

State of the art of population-based attitude research on mental health: a systematic review

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Aims. Population surveys have become a frequently used method to explore stigma, help-seeking and illness beliefs related to mental illness. Methodological quality however differs greatly between studies, and our current knowledge seems heavily biased towards high-income countries. A critical appraisal of advances and shortcomings of psychiatric attitude research is missing. This review summarises and appraises the state of the art in population-based attitude research on mental health.

Methods. Systematic review of all peer-reviewed papers reporting representative population studies on beliefs and attitudes about mental disorders published between January 2005 and December 2014 ($n = 478$).

Results. Over the decade covered by this review considerably more papers on psychiatric attitude research have been published than over the whole time period before. Most papers originated in Europe (36.3%), North America (23.2%) and Australia (22.6%), only 14.6% of all papers included data from low- or middle income countries. The vast majority of papers (80.1%) used correlational cross-sectional analyses, only 4% used experimental or quasi-experimental designs. Data in 45.9% of all papers were obtained with face-to-face interviews, followed by telephone (34.5%), mail (7.3%) and online surveys (4.0%). In almost half of papers (44.6%) case-vignettes served as stimulus for eliciting responses from interviewees. In 20.7% instruments meeting established psychometric criteria were used. The most frequently studied disorder was depression (44.6% of all paper), followed by schizophrenia (33%). 11.7% of papers reported time trend analyses of attitudes and beliefs, 7.5% cross-cultural comparisons. The most common focus of research was on mental health literacy (in total 63.4% of all papers, followed by various forms of stigma (48.3%). There was a scarcity of papers (12.1%) based on established theoretical frameworks.

Conclusions. In the current boom of attitude research, an avant-garde of studies uses profound and innovative methodology, but there are still blind spots and a large proportion of conventional studies. We discuss current and future methodological challenges that psychiatric attitude research needs to embrace. More innovative and methodologically sound studies are needed to provide an empirical basis for evidence-based interventions aimed at reducing misconceptions about mental disorders and improve attitudes towards those afflicted.

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Introduction

Over the last two decades, research into the attitudes of the general population has become a thriving field of psychiatric research. Indisputably, attitudes of the general public towards persons with mental illness, beliefs about help-seeking and perceptions of causes and consequences of mental disorders have immediate impact on the lives and well-being of those who experience mental illness. Despite this ‘boom’ in attitude research (Angermeyer & Holzinger, 2005) it is unclear to what extent growing quantity has been met by

advances in methodological quality. While several recent reviews of population-based studies have summarised findings on specific topics, a summary and critical appraisal of the methodological developments in the field is missing.

Topics that have been subject to systematic reviews include the perception of dangerousness of persons with mental illness (Jorm *et al.* 2012), desire for social distance (Jorm & Oh, 2009), gender differences in public beliefs and attitudes (Holzinger *et al.* 2012), attitudes towards people with alcohol dependence (Schomerus *et al.* 2011), the association between biogenetic explanations and attitudes towards people with mental illness (Angermeyer *et al.* 2011; Kvaale *et al.* 2013), and time trends of beliefs and attitudes (Schomerus *et al.* 2012). In 2006, a comprehensive

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review of population-based attitude research between 1990 and 2004 pointed out a number of methodological limitations which, at that time, the authors considered urgent to overcome (Angermeyer & Dietrich, 2006). For example, the majority of studies had been conducted in western countries, very few studies originated from other parts of the world and there were only few cross-cultural comparisons of beliefs and attitudes; most studies were purely descriptive in nature and lacked any theoretical foundation; attitude research had mainly taken an interest in schizophrenia and depression and only few studies had looked into other mental disorders; there was a scarcity of studies on the development of public attitudes over time. Beyond the points raised in that earlier review, we do not know to what extent attitude research is based on reliable and valid instruments, and which instruments have proven most useful. Furthermore, we do not know how the evolution of interview modalities (from face-to-face to online surveys) has affected attitude research, and how far the use of quasi-experimental study designs on a population level has advanced. To further expand our knowledge on mental health related attitudes and how they might change, it is crucial to establish a state of the art of population-based research methodology. In this paper, we take on this task and look at how attitude research has developed in recent years. Based on a systematic review of the literature published between 2005 and 2014, we will summarise achievements that have been made and point out areas where further methodological progress is still needed.

Material and methods

We systematically reviewed all papers reporting results of representative population-based studies on beliefs and attitudes about mental disorders published in peer-reviewed journals between January 2005 and December 2014. To search for relevant papers we took a stepwise approach according to the systematic literature review guidelines of the Centre for Reviews and Dissemination (2009) and the Cochrane Collaboration (Higgins & Green, 2011). As a starting point we conducted a literature search in PubMed, Web of Science and PsycINFO using the terms (population OR representative) AND (depression OR schizophrenia OR 'mental disorder' OR alcohol OR 'bipolar disorder' OR 'obsessive compulsive disorder' OR suicide OR 'anxiety disorder' OR 'dementia' OR 'eating disorder' OR 'attention deficit hyperactive disorder' OR 'post traumatic stress disorder') AND (knowledge OR attitude OR stigma OR stereotype OR discrimination OR 'mental health literacy'). We used mesh-

terms and truncations according to the properties of each database, for detailed syntax see the online supplement. We included all papers written in any of the European languages. Our search on January 8, 2015, resulted in 3275 articles from PubMed, 8252 articles from PsycINFO, and 11 915 articles from Web of Science. After manually removing all duplicates, this resulted in 11 447 references. Two independent researchers screened titles, abstracts and (where appropriate) the full text of all identified papers. All reports on studies meeting the following inclusion criteria were retained: first, the focus of the study was on the general public; studies investigating beliefs and attitudes of particular subgroups such as consumers, health professionals or students were excluded. Second, samples were obtained by either random or quota sampling methods. Third, while we included studies focusing on attitudes about substance-related disorders, those merely dealing with attitudes toward substance use and not referring to any disorder were excluded. After exclusion of papers not meeting our inclusion criteria we ended up with 310 papers. We then hand-searched the identified literature for relevant citations and searched electronically for other relevant publications by authors of papers thus far identified. By this method we identified another 168 papers that met our inclusion criteria. Our search strategy yielded in total 478 papers (see PRISMA flowchart in online supplement), 37 of which were written in languages other than English (7.7%).

With these papers a full-text analysis was carried out independently by the two authors. The following data were extracted from each paper:

- Publication details (year of publication, research group, theory-driven *v.* descriptive);
- Study characteristics (country, study year, sample size, national *v.* regional/local, special sample, subgroup analysis, age group, mental illness unspecified *v.* specific diagnosis);
- Study method (study design, interview mode, vignette, instruments);
- Research topics (mental health literacy, public stigma, perceived stigma, structural stigma, self-stigma, experienced stigma, courtesy stigma; attitudes towards mental health services, psychotropic medication, psychotherapy; help-seeking attitudes, attitudes towards prevention; comparison between attitudes of the public and professionals; time trends; cross-cultural comparison between countries, cross-cultural comparison within a country; attitudes towards mentally ill youth, attitudes towards mentally ill elderly; evaluation of anti-stigma or awareness raising interventions; relationship between causal attributions and attitudes towards people with

mental illness; survey methodology, evaluation of instruments; miscellaneous).

If necessary, native speakers were contacted to provide translations. Disagreement about inclusion of individual papers into the review or about the allocation to the various analytic categories was resolved by discussion.

In order to assess the frequency of publications over a longer time span, an additional search was conducted covering the time period between 1945 and 2004, using the same procedure. This time, only the date of publication was registered and no full-text analysis was carried out.

Results

Time trend

As shown in Fig. 1, since the beginning of population-based psychiatric attitude research in the late 1940s the number of papers increased slowly and steadily until the time period 1985–1994. Since then publication activity increased exponentially, resulting in an output of 478 papers during the years 2005–2014. Obviously there has been a real boom in population-based attitude research over the past 10 years with considerably more papers having been published in that time than over the whole time period before.

Geographical distribution

Figure 2 shows the geographical distribution of psychiatric attitude research by countries in absolute

numbers of papers published. Most papers originated from Europe (36.2%), primarily from Germany (15.5%), France (4.6%) and UK (4.2%). Oceania comes next (23.4%), where Australia has contributed the lion share (22.6%). North America ranks third (23.2%) with the USA accounting for 20.9% and Canada for 5.2% of all papers. In contrast to western countries a relatively small proportion of papers reported research conducted in Asia (10.9%; mainly China (3.3%), Japan (2.9%) and India (1.9%)), Africa (4.8%; mainly Nigeria (2.5%)) and Latin America (4.6%; mainly Brazil (3.6%)).

The distribution of papers over the various research centres involved in psychiatric attitude research turns out being highly skewed: The two most prolific research groups (one in Australia and one in Germany) accounted for three in ten papers published (28.7%). Almost half of all papers (44.4%) originated from the 10 most productive research centres worldwide.

Study characteristics

Slightly more papers were based on national surveys (54.8%) than on surveys conducted on a regional or local level. Regarding the age of participants, adults were the target in most cases (85.1%). In 9.2% research had been carried out among youth, in 2.7% among elderly. 1.9% focused specifically on attitudes towards mentally ill youth.

As concerns study design, the overwhelming majority of papers reported correlational cross-sectional studies (80.1%). Only a few were experimental ($n=9$)

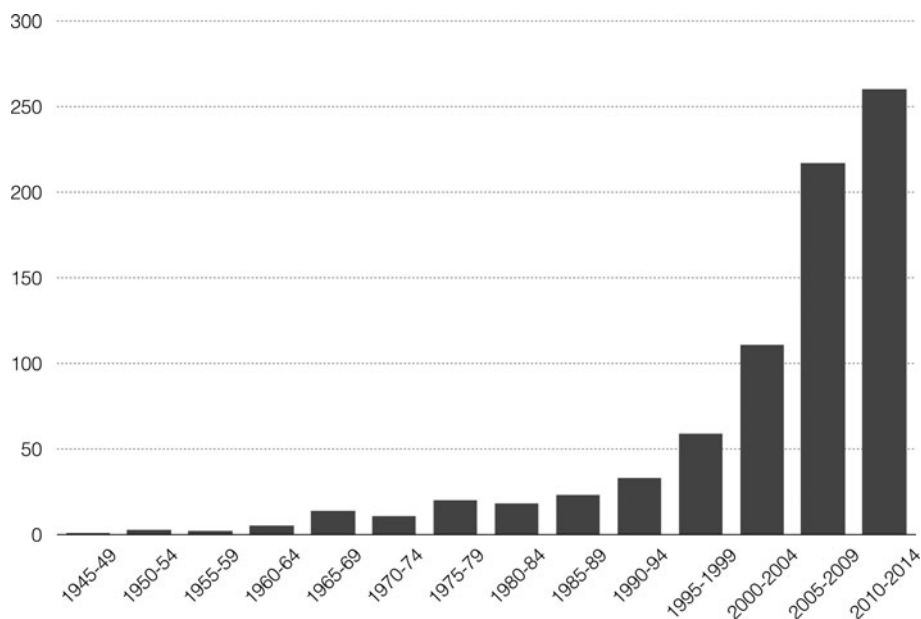


Fig. 1. Publication activity since the beginning of population-based psychiatric attitude research (number of papers).

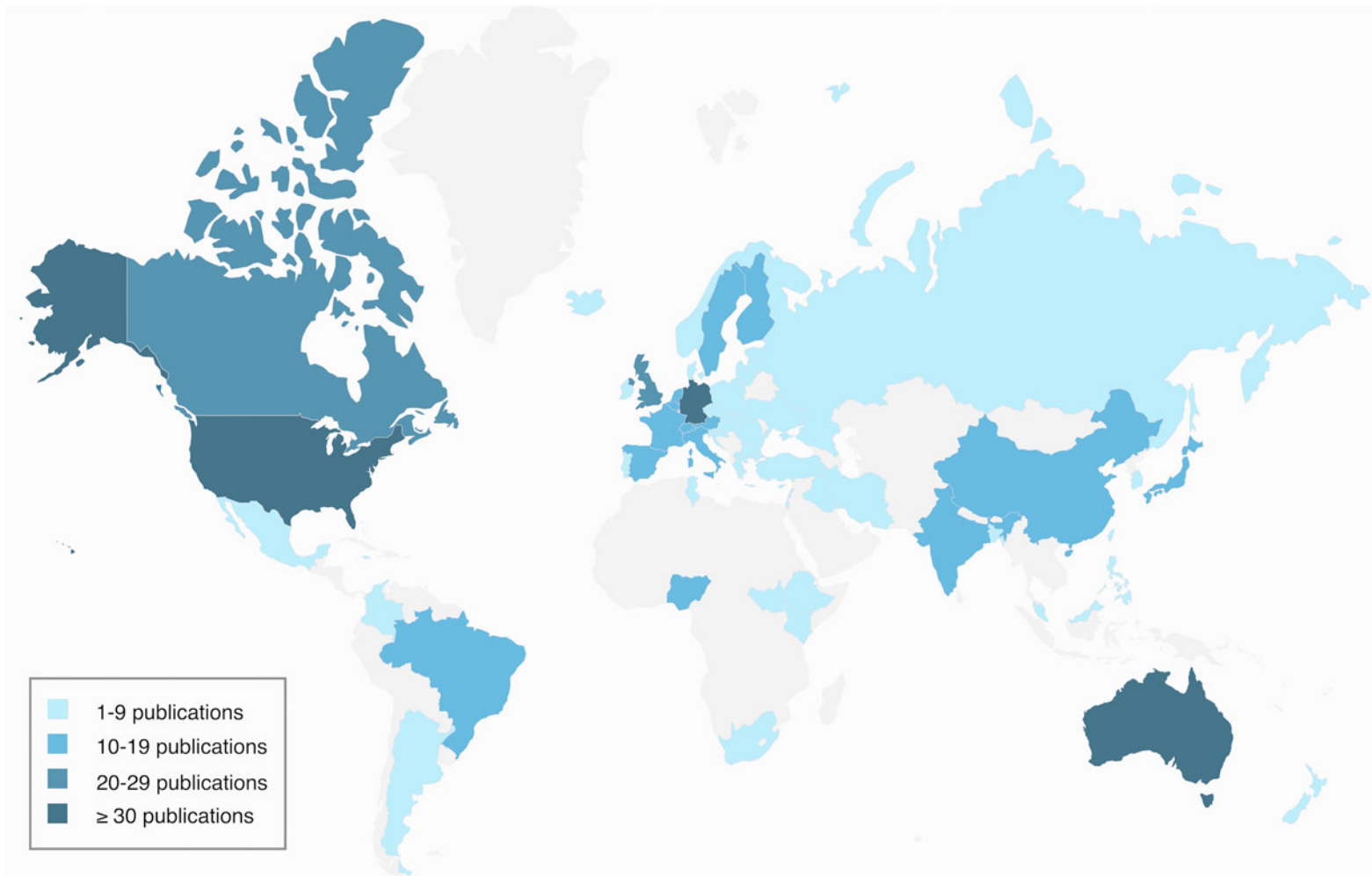


Fig. 2. Geographical distribution of psychiatric attitude research by countries (number of papers).

or quasi-experimental ($n=10$) in nature, of which seven studies evaluated campaigns aiming at reducing stigma or raising awareness. 11.7% of all papers presented results of trend analyses, comparing data obtained from at least two samples independently drawn at different times.

The most commonly chosen interview mode was face-to-face (45.9%). In 34.5% of papers the findings were based on telephone interviews. In 7.3% data had been obtained by mail, in 4.0% online.

In almost half of instances (44.6%) case-vignettes served as stimulus for eliciting responses from interviewees, most of them fulfilling criteria of commonly used diagnostic systems (DSM-III-R, DSM-IV, ICD-10).

The majority of papers presented data collected with instruments that had been developed ad hoc and had not been validated. In only 20.7% results were obtained using scales meeting established psychometric criteria. Among the five most frequently used scales for the measurement of stigma were Link's Social Distance Scale (Link *et al.* 1987) (7-item version: 21 times, 5-item version 11 times), Link's Devaluation-Discrimination Scale (Link *et al.* 1989) (22 times), the Depression Stigma Scale developed by Griffiths (Griffiths *et al.* 2008) (21 times), the Community Attitudes towards the Mentally Ill Scale (CAMI) (Taylor & Dear, 1981) (11 times), and the Emotional Reactions Scale (ERMIS) (Angermeyer & Matschinger, 2003) (10 times).

As concerns mental health literacy, an instrument devised by Jorm *et al.* (1997) for the assessment of the likely helpfulness and harmfulness of various professional and non-professional interventions for mental disorders has most widely been used (44 times, including modified versions). In its original form, the inventory represents the three factor-analytically derived dimensions 'Medical', 'Psychological' and 'Lifestyle'. A more recent enlarged version includes a fourth factor named 'Information-seeking' (Jorm *et al.* 2005c).

Conceptual framework

Most papers were descriptive in nature, only 12.1% were theory-driven. Most frequently they relied on attribution theory (Weiner, 1995) (14 papers), followed by cultural theories, such as the concept of 'what matters most' (Yang *et al.* 2007) ($n=10$), the theory of social representations (Moscovici, 2001) ($n=7$), Link and Phelan's conceptualization of stigma (Link & Phelan, 2001) ($n=5$), the concept of medicalization (Conrad, 2007) ($n=4$), the concepts of genetic essentialism (Nelkin & Lindee, 1995) ($n=4$), and the theory of planned behaviour (Ajzen, 1991) ($n=3$).

Type of mental health problem

Almost half of attitude studies focused, exclusively or in combination with other disorders, on depression (44.6%). Schizophrenia comes next with 33.5% of all papers. 20.6% dealt with mental disorders in general without focusing on a specific illness. Less frequently researched were alcohol dependence, dementia, social phobia, PTSD and drug dependence (4.2–9.0%) and only few papers addressed the remaining disorders (Table 1).

Topics

As shown in Table 2, the most common focus of research was on mental health literacy and related topics (in total 63.4% of all papers). This was followed by research focusing on various forms of stigma (in total 48.3%), with public stigma receiving by far the greatest attention (36.6%). 11.1% of papers investigated time trends of beliefs and attitudes about mental illness. The studies covering the longest time period were conducted in a rural community in the North of Sweden (27 years) (Ineland *et al.* 2008) and, on a national level, in Germany (21 years) (Angermeyer *et al.* 2013) and in Australia (16 years) (Reavley & Jorm, 2012). 7.5% of papers reported on cross-cultural comparisons

Table 1. Disorders addressed by population-based attitude research

Disorder	N papers	%
Depression	213	44.6
Schizophrenia	160	33.5
Mental disorder unspecified	98	20.6
Alcohol dependence	43	9.0
Dementia/Alzheimer's disease	41	8.6
Social phobia	38	7.9
PTSD	21	4.4
Drug dependence	20	4.2
ADHD	11	2.3
Suicide	9	1.9
Eating disorders	9	1.9
SMI	6	1.3
Addictions, substance abuse	6	1.3
GAD	5	1.0
Anxiety disorders	5	1.0
Bipolar disorder	4	0.8
Mood disorders	4	0.8
Gambling disorder	3	0.6
Panic disorder	2	0.4
Intellectual disability	2	0.4
OCD	1	0.2
Pre- and post-natal disorder	1	0.2

Table 2. Topics of population-based attitude research

Topic	N papers	%
Mental health literacy	253	52.9
Attitude towards mental health services (mental health care)	20	4.2
Attitudes about psychotropic medication	18	3.8
Attitude toward psychotherapy	5	1.0
Help-seeking attitudes	83	17.4
Public stigma	175	36.6
Structural discrimination	30	6.3
Perceived stigma	56	11.7
Self-stigma	24	5.0
Experienced stigma	8	1.7
Courtesy stigma	7	1.5
Time trends of beliefs and attitudes	53	11.1
Cross-cultural comparison within countries	13	2.7
Cross-cultural comparison between countries	23	4.8
Association between causal beliefs and attitudes towards people with mental illness	25	5.2
Evaluation of anti-stigma/awareness interventions	23	4.8
Comparison between (mental) health professionals and the general public	21	4.4
Attitudes towards early diagnosis and preventive measures	21	4.4
Methods (survey methodology, instruments)	20	4.2

between countries or within countries. Most studies comparing different countries were conducted in the western hemisphere, only three included both western and non-western countries (Jorm *et al.* 2005b; Nakane *et al.* 2005; Griffiths *et al.* 2006; Alonso *et al.* 2008; Pescosolido *et al.* 2013). Comparisons between different ethnic groups within the same country originated almost all from the USA. 4.8% of papers are devoted to the evaluation of anti-stigma or awareness campaigns. Apart from these topics, which had already been included in the previous review new research topics have emerged. Fuelled by the ongoing debate whether biological illness explanations improve tolerance towards people with mental illness a number of papers examined the relationship between causal beliefs on the one hand and stereotypes, emotional reactions or desire for social distance on the other (5.2%). In several papers (4.4%) beliefs and attitudes of (mental) health professionals were contrasted with those of the general public. There has also been an increasing interest in public attitudes towards early diagnosis and preventive measures, mainly in the context of depression and dementia (4.4%).

Discussion

Limitations

Before discussing the results of our review some limitations should be addressed. First, our review only included papers written in English or other European

languages, which may have resulted in an under-representation of countries where also other languages are in use for disseminating research results. Second, in order to guarantee a minimum of quality we only included peer-reviewed papers and excluded grey literature, research reports available on the Internet and doctoral theses, which also may have biased the sources on which our review is based.

Geographical distribution

Although attitude research has expanded in recent years into other parts of the world studies originating from western countries still predominate. Looking at economic indicators, only 14.6% of all studies included data from at least one low or middle income (LAMI) country (according to World Bank criteria), among them only 0.8% from low income economies, although these countries account for 80% of the world population. Here, psychiatric attitude research mirrors a general problem, the heavy bias of medical and psychiatric research towards high-income countries. It has been pointed out that on the one hand, in LAMI countries with low funding for research in general and few mental health researchers in particular, these restricted resources translate into lower research output (Sharan *et al.* 2009), while on the other hand medical journals could be biased against research from poorer countries (Patel & Kim, 2007). Beyond, attitude research in particular is much more challenging in less affluent than in wealthier countries. Absence of

professional market research companies, unequal distribution of landline or mobile telephones and stark differences in urban and rural infrastructure make accomplishing representative population samples highly difficult. These methodological challenges contrast with the high public health relevance of attitude research in countries where barriers to help-seeking are even higher because of lower availability of mental health care (Sharan *et al.* 2009; Becker & Kleinman, 2013).

Cross-cultural comparison

Studies comparing public beliefs and attitudes about mental illness across different cultures still are scarce. This applies particularly to the comparison between western and non-western cultures. Typically, in stigma research instruments have been developed and validated in a western culture (mostly in the USA) with people of western European descent and then translated with little or no modification into another cultural context. The strength of this 'universal' approach is the generalisability and comparability of results across contexts. However, one inadvertent consequence is the elimination of stigma's culture-specific aspects (Yang *et al.* 2014). Only recently, Yang *et al.* (2007) have proposed a new theory, which allows accounting for how cultural influences impact upon stigma specifically. The concept of 'moral experience' or 'what is most at stake for actors in a local social world' provides a new interpretative framework for the behaviours of both the stigmatiser and the stigmatised person. The authors maintain that culture affects stigma by threatening a person's capacity to participate in the activities that determine 'what matters most' within a cultural context. For example, because the perpetuation of one's lineage is something, which is valued most within Chinese cultures, stigma is seen to most powerfully attack one's ability to extend one's lineage. So far, there exists one single population-based study where this new conceptual approach has been used (Yang *et al.* 2013).

Instruments

Apart from cultural validity, a major problem of population-based stigma research is that most studies use ad hoc developed instruments that have not been psychometrically validated. Moreover, among those instruments with proven psychometric properties, there are some, which have been developed years ago and may therefore not fully reflect the current situation. Just to give an example: In several items of Link's frequently used Devaluation-Discrimination Scale the perception of the stigma experienced by

someone who had been in a 'mental hospital' is assessed – an institution, which in many western countries nowadays plays a rather marginal role in psychiatric care. The assessment of implicit stigma, a novel approach to measure stigmatising reactions, which is becoming increasingly popular in social-psychological experiments (for example, Rüscher *et al.* 2010), has so far not been introduced into population-based research.

Type of mental health problem studied

Despite the spectrum of disorders under study having increased, the main focus of research is still on schizophrenia and depression. Reviews on differences in attitudes towards different disorders show that, for example, alcoholism seems to be stigmatised for very different reasons than schizophrenia (Schomerus *et al.* 2011). This leads to another conceptual problem that should be addressed in future attitude research: Other stigmatised conditions like obesity or poverty often co-occur with mental disorder in individuals who then experience multiple stigmata. The concept of 'layered stigma' has been used in studies describing the multiple stigma experiences of persons with HIV (Henkel *et al.* 2008). Layered stigma could also be a useful concept when investigating mental illness stigma, but so far, attempts to bring together research on attitudes related to different medical and social conditions is only beginning (for example, Corrigan, 2014).

Studies of time trends in attitudes and beliefs

The number of studies investigating time trends in attitudes and beliefs has significantly increased. Practically all of them are based on repeated cross-sectional assessment of attitudes with independent samples from the same population. This approach is best suited to detect variations of cultural conceptions of mental illness over time. While also providing insights into changes of people's attitudes on an individual level, panel studies would have to struggle with lack of representativeness of the follow-up assessment due to the huge attrition rate to be expected over time periods of 10 or more years, and, therefore, be less suitable for studying changes at the collective level. Using the same sampling procedure, interview mode and instruments within the same population at different time points has to be considered the gold-standard of time trend analysis. Data from identical surveys at three or more time-points will enable novel statistical approaches such as age-period-cohort (APC) analyses. APC analyses distinguish time-period effects from cohort and age effects and help thus explain whether any

change in population attitudes is due to demographic transformation or a general shift of attitudes irrespective of age or cohort effects (Schomerus *et al.* 2015).

Influence of societal context on individual attitudes

Research has so far almost exclusively focused on individual beliefs and attitudes. The societal context that may influence individual perceptions and behavioural intentions has rarely attracted attention. Mojtabai (2010) was the first examining the interplay between both individual and collective stigmatizing attitudes and how they are associated with willingness to seek professional help. Using multi-level analysis, Jang *et al.* (2012) were able to show that the desire for social distance from people with mental illness is not only determined by individual factors but also influenced by contextual factors. Adjusting for the individual's perceptions and characteristics, Richardson *et al.* (2013), also using multi-level modelling, found collective perception of treatment effectiveness to be positively associated with the use of mental health services while collective perceptions of mental-illness stigma were not. Evans-Lacko *et al.* (2012) used multi-level analysis to show that self-stigma of individual patients is related to the degree of public stigma in a country. In view of potential implications for anti-stigma and awareness-raising interventions further research efforts in this direction are needed.

Attitudes v. behaviour

The overwhelming focus on attitudes may be looked upon as a limitation of the research reviewed, since attitudes allow predicting behaviour with only less than ideal accuracy. However, rather than using them as proxy for individual behaviours, public attitudes should also be regarded as a relevant phenomenon on their own. At a collective level, they reflect cultural conceptions of mental illness, forming a cultural context that influences the way we think about mental illness and the people who have them. As Link *et al.* (2011) have pointed out 'as a context this cultural conception becomes an external reality, something that individuals must take into account when they make decisions and enact behaviour' (p. 255). Studies on individual stigma experiences yield manifold subtle forms of behaviour that are expressions of stigmatising attitudes but pose sincere problems to measurement (Angermeyer *et al.* 2004). Altered everyday interactions like not being completely trusted at work or receiving less phone calls by friends, for example, defy scientific evaluation. Moreover, the most frequently reported effect of stigma in a study among persons with schizophrenia was anticipation of

discrimination and subsequent avoidance of critical situations (Thornicroft *et al.* 2009). Social withdrawal because of fear of discrimination is discrimination without discriminatory behaviour, solely based on public attitudes and their perception. So attitudes remain a highly relevant topic of population-based studies. To measure and explain relevant discriminatory behaviour, studies in specific environments (work, school, health care, social media) or studies examining structural discrimination seem more useful than population studies.

Conceptual framework

Papers presenting descriptive results still predominate and only a minority of studies is theory driven. This is deplorable because pure description of reality does little to aid our understanding of attitudes and does not explore possibilities to change them. A good example is how testing specific theories has advanced research into the role of causal attributions for stigma. The dominant biological presentation of mental illness in science and media raised the question whether this shift in illness conceptualisation would help to reduce stigma. Here, conflicting theories predicted different effects: while attribution theory stressed the importance of blame and the potential of biogenetic causal models of mental illness to relieve it (Corrigan, 2000), genetic essentialism predicted a deepening divide between persons with and without mental illness, should mental illness be explained in biogenetic terms (Phelan, 2005). Comparative testing of both theories revealed that in severe mental illness, essentialist thinking is much more relevant for stigma than attribution of blame (Schomerus *et al.* 2014).

Study design

Most studies are correlational studies not allowing causal inferences. Only a small number of studies used quasi-experimental designs, mainly for examining the influence of the presence of a community mental health facility on the attitudes of those living in the neighbourhood (Veltro *et al.* 2005; Stadler, 2010) or for the evaluation of anti-stigma or awareness campaigns at a population level (Jorm *et al.* 2005a, 2006; Wright *et al.* 2006; Baumann *et al.* 2007; Gaebel *et al.* 2008; Dietrich *et al.* 2010). Although a population-based randomised controlled trial (RCT) to examine the effect of an information program on mental health literacy and help-seeking (Jorm *et al.* 2003) had already been conducted prior to the time covered by this review, no such RCT has been conducted since 2005.

As early as in 1963 Phillips (1963) carried out a first survey experiment, but experimental studies *sensu*

stricto only started again with Link's seminal study on the importance of labelling for mental illness stigma (Link *et al.* 1987). Recent experimental studies manipulated for example causal explanations (Phelan, 2005), contextual factors of a disorder (Holzinger *et al.* 2011), or tested potentially adverse effects of different news media messages (McGinty *et al.* 2013). The thematic diversity among these few experimental studies demonstrates how widely experimental study designs may be used. Conducting online surveys has become increasingly convenient, facilitating complex experimental designs in large samples. The share of population-based experimental online surveys in the literature will thus likely grow.

Interview mode

The diversity of interview modes found in this review reflects the fact that each method carries specific advantages and disadvantages. Face-to-face interviews offer the opportunity that the interviewer can give direct support to the task performance of the respondent. They are therefore particularly suitable for longer interviews with more complex tasks (Holbrook *et al.* 2003). On the other hand, the presence of an interviewer may systematically influence the answers of the respondent resulting in interviewer bias, with social desirability bias being the best known example. In addition, as differences between interviewers in the way they do their job are not easy to control interviewer variance may pose a problem (Loosveldt, 2008). Face-to-face interviews are also the most expensive option.

Although face-to-face has remained the most frequently used interview mode, its share has decreased compared to the previous review, while that of telephone interviews has increased. An explanation for this change may be that telephone surveys, particularly those using Random Digit Dial samples, offer a more cost-efficient method for gaining access to the general population. Another advantage is that due to the centralised administration of Computer Assisted Telephone Interview (CATI) systems, complete control over all aspects of the interviewing process is possible (Steeh, 2008). However, the growing use of mobile phones (and declining availability of landline phones) makes it increasingly difficult to achieve representative samples in telephone surveys (Holborn *et al.* 2012). To overcome this problem, in some recent surveys the sample was contacted by random-digit dialling of both landlines and mobile telephones (for example, Reavley & Jorm, 2012). However, this mixed design raises new methodological problems, since households are the sample unit for a landline telephone frame, whereas the individual subscriber is the sample unit

for a mobile number frame (Steeh, 2008). Apart from the coverage problem, the principal difficulty has been maintaining adequate response rates as participants tend to object to long telephone interviews and feel more annoyed and disturbed by this approach (Holbrook *et al.* 2003). Systematic trend studies show response rates dropping significantly when the interview mode changes from face-to-face to random-digit dialling (Steeh, 1981). Like face-to-face interviews, telephone surveys are considered vulnerable to social desirability bias (Henderson *et al.* 2012).

Online surveys are a recent development and their share will likely increase due to the growing availability of online access and low costs of surveys. They have the advantage of eliminating unwanted interviewer effects and providing more privacy when answering sensitive questions (Henderson *et al.* 2012). However, recruiting a sample representative of the general population for online studies is methodologically challenging. Of 14 online studies included in this review, seven used a 'gold standard' sampling method, drawing randomised samples from a large nationally representative panel that was recruited offline. Other studies relied on online panels that were not representative of the general population. Methods to approximate a representative sample were quota sampling or weighing data according to socio-demographic variables. Nonresponse is another serious problem for Internet surveys, which is higher than in comparable telephone surveys (de Leeuw & Hox, 2008).

In sum, the various interview modes carry specific benefits and risks, which, in consequence, may lead to differences in effective study samples and/or responses to survey questions. Direct comparison between surveys using different interview modes appears therefore highly problematic as differences may be the result of mode change rather than any actual difference in attitudes of interest (Dillman & Christian, 2003).

Use of case-vignettes

Case-vignettes were first used in 1955 by Star in a national survey on attitudes of the American public towards mental illness. They have been in use for many years until, in 1990, Angermeyer & Matschinger (1995) introduced for the first time into population studies vignettes utilising explicit criteria for diagnosing mental disorders derived from DSM-III-R (and subsequently DSM-IV). Since then, case-vignettes have enjoyed growing popularity. Over the last 10 years, in about half of all articles on public attitudes the vignette technique has been employed. According to Yang *et al.* (2008) there are two major reasons why vignettes have gained such a prominent position: first, vignettes

present a more elaborate stimulus to respondents than simply asking about ‘mental illness’ or ‘mentally ill people’. Second, they can also be administered via random assignment, which brings the power of the experimental method to hypothesis testing – a possibility which, as indicated above, so far has only rarely been used in population-based studies (for example, Phelan, 2005; Holzinger *et al.* 2011).

Besides these strengths also some limitations of the vignette methodology have to be mentioned: supposedly equivalent vignettes illustrating the same disorder may yield different responses because of variation in number and type of symptoms described (Sai & Furnham, 2013; Schlier *et al.* 2014). By their very nature vignettes tend to be highly specific and situated, questioning whether responses are transferable to different persons or situations. Moreover, the focus on paradigmatic cases does not represent the true diagnostic and demographic heterogeneity of a particular mental illness. The utilisation of paradigmatic cases may in fact be assessing the possession of stereotypical information among respondents, as much as their mental health ‘knowledge’ (Aldersey *et al.* 2016). With rare exceptions (for example, Phelan, 2005; von dem Knesebeck *et al.* 2013), population-based studies used unlabelled vignettes depicting symptoms of the disorder of interest. This may have clouded potential differences between reactions to unusual behaviour and reactions to psychiatric illness (Angermeyer *et al.* 2015). In view of these problems there is a pressing need for more systematic research on this methodology.

Future directions of population-based attitude research in psychiatry

Our review shows that there is an avant-garde in attitude research using both well-founded and innovative survey methods to explore the depth of population attitudes towards mental illness, enabling us to exemplify the current gold-standard of population-based attitude research. However, dissemination of these methods is by far incomplete, and many of the shortcomings observed in 2006 persist until today. Additionally, there are challenges ahead: the outlined difficulties to achieve representative population samples particularly with telephone surveys will likely increase and it remains to be seen to what extent carefully selected representative online-panels can be used as a methodologically sound replacement. With regard to its methodology, attitude research needs to show both more rigor and sustain a pioneering spirit.

Supplementary material

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Conflict of Interest

None.

Availability of data and materials

The complete list of articles analysed in this review is provided in the online supplement.

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