances in the brain or genetic causes.^{5–8} However, at the same time attitudes towards people with mental illness have not become more tolerant,^{5,7,8} a finding questioning the destigmatising potential of biogenetic explanations of mental illness. In this review we examine the argument that biogenetic causal attributions decrease notions of guilt and responsibility and subsequently increase tolerance towards people

with mental illness. In a systematic review of representative population studies of attitudes towards mentally ill people and beliefs about mental illness, we addressed the following questions: is attributing mental illness to biogenetic causes associated with greater acceptance of those with mental disorder? Is attributing mental illness to biogenetic causes associated with lower perceptions of guilt and responsibility? How strongly is the attribution of responsibility associated with rejection of people with mental illness? To enable conclusions to be drawn concerning the relative importance of notions of responsibility, we compared its influence on rejection with the influence of the second prominent set of stereotypes related to mental disorder, the belief that people with mental illness are dangerous and unpredictable.^{9,10} How prevalent is the stereotype of self-responsibility in mental illness among the general population, again compared with the stereotypes of dangerousness and unpredictability? By answering these questions we aimed to find out whether biogenetic causal explanations of mental illness are an appropriate means of attempting to reduce the rejection of people with these disorders.

Method

We systematically reviewed all representative population-based studies of public beliefs about mental disorders and attitudes towards people with mental illness published before 30 June 2010. Besides reports published in scientific journals or books, we included also documents published online and 'grey' literature (reports not published in commercially available books or journals). To detect all relevant studies, we took a stepwise approach according to the systematic literature review guidelines of the Centre for Reviews and Dissemination and the Cochrane Collaboration.^{11,12} As a starting point we conducted a literature

search in PubMed, PsycINFO and Web of Science using the terms (“mental illness” OR “mental disorder” OR schizophrenia OR depression OR alcoholism OR “alcohol abuse” OR “alcohol depend*” OR alcoholic OR “anxiety disorder” OR “obsessive compulsive disorder” OR dementia OR “Alzheimer’s disease”) AND (attitudes OR stigma OR “mental health literacy” OR “causal beliefs” OR “causal attributions” OR stereotype OR “social distance”) AND (representative OR population). There was no restriction on language. Two independent researchers (Sarah von Saß and M.C.A.) screened titles, abstracts and (where appropriate) the full text of all identified reports in order to minimise the possibility of discarding potentially relevant reports. All reports on studies that met the following selection criteria were retained. First, the focus of the study was on the general public. Studies investigating beliefs or attitudes of particular subgroups such as consumers, health professionals or students were excluded. Second, studies were based on representative population samples obtained by either random or quota sampling methods. This applied to 310 reports. We then hand-searched the identified literature for relevant citations and searched electronically for other relevant publications by authors of the documents thus far identified. By this method we detected another 168 reports that met our inclusion criteria. Finally, we contacted experts in the field of psychiatric attitude research and asked them about any relevant study not published in peer-reviewed journals or other relevant ‘grey’ literature known to them, resulting in additional 25 reports. Screening bibliographies and asking experts further helped to reduce language bias. Our search strategy yielded in total 503 reports, 96 of which were written in languages other than English. With these 503 reports a full-text analysis was carried out independently by two researchers (M.C.A. and A.H.), looking for reports on studies addressing our research questions. If necessary, native speakers were contacted to provide translations. Disagreement about inclusion of individual reports was resolved by discussion. Specifically, we looked for studies examining the following:

(a) the association of causal attributions with the desire for social distance from people with mental illness;

- (b) the relationship between biogenetic attributions and the tendency to blame the afflicted individual for his or her illness;
- (c) the association between stereotypes related to responsibility, dangerousness and unpredictability, and desire for social distance;
- (d) the prevalence of these stereotypes about mental disorder in the general population.

Results

We identified 39 reports on 32 suitable representative population studies (Fig. 1). These studies included a total of 72 963 respondents (range 201–29 248, mean 2280, median 1126). Details of these studies can be found online in Table DS1. Two reports dated from before 1970,^{13,14} two from 1989,^{15,16} and all other reports were published after 1999. Results of the early studies did not differ substantially from recent studies. Fourteen studies were conducted in Europe, eight in North America, seven in Asia and one each in South America, Africa and Australia. We report results for mental illness, schizophrenia, depression and alcoholism, since they were the topics of most studies. Only regarding our fourth question, five studies additionally reported on drug misuse,^{9,17–20} and two of them also reported on panic attack, eating disorder and dementia.^{17,18}

Acceptance of people with mental disorder

Discriminatory attitudes towards people with mental illness are commonly measured as the desire for social distance, i.e. the reluctance to engage in several forms of everyday contact with an affected person.²¹ Findings of studies examining associations of biogenetic causal attributions with desire for social distance are summarised in online Table DS2, displaying results separately for mental illness in general (or for a combined analysis of several diagnoses), schizophrenia, depression and alcohol dependence. It shows that overall, most associations between certain biogenetic causal beliefs and social distance remained insignificant, and that results varied according to diagnosis. Of the significant

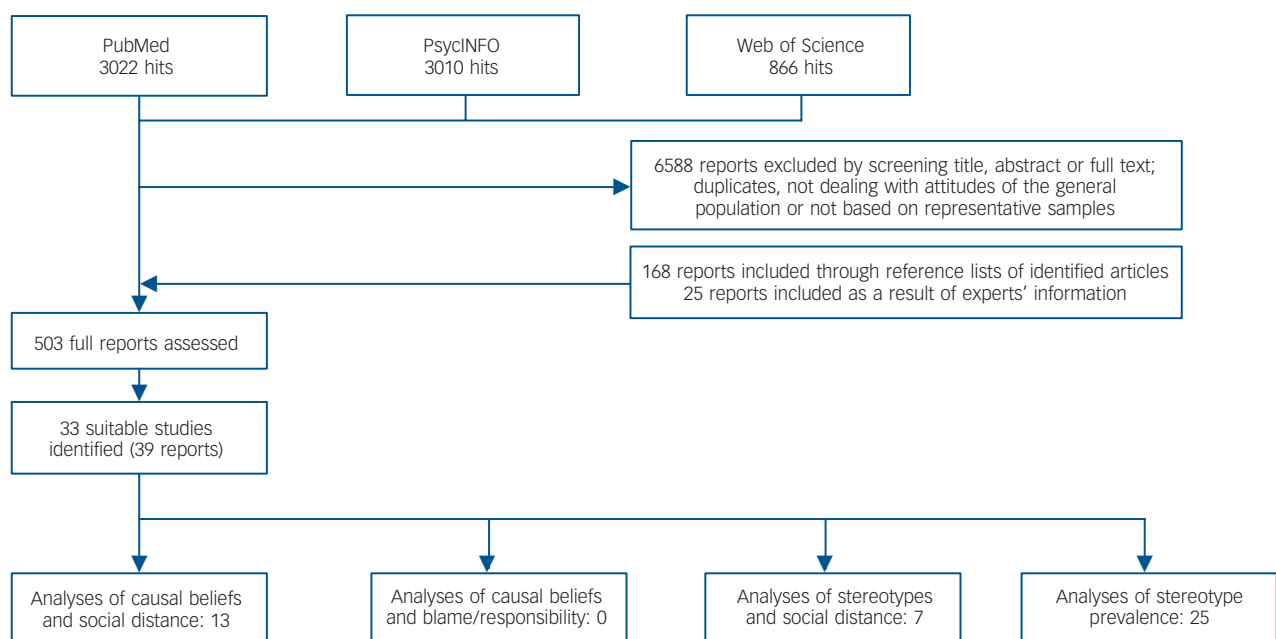


Fig. 1 Literature search.

associations, most were found for schizophrenia, where biogenetic causal beliefs in most instances predicted stronger desire for social distance (Table DS2). A similar picture, although interspersed with more insignificant associations and one negative association, emerged for depression. No significant association was reported for alcoholism. For general or combined mental illness most associations remained insignificant, but a few studies showed favourable (negative) associations between biogenetic causes and social distance. Overall, support for the claim that biogenetic causal attributions are associated with less stigmatising attitudes towards people with mental illness is small. Particularly with schizophrenia, biogenetic causal beliefs seem to increase rather than decrease rejection of those affected.

Perceptions of guilt and responsibility

We did not detect any published study from population surveys reporting on associations between biogenetic causal attributions and perceptions of guilt and responsibility. Unpublished analyses of the population surveys conducted by our group in Germany (in 2001), Russia (Novosibirsk, in 2002), Mongolia (Ulan Bator, in 2002) and Slovakia (Bratislava, in 2003) revealed that none of these surveys produced significant associations between biogenetic causal beliefs and perceived responsibility.^{22,23} The second question of our review thus remains unanswered, but there are indicators against an association between both beliefs on a population level.

Responsibility v. dangerousness and unpredictability

We were able to locate eight studies where the attribution of responsibility to the individual with mental disorder, as well as notions of unpredictability or dangerousness, were regressed on the desire for social distance. Studies conducted in Austria, Turkey and Germany focused on schizophrenia;^{24–27} in these studies the attribution of responsibility for the illness to the individual ('lack of willpower', 'immoral lifestyle' or 'weak character') had no effect on social distance,^{25,26} or had a considerably weaker effect than perceptions of dangerousness and unpredictability.^{24,27} Dangerousness and unpredictability, in contrast, were strongly associated with preferences for increased social distance in all studies.^{24–27} Similarly, Kermodé *et al* reported from a rural area of India that one of the most influential predictors of social distance for both psychosis and depression was the perception of dangerousness; in contrast, the attribution to 'personal weakness' was associated with reduced social distance.²⁸ Regression analysis of data from the USA, merging several mental disorders for a combined analysis, also revealed a strong effect of the perception of mentally ill people as being violent toward others and no effect of the attribution to 'bad character'.²⁹ Results from The Netherlands point in the same direction: although the desire for social distance was significantly associated with the stereotype that mentally ill people tend to be aggressive, there was no statistically significant association with the attribution to 'character'.³⁰ Only one data analysis, from a survey in the USA on public attitudes towards children with mental health problems, yielded highly significant effects of both perception of violence and attribution to 'bad character'.³¹ Taken together, these studies do not support a prominent role of perceived responsibility on social distance towards people with mental illness, but highlight the importance of perceptions of dangerousness or unpredictability.

Prevalence of the stereotype of self-responsibility

Findings on the prevalence of the stereotype of self-responsibility in mental illness, contrasted again with stereotypes related to

dangerousness and unpredictability, are summarised in online Table DS3. For mental illness and schizophrenia, stereotypes related to self-responsibility are infrequently endorsed, and notions of unpredictability and dangerousness are voiced prominently. For example, all of 30 national surveys conducted in European countries as part of a Special Eurobarometer study in 2006 consistently found being unpredictable and being dangerous more frequently endorsed for mental illness than being responsible.³² Two studies from Asian countries (Malaysia and Japan) differed from this rule by showing higher ratings for responsibility-related items for mental illness and schizophrenia.^{33,34} For depression, studies show mixed patterns. Self-responsibility related stereotypes such as 'personal weakness' or 'self to blame' were endorsed by less than one in five respondents in surveys from Great Britain, Australia and Canada,^{17,18,34,35} where instead notions of unpredictability dominated. Studies from the USA and Scotland showed low prevalence of both unpredictability/dangerousness and self-responsibility.^{8,19,36–38} In studies from Germany, Japan, Brazil and India, stereotypes related to guilt and self-responsibility such as 'bad character', 'lack of willpower' and 'personal weakness' dominated over 'being dangerous/unpredictable'.^{28,34,39–41} With regard to alcohol dependence, both kinds of stereotypes (being violent, dangerous or unpredictable and being responsible for the condition) were equally frequently endorsed by more than half of respondents. These results show that the assumed target of biologically founded anti-stigma messages, the stereotype of self-responsibility, is not common among the general public and is overshadowed by notions of unpredictability and dangerousness for general mental illness, schizophrenia and – in some countries – depression.

Discussion

Summarising our findings, one can state that in most instances biological or genetic causal attributions are not associated with lesser rejection of people with mental illness. For schizophrenia there is evidence that biogenetic causal beliefs may even increase the desire for social distance from those affected. No published evidence links biological causal attributions to low perceptions of blame and responsibility for mental disorders, and studies examining the relationship of certain stereotypes to rejection of people with mental illness almost universally found notions of dangerousness and unpredictability to be much more relevant than notions of responsibility, which were mostly unrelated to public attitudes towards mentally ill persons. Overall, attributions of responsibility showed a limited prevalence among the public with regard to general mental illness, schizophrenia and (in some countries) depression. This leads us to conclude that the assumption that biogenetic causal models of mental illness reduce notions of self-responsibility and subsequently increase acceptance of people with such disorder is only weakly related to public attitudes and their determinants.

Our findings provoke speculation as to the extent that attribution theory contributes to the explanation of mental illness stigma. There are elements of the theory that were not adequately represented by our data. For example, since most population surveys elicit perceived causes of mental disorder, they are concerned with onset responsibility (responsibility for contracting a disease), but do not enquire about offset responsibility (responsibility for getting better – by treatment adherence, for example).⁴ Dependent on the specific illness, perception of offset responsibility could well be an important predictor of rejection, for example in conditions that provoke high levels of blame such

as alcoholism.³ Another important mediator of reactions to causal explanations is stability, the perception that a certain cause does not change. There is evidence that genetic causes are perceived as stable,⁴² but it is unknown whether this holds true for other biological causes such as ‘chemical imbalance’ or ‘brain disease’. So the data available from population surveys do not allow definite conclusions on the role of attribution theory for the stigma of mental illness. The data do show, however, that the simplified adoption of attribution theory predicting that biogenetic causal beliefs result in lower perceived responsibility and more tolerant attitudes is not supported by evidence from representative population surveys.

There are some indicators that biogenetic causal attributions possibly have differential effects with regard to different diagnostic categories and cultural backgrounds. A positive effect of biogenetic causal models on stigma can clearly be rejected for schizophrenia, where results of our review even suggest a detrimental effect. For general mental illness and depression, results are mixed. In general mental illness, for example, a positive effect of biogenetic concepts could be expected in Malaysia, where a majority of respondents expressed blame towards mentally ill individuals; the same holds true for depression in Japan, India, Germany and Brazil, where guilt-related stereotypes were quite prevalent. So far, however, even in these countries a positive effect of biogenetic causal models on stigma has not been proved. In India no association between biogenetic causal beliefs and rejection was found, and in Germany associations were even unfavourable. Only one study analysing combined data from surveys in the USA (conducted in 1996 and 2006) found a desirable positive association between genetic causal beliefs and tolerance of depression.⁸ For alcoholism we found a deplorable lack of studies examining associations between causal beliefs, stereotypes and social distance, given that alcoholism is among the most severely stigmatised mental disorders.⁴³ So, cultural differences seem to influence the prevalence of certain stereotypes, and particularly in non-Western cultures, notions of guilt and responsibility seem to have a more important role. At the time of this review, however, there was no evidence of a mediating effect of cultural factors on the influence of biogenetic messages on public attitudes. Different effects of biogenetic models for different mental disorders seem also possible, but there is only weak and inconclusive evidence for positive effects in general mental illness and depression, and no such evidence for alcohol dependence.

At this stage, promulgating biogenetic causal models of mental illness cannot be regarded as a rational, evidence-based strategy to decrease individual discrimination against people with mental illness, but rather entails a risk of increasing stigma. Indeed, there seems to be some truth in the argument of those critical of biogenetic conceptualisations who point out that biogenetic causal models could have unintended negative consequences, inducing notions of fundamental, irreversible differences between those affected and those not, and increasing notions of dangerousness and unpredictability.^{44,45} There is evidence from population studies corroborating this concern,^{8,46,47} and along similar lines, a number of experimental studies have shown that interventions promulgating biogenetic causal models of mental illness increase stereotypes of unpredictability and dangerousness.^{48–51} Hence, besides the low potential of biogenetic illness models to destigmatise mental disorders, there is a real danger of unintentionally worsening such stigma. This problematic effect of biological conceptualisations on the stigma of schizophrenia has been anticipated by social psychologist Nick Haslam, who stated:

Even if schizophrenia were to become recognized by the lay public as just as much a disease as diabetes, equally grounded in a chemical malfunction of known cause and

outside of intentional control, the characteristics that lead it to be stigmatized would remain unchanged. The condition would retain its . . . association with violence, as well as the apparent unpredictability and incomprehensibility that have made madness so unsettling to observers through the ages . . . The simple point here is that a great deal of stigma of mental disorder springs from sources other than responsibility attributions, and changing these attributions by an uncritical and vulgarized adoption of the disease model may leave many sources untouched, as well spawning new ones.⁵²

Perceived stigma, structural discrimination and biogenetic models

Although population studies show that attributing the cause of mental disorders to biogenetic mechanisms does little to increase tolerance towards people with these illnesses, it could still be beneficial from an individual’s or relative’s perspective. For instance, Fusar-Poli *et al* expect that:

Neuroimaging can help to reduce the sense of personal blame and guilt associated with mental disorders, allowing schizophrenic patients to ask for and receive help and treatment without shame. Having a malfunctioning brain may be less stigmatizing than being a mentally ill person.⁵³

Qualitative studies assessing anticipated and perceived discrimination among people with depression or bipolar disorder do point in this direction: in a focus group study of people with depression and with several cases of depression in the family, a biogenetic explanation of depression was perceived as having the potential of diminishing self-stigma.⁵⁴ Interviews with women who had sought treatment for depression within the previous 5 years showed that they experienced some relief when they had been given a biomedical explanation of their depression and had subsequently adopted it. To them the explanation that their depression had a physical cause translated (quite in line with the reasoning explored in this review) into ‘it’s not my fault; I didn’t do this to myself’, and resulted in less guilt and shame.⁵⁵ Similarly, a study analysing in-depth interviews with members of families with a high density of bipolar disorder found that most of those interviewed felt that a genetic explanation was likely to decrease the stigma associated with bipolar disorder because it shifted the locus of control and responsibility away from the individual towards the role of heredity.⁵⁶ However, quantitative studies have so far failed to support these findings. A postal survey among families with several cases of bipolar disorder showed that having a genetic explanation for the condition had no impact on perceived stigma among affected family members.⁵⁷ Interviews with undergraduate students who reported ever experiencing clinical depression also showed no relationship between biological explanations and perceived stigma.⁵⁸

So far, our discussion has only dealt with individual discrimination, from both a population and a patient or family perspective. There are other aspects of stigma that might still be positively affected by biogenetic illness concepts. Structural discrimination occurs when structures, rules or legislation work to the disadvantage of a particular group.⁵⁹ Conceivably, for example, public funding for healthcare could be biased against conditions that are perceived as self-inflicted. In fact, there is evidence from a population survey in Germany that in depression (but not in schizophrenia or alcoholism) the notion of self-responsibility increases the public’s willingness to cut healthcare expenditures for this disorder.⁶⁰ Another German survey showed that for schizophrenia, acceptance of structural discrimination was related considerably more strongly to notions of self-responsibility than to perceptions of dangerousness or unpredictability, a picture complementary to that found for individual discrimination.²⁷ Hence the notion of self-responsibility might indeed be disadvantageous for people with mental illness, but less so with regard to individual than to structural discrimination. A beneficial effect of biogenetic causal

explanations, however, could only arise if they did indeed reduce this perception of self-responsibility, and on a population level there is so far no evidence pointing in this direction.

Effects of biogenetic models on help-seeking

Apart from stigma, biogenetic conceptualisations of mental illness may have an impact on attitudes towards help-seeking. Population surveys in Germany, Slovakia and Russia,²³ as well as in Australia and in the USA,^{61–64} consistently found beliefs in biological causes to be positively associated with the endorsement of professional treatment, particularly that offered by medical providers. Time trend analyses show that parallel to the growing popularity of biogenetic illness concepts among the general public, medical professional help-seeking recommendations for depression and schizophrenia become more frequent.^{65–67} Medical professional help-seeking attitudes due to biogenetic causal models of mental disorders are probably not a sign of destigmatisation, but simply of modified orientation: a medical definition of the problem suggests a medical solution. For severe mental illness this is clearly a desirable outcome. There still is a disadvantage to this development: experimental^{151,68,69} and population studies^{42,63} also show that biogenetic causal beliefs or interventions are negatively associated with expectations of recovery and good prognosis.

In conclusion, reducing discrimination against people with mental illness is not among the merits of increasing public knowledge of the biological and genetic basis of mental disorder. Instead, there seems to be a danger that biogenetic illness concepts increase rather than decrease public stigma of mental illness. As psychiatrists, we have to ask ourselves whether a neuroscientific public image of psychiatry is really in the interest of our patients. It seems worth contemplating to what extent such an image of our profession is motivated by our professional interests – for example, by closing a perceived gap between psychiatry and other medical disciplines. Anti-stigma initiatives need to be careful to not rely solely on biological or genetic concepts of mental illness. A biogenetic illness concept is not a simple way to solve the problems of discrimination and social exclusion of people with mental illness.

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First received 6 Aug 2010, final revision 23 Dec 2010, accepted 21 Mar 2011

Acknowledgements

We thank Sarah von Saß for assistance in conducting our database search.

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