Beware of the Mad Hatter.

Mental Illness Stigma and Healthcare Utilisation for Mental Problems.

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The present PhD thesis entails the following studies as existent on 1st September 2017:

Study 1

Schnyder, N., Panczak, R., Groth, N., & Schultze-Lutter, F. (2017). Association between mental health-related stigma and active help-seeking: systematic review and meta-analysis. *The British Journal of Psychiatry, 210*(4), 261-268.

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Study 2

Schnyder, N., Michel, C., Panczak, R., Ochsenbein, S., Schimmelmann, B. G., & Schultze-Lutter, F. (*submitted*). Influence of knowledge about causes of mental disorders and stigma related to mental disorders on healthcare utilisation in a general population sample: a structural equation model.

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Abstract

Mental disorders cause high individual and societal costs and burden. Although they are treatable and potentially preventable, healthcare utilisation is often delayed or completely absent. Important barriers of healthcare utilisation are mental illness related stigmatising attitudes. Stigma is not a unitary concept but covers several aspects whose single contributions to delay or absence of healthcare utilisation are so far unclear. The first aim of this PhD thesis was to examine associations between different aspects of stigma and healthcare utilisation in a meta-analysis, providing more robust and aggregated evidence to the growing body of literature in this field. Stigmatising attitudes are not independent of each other and are influence by other factors, an important one being knowledge about signs and treatment of mental disorders, i.e. mental health literacy (MHL). In particular persons' causal or etiological explanations for a mental illness were associated with stigmatising attitudes before. The second aim of this PhD thesis was to examine associations between persons' causal explanations for mental disorders and stigma, and between stigma and healthcare utilisation in the general population. Using structural equation modelling and a comprehensive set of variables in order to elucidate complex relations between the latent constructs, makes this work stand out from majority of previous research. The main findings of this PhD will be discussed in the light of earlier studies and social psychological research and theories. Furthermore, suggestions for future studies and for campaigns promoting healthcare utilisation via improving MHL and stigmatising attitudes will be derived.

Imagine the following: In the last 6 month, a good friend of yours seems changed. He shuts himself out and avoids contact to everybody. In the rare moments you can talk to him, one topic dominates the conversation: the question if some people can read minds of other people. Your friend does not think about anything else anymore. He neglects himself and looks more and more dishevelled. At work, he seems confused and suddenly makes many mistakes. His boss already wanted to talk to him about his problems.

Finally, your friend stays unexcused away from work for one week. When he returns, he seems frightened and haunted. He is now certain that other people can not only read the mind of others, but that they can also directly influence thinking. His thoughts are disturbed all the time. He can hear other people talking to him and giving him orders. Sometimes, these people would even talk about him and laugh at him. It is worst in his flat where he feels threatened and frightened. That's why he didn't go home for the last week but stayed hidden in hotel rooms, being afraid to go out.

What do you think is wrong with your friend? What do you think caused his condition? Is it a disease of the brain? Or was his work too stressful? Do you think his condition makes him unpredictable? Or even dangerous? Would you let your friend babysit your children anymore? Do you think he should seek help with a psychologist or psychiatrist? Or maybe with a homeopath? Do you think that seeking help would make him feel better?

Introduction

Approximately every second person develops a mental or substance use disorder in the course of their lives (Kessler, Berglund, Demler, Jin, Merikangas, & Walters, 2005; Kessler et al., 2007). Although mental disorders are rarely a direct cause of premature death, the personal and societal burden associated with them is high. Since the World Development Report by the World Bank in 1993, the relative burden related to disease morbidity rather than disease mortality came globally into focus. Disease morbidity is commonly measured as years lived with disability (YLD) or disability adjusted life years (DALYs). Latter is expressed by the cumulative number of years of life lost due to disability, ill-health or early death (Murray, 1994; Murray & Lopez, 1994). At 7.4%, mental and substance use disorders are the fifth leading cause of DALYs and, at 22.9%, the

leading cause of YLDs worldwide (Whiteford et al., 2013). Beside the high personal costs delineated by YLD and DALYs, direct healthcare, direct non-medical and indirect costs (such as production losses) contribute to the immense societal costs of mental disorders of € 453.4 billion in Europe in 2010 (Gustavsson et al., 2011). In the wake of the change of focus from mortality to morbidity, efforts to improve mental health have been given increasing emphasis worldwide (Patel et al., 2008).

Mental disorders are treatable and potentially preventable, and psychotherapy (Gu, Strauss, Bond, & Cavanagh, 2015; Hofmann & Smits, 2008), pharmacotherapy (Arroll et al., 2009; Anderson et al., 2008; Goodwin et al., 2009; Leucht et al., 2013) and especially their combination (Cuijpers, Sijbranij, Koole, Andersson, Beekman, & Reynolds, 2014; Fournier, DeRubeis, Hollon, Dimidjian, Amsterdam, Moore, & Johnson, 2010; Kirsch, Deacon, Huedo-Medina, Scoboria, Moore, & Johnson, 2008) are effective to improve patients mental health. Yet, many persons do not or only with significant delay seek help for mental problems and disorders (Wang et al., 2007; Wittchen et al., 2011). In Europe where disorders of the brain are the largest contributor to DALYs, despite good access to care and much efforts to improve help-seeking, no indications of improved care and treatment between 2005 and 2010 were found with more than two thirds of all cases not receiving any treatment; this indicates a considerable level of unmet needs (Wittchen et al., 2011).

An unmet need, however, can only be assumed in someone actually needing something. In studies aiming at finding reasons for the lack of or delay in healthcare utilisation, a *need for treatment* is commonly defined by meeting criteria for a mental disorder. This definition has been debated. Some opponents of this definition argued that people who do not meet diagnostic criteria still have legitimate reasons to seek treatment, for example, for subthreshold symptoms or psychological distress, and that the definition of "need" by

meeting criteria for a mental disorder might underestimate the actual need for treatment (e.g. Harris, Diminic, Burgess, Carstensen, Steward, Pirkis, & Whiteford, 2014; Pagura, Katz, Mojtabai, Druss, Cox, & Sareen, 2011). Others argued that many people remit without treatment and that this definition of "need" might therefore overestimate the need for treatment (e.g. Sareen, Henriksen, Stein, Afifi, Lix, & Enns, 2013). In a recent study, it was argued against the overestimation assumption that even persons who spontaneously remit from their mental disorder demonstrate lower quality of life than healthy individuals (Wang, Henriksen, ten Have, de Graaf, Stein, Enns, & Sareen, 2017). This line of argument assumes that persons treated for mental disorder demonstrate a quality of life as good as that of healthy individuals; this, however does not seem to be the case for many mental disorders including depression (IsHak et al., 2011) and schizophrenia (Bobes, Garcia-Portilla, Bascaran, Saiz, & Bouzoño, 2007).

In the discussion about unmet need for treatment, it is also important to specify the kind of contact point and of treatment that is referred to as meeting the need for treatment. While a combination of medication and psychotherapy is considered to be good clinical practice by professionals (Cuijpers et al., 2014; Fournier et al., 2010; Kirsch et al., 2008), lay-persons from the general population prefer psychotherapy over medication (Angermeyer, Matschinger, & Schomerus, 2013) or might even recommend alternative treatments (Angermeyer et al., 2013). The source and duration of help-seeking is important to determine as well. In a wider definition of meeting the need for treatment, persons might only ones seek help from a general practitioner that prescribed a helpful medication. In a narrower definition of meeting the need for treatment, persons might regularly receive psychotherapy and combine it with medication. Of course, everything in between and beyond, like the admission to a psychiatric hospital, is possible too. Furthermore, with regard to the outcome "help-seeking", it might be important to distinguish between hypothetical help-seeking intentions and actual help-seeking. This view is supported by the

discrepancy between the above studies on unmet needs and reported rates on help-seeking intentions that are by far higher (Lally, ó Conghaile, Quigley, Bainbridge, & McDonald, 2013).

However, beyond the discussion around definitions, to address the challenge of promoting help-seeking for mental problems or disorders, reasons why individuals with mental health problems do not or do only reluctantly seek help have to be addressed. Several barriers to healthcare utilisation have been suggested in past years, including:

- a low perceived need for help (Andrade et al., 2014; Mojtabai et al., 2011),

- the preference to handle the problem on one's own (Adler, Britt, Riviere, Kim, & Thomas, 2015; Chen, Crum, Martins, Kaufmann, Strain, & Mojtabai, 2013; Gulliver, Griffiths, & Christensens, 2010; Mojtabai et al., 2011),

- financial barriers such as not being able to afford the treatment (Chen et al., 2013),

- poor knowledge about signs and treatment of mental disorders, i.e. low *mental health literacy* (MHL) (Gulliver et al., 2010), and

- negative or stigmatising attitudes towards individuals with a mental illness or towards help-seeking itself (further referred to as *stigma*) (Gulliver et al., 2010; Mojtabai et al., 2011; Clement et al., 2015).

Stigma is generally considered as one of the most influential barriers to mental healthcare utilisation and, therefore, is targeted in public health campaigns promoting help-seeking (Corrigan, Michaels, & Morris, 2015; Jorm, Christensen, & Griffiths, 2005; Mehta et al., 2015; Thornicroft et al., 2016). Yet, stigma is not a unitary concept but covers several aspects whose single contributions to delay or absence of healthcare utilisation are so far unclear.

Against this background, the first aim of this PhD thesis was to examine the associations between different types of stigma and healthcare utilisation in a meta-analysis

(Study 1). Results of this meta-analysis might help improve public health campaigns that target on facilitating (early) healthcare utilisation. Although several (systematic) reviews on this topic had been conducted before (Clement et al., 2015; Corrigan, 2004; Corrigan, Druss, & Perlick, 2014; Gary, 2009; Schomerus & Angermeyer, 2008; Sharp, Fear, Rona, Wessley, Greenberg, Jones, & Goodwin, 2015), a meta-analysis was never carried out. As will be explained in more detail below, this meta-analysis also addressed some conceptual and methodological flaws that former review articles presented. As little as being a unitary concept, stigma is also not alone-standing concept but interacts with a number of variables – also in its effects on mental healthcare utilisation. An important factor influencing persons stigmatising attitudes is MHL, in particular persons' causal or etiological explanations for a mental illness. Therefore, the second aim of this PhD thesis was to examine associations between persons' causal explanations for mental disorders and stigma, and between stigma and healthcare utilisation in the general population (Study 2). Using structural equation modelling (SEM) and a comprehensive set of variables in order to elucidate complex relations between the latent constructs, makes this work stand out from majority of previous research.

Overall, this PhD thesis makes a meaningful contribution to the understanding of mental illness related stigma, one of the most important barriers for healthcare utilisation, by providing more robust and aggregated evidence to the growing body of literature in this field. Furthermore, the analytical method (SEM) of study 2 helps to disentangle the complex interrelation between causal explanations and different aspects of stigma, and between stigma and healthcare utilisation. The insight provided by both studies will help to adapt public health campaigns aiming to promote healthcare utilisation for mental problems via reducing stigmatising attitudes. Furthermore, it might support clinicians' awareness of stigma as a barrier for treatment, and in targeting psychoeducation to less stigmatised causal explanations.

Defining Mental Illness Related Stigma

In the context of mental health and healthcare utilisation, the term stigma is understood as negative public and personal attitudes and behavioural responses towards persons with a mental illness and towards help-seeking for mental disorders whereby stigmatising attitudes are formed by cognition and affect and have a behavioural component (Dividio, Hewstone, Glick, & Esses, 2010; Fiske, 1998). Mental illness related stigma is commonly assessed with a variety of instruments whose correspondence is frequently unclear (Study 1). Although the term stigma is often used as umbrella term in the literature, three to four different, yet related main categories of mental illness related stigma can be distinguished, which are associated with healthcare utilisation (Study 1 and Study 2):

- public stigma (divided into perceived public stigma, PublicS, and personal stigma, PersonS),

- self-stigma (SelfS), and

- stigmatising attitudes towards mental health professionals or mental health treatment institutions (HelpA).

The broader concept of public stigma is defined as the perceptions of members of the general population about a person suffering from a mental illness and involves two distinct sub-categories: PublicS, the individual's perception of public stigma; and PersonS, the individual's own stigmatising attitudes towards a person with a mental illness (Dietrich, Mergl, & Rummel-Kluge, 2014; Griffith, Christensen, & Jorm, 2008; Rüsch & Corrigan, 2013). Thinking back to the person described in the introductory vignette, these two types of stigmata could differentially show in someone reporting that the majority of the community (PublicS) but not him-/herself (PersonS) would consider the depicted person as unpredictable. While this difference in reported attitudes might be real, it might also be related to response bias in PersonS, i.e. to a tendency to depict oneself in a socially desired,

tolerant way. This illustrates why PublicS and PersonS should be explored separately when conducting research on public stigma, and why the endorsement of PublicS was found to be substantially higher than that of PersonS (Dietrich et al., 2014; Eisenberg, Downs, Golberstein, & Zivin, 2009). Another type of stigma, SelfS, occurs when individuals with a mental illness endorse public's stigmatising attitudes as self-relevant and turn them against themselves, or when they belief to be a devaluated member of society (Corrigan, Watson, & Barr, 2006; Livingston & Boyd, 2010; Rüsch & Corrigan, 2013). With regard to the case vignette, SelfS would occur when the depicted person started to consider himself as unpredictable due to his mental state. HelpA, in turn, is less directly related to persons with mental disorders but defined by stigmatising attitudes towards help-seeking for mental problems and, thus, includes negative attitudes towards mental healthcare professionals or institutions, confidence that the offered help will be of assistance, and own emotional evaluations related to help-seeking, such as feeling embarrassed to be in need of help (Fischer & Turner, 1970). Persons with negative HelpA might think that mental healthcare professionals have mental problems themselves, that they cannot help, or would even further harm a person like the one in the vignette.

The cognitive, affective and behavioural components of mental illness stigma.

Stigmatising attitudes have a strong cognitive component that not only involve the so far mainly described cognitive-affective evaluations of a person with a mental illness or of help-seeking but also a cognitive-behavioural evaluation of individuals with mental illness or towards help-seeking (Lee, Laurent, Wykes, Andrey, Bourassa, & McKibbin, 2014; Schomerus, Matschinger, & Angermeyer, 2014) or even behavioural responses (Cuddy, Fiske, & Glick, 2007). In the context of mental illness related stigma, Link (1987) addressed this issue and developed the 'wish for social distance' (WSD) scale that measures the cognitive-behavioural aspect of PersonS. Persons with a high WSD might not

want the person in the vignette to babysit their children, to have him as a co-worker or to introduce him as a potential partner to their best friend (PersonS). Corresponding examples for the cognitive-behavioural aspects of PublicS, SelfS and HelpA involve that persons might think that majority of their community would not let a person with a mental illness babysit their children (PublicS), that the person in the vignette might think of himself that he would not be capable of babysit children (SelfS) or the perception that seeking help will not improve the person's ability to babysit, i.e., that help-seeking will likely be useless (HelpA). Table 1 summarises the different aspects and components of stigma.

The cognitive-affective and cognitive-behavioural aspects of stigmatising attitudes are relatively easy to assess in representative population based research using questionnaires or interviews, and are well studied. Discriminating structural conditions and stigmatising personal actual behaviours are more difficult to assess in representative population based research and are less well studied. Historical studies on stigmatising personal behaviours resembling current measures of WSD suggested that employers are less likely to hire persons with a history of mental illness (Bordieri & Drehmer, 1986), house owners are less likely to rent their flat to a person with a mental illness (Page, 1977), and persons with a mental illness are more likely to be falsely arrested for a criminal offense than persons without mental illness (Hunt, MacKinnon, & Michels, 1974). Discriminating structural conditions show, among others, that psychiatric hospitals have traditionally been built in the outskirts of cities or the countryside, while somatic hospitals are commonly located in city centres. Although it is difficult to retrospectively evaluate if such structural discrimination is due to discriminatory behaviour of city planners, it certainly does not benefit the social inclusion of psychiatric patients. Because actual stigmatising behaviours and structural discrimination are difficult to validly observe in community surveys and our focus was on the general population, the emphasis of this PhD thesis was on the cognitive-affective and the cognitive-behavioural components of stigmatising attitudes. With respect

to the outcome variable of Study 1 and Study 2, "help-seeking for mental problems",
however, the focus was on the reported actual behaviour, i.e., healthcare utilisation, rather
than on help-seeking intentions that might never be put into action.

Interrelation of different stigmatising attitudes and components.

Although the different components and aspects of stigmatising attitudes are distinct,
they are nevertheless interrelated. Studies suggest that PublicS influences SelfS, PersonS,
and HelpA (Evans-Lacko, Brohan, Mojtabai, & Thornicroft, 2012; Jennings et al., 2015)
and that media shapes public's perceptions and stigmatising attitudes (Coverdale, Nairn, &
Claasen, 2002; Francis, 2001). Media reports are biased towards the rather rare occasions
of violent or criminal acts committed by persons with a mental disorder (Schomerus,
Stolzenburg, Bauch, Speerforck, Janowith, & Angermeyer, 2017), and movies often
illustrate individuals with a mental illness in an unfavourable and inaccurate way (Klin &
Lemish, 2008; Wahl, Wood, & Richards, 2011) as dangerous or unpredictable. Because
media is the most significant source of information about mental illness for most persons
(Coverdale et al., 2002), individuals with a mental illness might therefore apply publicly
shared stigmatising attitudes (PublicS) to themselves and consider themselves as
unpredictable (SelfS), while others might feel awkward when sitting next to a person they
know or assume to suffer from a mental illness for fear that this person might do something
unpredictable or even dangerous (PersonS). Furthermore, aspects of PersonS can influence
aspects of HelpA (Schomerus, Matschinger, & Angermeyer, 2009). Persons with a strong
WSD less likely reported own help-seeking intentions in the hypothetical case of suffering
from mental problems themselves (Schomerus et al., 2009). This indicates that persons
with a strong WSD might avoid either the increased possibility of meeting other
psychiatric patients that healthcare utilisation might bring about or the social distance they
might fear others will keep once they learn about them being a psychiatric patient and

associate them with this stigmatised group. Furthermore, the cognitive-affective components of stigmatising attitudes seem to influence the cognitive-behavioural components (Lee et al., 2014; Schomerus et al., 2014) in the sense that perceiving someone with a mental illness as unpredictable, i.e., PersonS, increases WSD. Study 2 payed credit to these complex interrelations between the types of stigma.

Defining Mental Health Literacy (MHL)

Stigmatising attitudes are not only dependent of each other but are also influenced by other factors, an important one MHL. The concept of MHL was first introduced by Jorm and colleagues (1997) and is defined as "knowledge and beliefs about mental disorders which aid their recognition, management and prevention" (p. 183). MHL is commonly assessed in interview- or questionnaire-surveys, starting with a case vignette describing a person with a mental illness (similar to the introductory one above) and followed by questions about the possible type of disorder, its cause and the best contact point to receive help for it. Publics' MHL seems to have improved over the last years and have moved closer to the understanding of (mental health) professionals. Persons better recognise mental disorders, more often assume biogenetic causal explanations, and more often recommend mental health professionals as a source of help (Angermeyer, Holzinger, & Matschinger, 2009; Angermeyer, Matschinger, & Schomerus, 2017; Jorm, Christensen, & Griffiths, 2006; Reavley & Jorm, 2012). These improvements were associated with the success of public health campaigns in Australia (Reavley & Jorm, 2012) but not in the United Kindom (UK) (Evans-Lacko, Henderson, & Thornicroft, 2013). The campaign in Australia took place over a much longer time period and improvements in knowledge were surveyed over a longer time period than in the UK, which might be an explanation for the missing effect in UK.

It was assumed that improvement in MHL translates to improvement in stigmatising attitudes. But there is growing evidence that this might not be the case (Angermeyer et al., 2013; Angermeyer et al., 2017). Despite an increased readiness to recommend help-seeking from mental health professionals, to endorse biogenetic causation for mental disorder, and to understand mental health and illness as a continuum rather than a clear, dichotomised separation, attitudes towards persons with mental disorders did not change over time or even worsened (Angermeyer et al., 2013; Angermeyer et al., 2017). For example, endorsing continuum beliefs about mental disorder did not decrease negative stereotypes and negative emotional reactions towards persons with mental disorder and only improved WSD to a limited degree (Makowski, Mnich, Angermeyer, & von dem Knesebeck, 2016), and endorsing biogenetic causal explanations was associated with more rather than less stigmatising attitudes towards persons with mental illness (Kvaale, Haslam, & Gottdiener, 2013). Persons endorsing high biogenetic causal explanations showed more treatment pessimism and more negative attitudes towards persons with mental illness, such as perceiving them as being more dangerous (Kvaale et al., 2013). The influence of other causal explanations, such as psychosocial, constitution/personality, or drug/medication abuse related ones, on stigmatising attitudes has rarely been studied, although already in 2008 Jorm and Griffiths suggested that personal weakness (a part of constitution/ personality related causal explanations) might be a more important determinant of stigmatising attitudes than biogenetics. However, while commonly the influence of MHL on stigma is studied, a recent study suggested that associations can also run the other way; negative stereotypes and the related fear of persons with mental illness increased psychopharmacological treatment recommendations that might well be regarded as a sign of good MHL (Speerforck, Schomerus, Matschinger, & Angermeyer, 2017). Study 2 condensed this knowledge and examined these complex interrelations between different causal explanations as the component of MHL most likely influencing stigma and stigma

on the one, and between stigma and healthcare utilisation on the other hand using a

structural equation model.

Empirical Studies

This section will summarise the most important findings of this PHD thesis and discuss them in light of the current state of research. Study 1 is a meta-analysis based on peer-reviewed journal articles that were published between January 1990 and July 2015. The studies were identified in three electronic databases using keywords related to mental disorder, stigma and help-seeking. For each of four stigma types (PublicS, PersonS, SelfS and HelpA), we computed separate random-effect meta-analyses based on reported Odds Ratios and 95% Confidence Intervals. Study 2 is based on data of a general population sample from the Canton of Bern and comprehensively examined the interrelation between MHL, stigma and actual healthcare utilisation for mental problems. We applied orthogonal exploratory factor analyses (EFA) to receive uncorrelated factors on whose basis we computed a full structural equation model (SEM) to examine the influence of latent and observed predictor variables on the outcome variable as well as the interrelation of these predictor variables.

Study 1:

Schnyder, N., Panczak, R., Groth, N., & Schultze-Lutter, F. (2017). Associations between mental health-related stigma and active help-seeking: systematic review and meta-analysis. *The British Journal of Psychiatry, 210*(4), 261-268.

Recent (systematic) review articles (Clement et al., 2015; Corrigan, 2004; Corrigan et al., 2014; Gary, 2009; Schomerus & Angermeyer, 2008; Sharp et al., 2015) reported negative associations between stigma, in particular SelfS and HelpA, and help-seeking. After screening 6805 studies, we included 27 studies in the meta-analyses (see Figure 1 in Study 1). The meta-analysis was able to address and eliminate some methodological and conceptual flaws of above mentioned (systematic) review articles, such as (1) mixing help-seeking intentions and actual help-seeking, i.e. healthcare utilisation, (2) not discriminating

stigma types, (3) mixing different study populations and (4) not calculating pooled effects. The new insight gained by addressing these methodological issues is described in the following.

First, the outcome definition of help-seeking often mixed intended or recommended help-seeking and active healthcare utilisation in earlier reviews. Although intentions and behaviours are closely related according to the theory of planned behaviour (Ajzen, 1991), they are not the same, as even the best intentions might not always be put into action. Our meta-analyses showed that negative PersonS and negative HelpA but not SelfS or PublicS significantly reduced healthcare utilisation (see Figure 2 in Study 1), neither did the additional category general stigma that was used when we were not able to classify the stigma measure in one of the four categories. This indicates that a person's own attitudes are more important in the decision to seek help for mental problems than the perceived attitudes of others.

Second, many earlier reviews did not distinguish between the different stigma types but rather used stigma as an umbrella term. Along with other studies (Eisenberg et al., 2009; Vogt, Fox, & Di Leone, 2014), our meta-analyses underscored the importance of distinguishing the four stigma types as they differentially influence healthcare utilisation.

Third, the effect of stigma on healthcare utilisation was often examined in patient samples, and all (systematic) reviews included both patient and general population samples. To avoid the selection bias towards healthcare utilisation that is inherent to patient samples, our meta-analysis only included general population surveys. Furthermore, experience with the healthcare system and other persons with mental disorders might alter stigmatising attitudes of patient samples who, thus, might not be fully representative for general population samples with less experience with the mental health system. This representativeness is necessary since the practical relevance of studies examining

associations between stigma and help-seeking often lies in optimising campaigns promoting mental health or (early) healthcare utilisation that target the general population.

Fourth, this was the first meta-analysis on this topic and, therefore, the first time that subgroup analysis were able to estimate effects of study characteristics on the associations between stigma and healthcare utilisation. These sensitivity analyses demonstrated that studies with higher response rates and those that used face-to-face rather than questionnaire assessments showed stronger negative effects of stigma on healthcare utilisation (see Figure 3 in Study 1). Furthermore, the inspection of single study effects revealed an association between this two characteristics as studies with face-to-face assessments were more likely than studies with questionnaire assessments to report high response rates.

Overall, Study 1 added more robust and aggregated knowledge to the growing body of literature on associations between mental illness related stigma and healthcare utilisation. Our findings suggest that campaigns promoting healthcare utilisation by reducing stigmatising attitudes should address negative personal attitudes such as HelpA and PersonS. Unfortunately, we were not able to give credit to the entire complexity of mental illness related stigma in this meta-analysis, namely the cognitive-affective and the cognitive-behavioural components and their interrelations, because of the limited number of available studies. Furthermore, although it is often discussed that MHL, especially causal explanations, is an important influencing aspect of stigma, this was not studied so far in a general population sample in relation to healthcare utilisation and could therefore not be included in our meta-analysis. Thus, we addressed both topics in Study 2.

Study 2:

Schnyder, N., Michel, C., Panczak, R., Ochsenbein, S., Schimmelmann, B.G., & Schultze-Lutter, F. (submitted) Influence of knowledge about causes of mental disorders and stigma related to mental disorders on healthcare utilisation in a general population sample: a structural equation model.

Following up on the open questions and issues raised above, Study 2 investigated the influence of causal explanations for mental disorders on stigmatising attitudes, and of stigmatising attitudes on lifetime healthcare utilisation in the described general population sample. According to considerations about the need for treatment (see Introduction), we decided to include all persons who ever sought help for mental problems, regardless of their symptoms. Furthermore, healthcare utilisation included any semi-professional contact point incl. general practitioners because first contact points will often be the gate-keepers to professional help and referral to mental health professionals might dependent on them. The results of this study are based on cross-sectional data of an add-on study to the 'Bern Epidemiological At-Risk' (BEAR) study (Schultze-Lutter, Michel, Ruhrmann, & Schimmelmann, 2017), a random-selection representative general population telephone study (N=2683, aged 16-40 years). The telephone interview assessed socio-demographic variables, lifetime healthcare utilisation, and axis-I disorders. After completion of each interview, German-speaking participants (n=2519) were asked to fill out an add-on questionnaire about knowledge about mental illness, attitudes towards them and attitudes towards help-seeking. Of these, 1375 questionnaires were returned (see Figure 1 in Study 2 for recruitment procedure). The questionnaire was in accordance with the questionnaire used by the group of Angermeyer and colleagues (Angermeyer, Matschinger, & Corrigan, 2004) in Germany and started with an unlabelled case vignette describing a person with either major depression or schizophrenia, like the one at the beginning of this thesis. After reading the vignette, participants answered questions about potential causal explanations

for the condition described in the vignette, and about stigmatising attitudes towards the person described in the vignette as well as towards help-seeking for potential own mental problems.

Study 2 aimed to disentangle the complex interrelation between knowledge, stigma and behaviour using SEM. Given the theoretical background (see Introduction) and results of Study 1, we expected that causal explanations for mental illness will influence the perception of persons with mental illness as being 'unpredictable/dangerous' and the perception of treatment as being 'not embarrassing/comfortable' (cognitive-affective components of attitudes), which in turn influence WSD and help-seeking intentions (cognitive-behavioural components of attitudes). Furthermore, we expected the latter two to directly influence healthcare utilisation. SEM allowed us to consider relations between the stigma components and associations between causal explanations (see eFigure1 of Study 2 for the proposed model). It is important to note that, contrary to Study 1, we used positive attitudes toward help-seeking instead of negative attitudes towards help-seeking. This methodological decision, however, does not reduce the comparability of Study 1 and Study 2 since the assessed help-seeking attitudes are much alike and only differ in polarity (negative attitudes on one end of the scale, positive attitude on the other end of the scale). After removing non-significant associations and latent variables from the equation, we found two major pathways mostly confirming our hypotheses. One pathway stimulated own healthcare utilisation, and one impeded own healthcare utilisation.

As for the stimulating pathway, persons were more likely to use healthcare for their mental problems if they endorsed high psychosocial stress and low constitution/ personality related causal explanations that were associated with a more positive perception of help-seeking and more help-seeking intentions (HelpA) (see Figure 2 in Study 2). In line with Study 1, HelpA were associated with healthcare utilisation, yet the

role of causal explanations in this association that had not been studied before was surprising. According to research on attitudes towards persons with mental problems (Schomerus et al., 2014; Kvaale et al., 2013), we had expected that, along with other causal explanations, biogenetic causal explanations would influence HelpA. Yet, contrary to our expectations, biogenetic causal explanations played no role in the stimulating pathway. Rather, HelpA was associated with constitution/personality related and with psychosocial stress related causal explanations. Constitution/personality related causal explanations negatively influenced the perception of help-seeking as being pleasant and not embarrassing. Persons who believe mental illness to be caused by a weak will or by an immoral lifestyle had little positive HelpA. Moreover, psychosocial stress related causal explanations were positively associated with HelpA. Persons who believe mental illness to be caused by work-related stress or problems in the family, i.e. environmental factors, had more positive HelpA. The influence of psychosocial causal explanations on HelpA had not been demonstrated before, while the influence of psychosocial causal explanations on PersonS had already been reported (Lincoln, Arens, Berger, & Rief, 2008; Walker & Reader, 2002). Finally, partially supporting assumptions based on the theory of planned behaviour (Ajzen, 1991) that help-seeking intentions reflect actual healthcare utilisation, help-seeking intentions were a significant predictor of healthcare utilisation, yet the moderate strength of this association also indicated that they are not the same. Thereby positive help-seeking intentions were more frequent than active healthcare utilisation.

As for the impeding pathway, persons are less likely to use healthcare for their own mental problems when they endorsed high biogenetic and high constitution/personality related as well as low psychosocial stress related causal explanations leading to a stronger perception of individuals with a mental disorder being 'unpredictable/dangerous' and to an increased WSD towards this person (PersonS) (see Figure 2, Study 2). In this, our results suggest an only minor role of biogenetic causal explanations as opposed to

constitution/personality related or psychosocial stress related causal explanations on PersonS. Examining the effect of the vignette in sensitivity analyses, the global model was largely confirmed with the exception that (1) in the depression vignette model, the influence of biogenetic causal explanations on stigmatising attitudes disappeared, while (2) in the schizophrenia vignette model, the influence of WSD on healthcare utilisation disappeared.

Additionally, we were able to show that the different aspects of stigmatising attitudes were associated. Perceiving a person with a mental illness as unpredictable/dangerous increased the WSD, while perceiving help-seeking as 'not embarrassing/pleasant' increased help-seeking intentions. This finding is supported by an earlier stated 'synergistic' relationship between components of stigmatising attitudes (Maio & Haddock, 2015) and earlier findings in the field of mental illness related stigma (Lee et al., 2014; Schomerus et al., 2014). Surprisingly, however, perceiving a person with a mental illness as 'unpredictable/dangerous' enhanced own help-seeking intentions. This finding was only reflected in the schizophrenia vignette model in the sensitivity analyses. Contrary to this finding and our expectation (Schomerus et al., 2009; Yap, Wright, & Jorm, 2011), a strong WSD was not directly associated with help-seeking intentions but increased the perception of help-seeking as 'embarrassing/unpleasant', which, in turn, decreased help-seeking intentions.

Study 2 revealed two pathways between causal explanations, stigmatising attitudes and healthcare utilisation, thereby both supporting and expanding existing knowledge. Our results might be incorporated in future, even more comprehensive studies on the associations between MHL, stigma, and healthcare utilisation. Furthermore, they will help to plan future mental health campaigns that aim to facilitate (early) healthcare utilisation. The two pathways were largely independent of the clinical picture illustrated in the two

vignettes as well as of sociodemographic and clinical characteristics of participants.

Nevertheless, subgroup analyses revealed some disorder specific associations that might

also in future inform disorder-specific studies and mental health campaigns.

Discussion and Future Directions

This PhD thesis provides more robust knowledge on the association between mental illness related stigma, one of the most important barriers to healthcare utilisation, and healthcare utilisation. Furthermore, it expanded existing literature on the interrelations between MHL, stigmatising attitudes, and healthcare utilisation. Focussing on the general population rather than on clinical samples, this work was able to avoid potential selection biases inherent to patient samples and provide insights directly relevant to mental health campaigns promoting (early) healthcare utilisation in the general population. This section will discuss the main findings in the light of earlier studies and social psychological research and theories. Furthermore, it will make suggestions for future studies and for campaigns promoting healthcare utilisation via improving MHL and stigmatising attitudes.

In the light of earlier studies (see Introduction), five main findings are particularly noteworthy: First, negative PersonS reduce, while positive HelpA increase own healthcare utilisation (Study 1 and Study 2). The effect of PersonS was slightly (Study 1) or considerably weaker (Study 2) than the effect of HelpA on healthcare utilisation and completely disappeared when only the schizophrenia vignette was considered. This was surprising, as in light of the reported higher WSD towards person with schizophrenia compared to persons with depression (Angermeyer et al., 2004), a stronger impact of WSD on healthcare utilisation could have been expected in the schizophrenia vignette subgroup. A possible explanation for this finding is that symptoms of schizophrenia or psychotic disorders are with a lifetime prevalence of 3.5% (Perälä, 2007) much rarer than symptoms of depression with a lifetime prevalence of 16.6% (Kessler et al., 2005). Symptoms of schizophrenia might therefore be strange and inexplicable for an average person and perceived as decidedly different from any 'normal' state of mind. Symptoms of depression on the other side might be more comprehensible because individuals are more familiar

with them, they are closer to a 'known' state of mind and more likely perceived as lying on an extreme end of a continuum. Endorsing continuum beliefs of mental illness was associated with a smaller WSD (Makowski et al. 2017). Thus, in line with the assumption that a strong separation between "us", the "healthy and normal", and "them", the "ill and unpredictable" (Markowski et al. 2017), a high WSD towards a person with strange psychotic symptoms who is less likely perceived as "one of us" might have a weaker influence on own behaviour than a high WSD towards a person with more comprehensible depressive symptoms who is likely still perceived as "one of us".

Study 2 reinforced the finding of Study 1 that HelpA (incl. help-seeking intentions) are equally, if not more important determinants of healthcare utilisation compared to PersonS, although so far being less focussed in mental healthcare campaigns (Henderson, Evans-Lacko, & Thornicroft, 2013; Mehta et al., 2015; Thornicroft et al., 2016). The theory of planned behaviour (Ajzen, 1991) postulates a strong association between attitudes towards a behaviour, the intention to perform the behaviour, and the behaviour itself. It has been successfully used as a conceptual framework in health behaviour research (Cooke, Dahdah, Norman, & French, 2016; McDermott et al., 2015; Starfelt & White, 2016) and related campaigns. In light of this, it is surprising that campaigns promoting healthcare utilisation by reducing stigmatising attitudes have paid rather little intention to HelpA as a crucial "starting-point" on the behaviour path to healthcare utilisation.

PublicS and SelfS did not influence healthcare utilisation in our meta-analysis (Study 1). Results of SelfS, however, should be interpreted with caution since most studies only used a single item to assess this stigma type and the pooled effect only just failed level of significance. One methodological explanation of this finding is that a single item might not be enough to assess the complexity of SelfS. Another is that SelfS requires the presence of mental problems or disorders in order to develop and, consequently, its true effect might

not be revealed in general population studies in that most persons will not suffer from mental problems. Thus future studies should include more comprehensive measures of SelfS and examine the effects of SelfS in relation to the presence of mental problems.

When assessing associations between mental illness stigma and healthcare utilisation, Studies 1 and 2 underscored earlier findings on the importance to distinguish between different aspects of stigma (Eisenberg et al., 2009; Vogt et al., 2014). We showed that especially personal attitudes, such as PersonS and HelpA, influence own healthcare utilisation, while the perception of stigmatising attitudes of others (PublicS) failed to do so. Second, although stigmatising attitudes are distinct and differentially influence healthcare utilisation, they are nevertheless associated. A surprising interrelation was that perceiving a person with a mental illness as 'unpredictable/dangerous' enhanced help-seeking intentions. In the sensitivity analyses according to the vignette (Study 2), this finding was specific to the schizophrenia vignette model. This indicates that this association might depend on the strength of the perceived unpredictability/dangerousness that is commonly stronger in schizophrenia than in depression (Angermeyer et al., 2004; Angermeyer, Holzinger, & Matschinger, 2010). Participants express a stronger intention to seek help for mental problems because they might want to prevent the development of psychotic symptoms that, in their perception, could come along with unpredictability/dangerousness. Contrary to our expectation (Schomerus et al., 2009; Yap et al., 2011), a strong WSD was not directly associated with help-seeking intentions but mediated by the perception of help-seeking as 'embarrassing/unpleasant'. Since Study 2 was the first study to examine stigmatising attitudes in this complexity using a SEM approach, future studies have to be replicate and further extend these finding before we can draw concrete conclusions. A simple explanation might be, that the WSD towards persons with mental disorder is transferred to metal healthcare services and, consequently, contact with these is assumed to be unpleasant. Along the same line of argument, the perceived

unpredictability/dangerousness of persons with mental illness that feeds WSD might be extended to mental health professionals who frequently share the poor image of their clientele (Möller-Leimkühler, Möller, Maier, Gaebel, & Falkai, 2016; Nesseler, 2011).

Third, to detect stigmatising attitudes in the population, the mode of assessment might not be as important as earlier stated (Krumpal, 2013). Earlier, questionnaires were assumed to be more suitable to assess social taboos such as stigmatising attitudes (Krumpal, 2013). Study 1, however, indicated that face-to-face assessments were associated with a stronger negative effect of stigma on healthcare utilisation than questionnaire assessments. If this is generally true, the already impressive effects of stigmatising attitudes on healthcare utilisation of Study 2 might only give a lower estimate of their real importance, thus underlining the need for more research in order to more efficiently fight stigma. Additionally, studies with higher response rates showed stronger negative effects of stigma on healthcare utilisation. Since higher response rates reduce potential non-responder bias (Asch, Jedrziewski, & Christakis, 1997), results of these studies might be more reliable (Baruch & Holtom, 2008). The inspection of single study effects revealed that a higher percentage of studies with face-to-face assessments than of questionnaire assessments reported high response rates. We therefore concluded that a potential sampling bias associated with lower response rates might play a more important role in detecting associations between stigma and healthcare utilisation than the mode of assessment. In light of this, Study 2 with its high response rates will likely have delivered a realistic picture.

Fourth, regarding factors potentially influencing stigmatising attitudes, we studied knowledge about causal explanations of mental illness as an important part of MHL. Unexpectedly, although a main focus of earlier studies (Kvaale et al., 2013), biogenetic causal explanations were not the strongest predictor of PersonS and not predictive of

HelpA. Rather, psychosocial and constitution/personality related causal explanations seem to be most important. This supports earlier notions of Jorm and Griffiths (2008) and Yap and colleagues (2013) who had pointed out the important role of personal weakness, one of the main factors of our latent variable 'constitution/personality', in relation to stigmatising attitudes. Earlier results on the association between psychosocial causal explanations and stigmatising attitudes had inconsistently reported either a favourable influence on stigmatising attitudes towards individuals with schizophrenia (Lincoln et al., 2008) or no influence in relation to individuals with an unspecific mental illness (Walker & Read, 2002). Our results suggest that psychosocial or constitution/personality related causal explanations should move more into focus when both assessing determinants of stigmatising attitudes and planning anti-stigma campaigns. Furthermore, the differential role of biogenetic causal explanations in the two vignettes indicates the need for more disorder-specific stigma studies and campaigns and might support tailoring psychoeducation about specific disorders in the clinical practice in a way that avoids self-stigmatisation.

Fifth, although closely associated as assumed by the theory of planned behaviour (Ajzen, 1991), intentions to seek help in the hypothetical case of own mental problems cannot be equalled to actual behaviour (Study 2). While most persons would recommend seeking professional help for mental problems (Holzinger, Matschinger, & Angermeyer, 2011) or report intentions to seek help for potential own mental health problems (Lally et al.,2013), a much lower proportion actually engage in it (Wang et al., 2007) resulting in the large treatment gap in mental disorders (Wittchen et al., 2011). Studies assessing the influence of stigmatising attitudes on help-seeking should therefore focus actual behaviour rather than mere intentions.

Several suggestions for future research and for future campaigns promoting mental healthcare result from these five main findings that will be described in the following.

Future Studies

Multiple direct associations between healthcare utilisation and stigmatising attitudes (i.a. Study 1 and Study 2) as well as other barriers to healthcare utilisation, such as 'low perceived need' (Andrade et al., 2014; Mojtabai et al., 2011) or the 'preference to handle the problem on one's own' (Adler et al., 2015; Chen, et al., 2013; Gulliver et al., 2010; Mojtabai et al., 2011), had already been studied and described. They were commonly studied separate of each other so that their interrelation is still unknown. For example, persons might want to handle the problem on their own because of their own stigmatising attitudes towards individuals with mental. Another example might be that they do not perceive a need for treatment because they expect the problems to disappear spontaneously and, meanwhile, do not want to risk being unnecessarily stigmatised themselves. Furthermore, if persons do not belief that the available treatment is helpful, they might rather prefer to handle the problem on their own or do not perceive a need for treatment. Studies on such interrelations are wanted to understand the relationship between different barriers to healthcare utilisation or to detect potential subgroups of persons at risk to delay or completely avoid healthcare utilisation in case of mental problems.

Most studies of the association between mental illness related stigma and healthcare utilisation, including our Study 2, refer to the theory of planned behaviour (Ajzen, 1991) as the rationale for studying help-seeking intentions as a proxy for healthcare utilisation, i.e., for the assumed strong association between intentions and behaviour. The theory of planned behaviour postulates that human behaviour is guided by intentions towards this behaviour, which in turn is influenced by attitudes toward the behaviour, subjective norm and perceived behavioural control (Ajzen, 1991). Subjective norm is understood as the

perceived social pressure to engage in a behaviour. Perceived behavioural control is understood as persons' perception of their ability to engage in a given behaviour, i.e. self-efficacy. The theory of planned behaviour was supported in many domains of behavioural health-related research both cross-sectionally (Ajzen, 2015; Hagger, Chatzisarantis, & Biddle, 2002; Sheeran & Taylor, 1999) and prospectively (McEachan, Conner, Taylor, & Lawton, 2011). But strictly speaking and to the best of my knowledge, theory of planned behaviour was not examined in the field of mental healthcare utilisation and only recently informed first studies in this field (Russo, Stochl, Croudace, Graffy, Youens, Jones, & Perez, 2012; Russo, Stochl, Painter, Shelley, Jones, & Perez, 2015). More frequently, this theory had been successfully applied in the related field of health behaviour studies that aimed to identify antecedents of health behaviours and design effective interventions (Cooke et al., 2016; McDermott et al., 2015; Starfelt & White, 2016). Thus, the theory of planned behaviour might well inform studies on the similar questions of antecedents of health care utilisation for mental problems as an extension of traditional "health behaviour". Future studies involving this theory on the background of mental health incorporating perceived behavioural control and subjective norm along with attitudes towards help-seeking and towards persons with mental illness are therefore required.

Regarding the measurement of stigma, explicit measures of stigmatising attitudes, such as applied in questionnaire studies where the person indicates explicit agreement to a stigmatising statement, might not be most appropriate. Persons might not be able to access their attitude because it is not open to introspection, or they might want to hide it because it is not socially desirable (Fazio & Olson, 2003; Greenwald & Banaji, 1995). One possibility to overcome this problem are implicit measures, such as the implicit association test, that is applied on the computer (Greenwald, McGhee, & Schwartz, 1998). With the wide accessibility of modern technology, however, computer based studies on mental illness stigma using such implicit measures in a large general population samples appear well

feasible and would increase the so far limited knowledge on implicit mental illness related attitudes (Hinshaw & Stier, 2008). Yet, in other domains of behaviour research, implicit attitudes were mainly associated with impulsive behavioural responses, while explicit attitudes were mainly associated with controlled and elaborated behavioural responses (Fazio & Towles-Schwen, 1999; Friese, Hofmann, & Wänke, 2008; Starck & Deutsch, 2004). As the decision to seek help for a mental problem is most probably the result of elaborated cognitive effort, the significance of implicit attitudes for healthcare utilisation might thus be questionable.

Furthermore, longitudinal studies on the association between causal explanation and mental illness related stigmatising attitudes in predicting future healthcare utilisation in general populations are rare (Study 1). Yet, past healthcare utilisation might shape persons' attitudes towards help-seeking or towards individuals with mental illness including themselves and, thus, might only have limited relevance to first healthcare utilisation for mental problems. As another sensitivity analysis of Study 1, that only based on few studies and was therefore not reported as one of the main findings before, indicates, the association between stigmatising attitudes and future healthcare utilisation might be unclear (see Figure 3 in Study 1). Therefore, more longitudinal studies on this topic are clearly required.

Future Campaigns and Interventions

Anti-stigma interventions and campaigns involve education/information about mental illness and/or social contact with the stigmatised group. Despite the variety of methodological approaches to reduce stigma in the population and in target groups, these interventions generally reduce stigmatising attitudes in the short- and medium term (Corrigan et al., 2015; Mehta et al., 2015; Thornicroft et al., 2014; Thornicroft et al., 2016). It is unclear, however, if these improvements translate into increased healthcare utilisation;

this outcome should be targeted in future interventions or campaigns and their evaluation (Thornicroft et al., 2016). Moreover, most efforts targeted the reduction of PersonS. If the ultimate aim of these interventions is to facilitate (early) healthcare utilisation via a reduction of stigmatising attitudes, the results of this PhD thesis in light of the theory of planned behaviour (Ajzen, 1991) indicated that HelpA should be additionally targeted. The need for improving the image of psychiatry in order to fight the unmet needs of mental health treatments has recently been addressed by the European Psychiatric Association as part of its Guidance projects (Bhugra et al., 2015; Möller-Leimkühler et al., 2016). Yet, public campaigns to this aim were not in the focus of the recommendation, likely for lack of sufficient knowledge about influencing factors of stigmatising attitudes such as causal explanations. Study 2 indicated that causal explanations related to the person, such as constitution/personality and biogenetics, reinforce stigmatising attitudes while environmental explanations, such as psychosocial, reduce stigmatising attitudes. Yet, mental disorders might be caused by person-related and environmental factors to different degrees and, consequently, treatment options differ. Campaigns improving MHL should communicate these facts along with treatment success rates and should emphasise that symptoms can be improved, regardless of their cause, thus conveying a positive image of psychiatry (Möller-Leimkühler et al., 2016).

Contrary to the positive short- and medium-term effects of public campaigns, long-term changes in stigmatising attitudes seem to be more difficult to achieve (Thornicroft et al., 2016) and, according to the elaboration likelihood model (Petty & Cacioppo, 1986), depend on the motivation of the person to process arguments that contradict own attitudes. This motivation is determined by the perceived personal relevance of the message (Petty, Cacioppo, & Schuman, 1983; Petty, Briñol, & Priester, 2009). Therefore, campaigns that aim to achieve an enduring change of recipients' attitudes should first try to increase their motivation to process the message by increasing the personal relevance of the message

(Petty et al., 2009). Personal relevance can be enhanced by linking the message to aspects of the self, such as personal values or a personal outcome (Briñol & Petty, 2006); and even simply changing the pronouns of a message from 'one' or 'she and he' to 'you' can increase personal involvement and processing of the arguments (Burnkrant & Unnava, 1989). Thus, relating to social psychology that has a long history of research on changing attitudes and related behaviour might again improve future research and campaigns addressing mental health.

   In countries such as Australia, Germany, Norway, UK, and New Zealand efforts to improve public's mental health has a longer tradition than in Switzerland; and several national and regional awareness and anti-stigma campaigns targeted at the general population were realised and evaluated (Gaebel, Zäske, Baumann, Klosterkötter, Maier, Decker, & Möller, 2008; Jorm et al., 2005; Kitchener & Jorm, 2002; Paykel, Hart, & Priest, 1998; Søgaard & Fønnebø, 1995; Thornicroft et al., 2014). In Switzerland, the prevention and early intervention of non-communicable disease, including mental illness, came stronger into focus of politics in 2012 when agents at federal, cantonal, and non-governmental level decided to work closer together to improve population's mental health. According to a first national report aiming to determine goals to promote mental health in Switzerland, improvement of population's knowledge and de-stigmatisation are listed as one out of four main fields of action (Bundesamt für Gesundheit, 2015). This was an important step for the promotion of the Swiss population's mental health and includes university research of prevention and early detection of mental problems as well as evaluation of ongoing campaigns (Bundesamt für Gesundheit, 2015). As a researcher and all the more as a member of the Swiss community, I am glad to see these national developments towards a better mental health and will do my best to take an active part in it. This PhD thesis is my first step towards this aim.

Table 1

Different aspects of mental illness related stigmatising attitudes

Stigma type	Explanation	Examples	
		cognitive-affective component	cognitive-behavioural component
Public Stigma	Population's negative attitudes towards a person with a mental illness.		
Perceived Public Stigma (PublicS)	Perceptions of an individual about the stigmatising attitudes of others or the majority of the population.	*I think that most others think that an individual with a mental illness is unpredictable.*	*I think that most others would not let a person with a mental illness babysit their children.*
Personal Stigma (PersonS)	Personal stigmatising attitudes toward a person with a mental illness.	*I think that persons with a mental illness are unpredictable.*	*I would not let a persons with a mental illness babysit my child (wish for social distance).*
Self-stigma (SelfS)	An individual affected with a mental illness considers stigmatising attitudes to be self-relevant and beliefs to be a devaluated member of society.	*I am unpredictable because of my mental illness.*	*I might not be capable to babysit children because of my mental illness.*
Attitudes towards mental health help-seeking (HelpA)	Personal stigmatising attitudes towards mental health professionals, toward mental health institutions, and perception of helpfulness of offered or sought help.	*I feel embarrassed talking to a professional about my mental problems.*	*In case of a mental illness, I would not seek help with a professional.*

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Statement of authorship

I hereby certify that this doctoral thesis has been composed by myself, and describes my own work, unless otherwise acknowledged in the text. All references and verbatim extracts have been quoted, and all sources of information have been specifically acknowledged. The work has not been accepted in any previous application for a degree. I am aware that otherwise, according to the article 36(1)(o) of the law of the 5th of September 1996, the senate is entitled to withdraw the title obtained by the present thesis.

Bern, September 2017   Nina Schnyder

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Journal Articles

Review article

Association between mental health-related stigma and active help-seeking: systematic review and meta-analysis

Nina Schnyder, Radoslaw Panczak, Nicola Groth and Frauke Schultze-Lutter

Background
Mental disorders create high individual and societal costs and burden, partly because help-seeking is often delayed or completely avoided. Stigma related to mental disorders or mental health services is regarded as a main reason for insufficient help-seeking.

Aims
To estimate the impact of four stigma types (help-seeking attitudes and personal, self and perceived public stigma) on active help-seeking in the general population.

Method
A systematic review of three electronic databases was followed by random effect meta-analyses according to the stigma types.

Results
Twenty-seven studies fulfilled eligibility criteria. Participants' own negative attitudes towards mental health help-seeking

(OR = 0.80, 95% CI 0.73–0.88) and their stigmatising attitudes towards people with a mental illness (OR = 0.82, 95% CI 0.69–0.98) were associated with less active help-seeking. Self-stigma showed insignificant association (OR = 0.88, 95% CI 0.76–1.03), whereas perceived public stigma was not associated.

Conclusions
Personal attitudes towards mental illness or help-seeking are associated with active help-seeking for mental problems. Campaigns promoting help-seeking and fighting mental illness-related stigma should target these personal attitudes rather than broad public opinion.

Declaration of interest
None.

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Mental disorders are the leading cause of disability worldwide, accounting for 23% of all non-fatal burden.[1] Approximately 38% of the EU population experience a mental disorder each year,[2] causing significant societal costs, estimated at €453 billion in Europe in 2010; in the USA costs were $300 billion in 2002–2003.[3,4] Mental disorders are treatable and potentially preventable.[5–7] However, help-seeking is often delayed or completely absent.[8] The low treatment rate further aggravates burden and costs,[9] as untreated individuals are more likely to experience problematic interpersonal and family functioning and have lower life expectancies.[10–13] Prevention of mental disorders through early intervention and the encouragement of help-seeking are major challenges for public health.[14,15] However, several factors influence help-seeking for mental health problems. Desire to handle the problem on one's own, low perceived need, low mental health literacy and financial factors are associated with a reduction in help-seeking.[16–20] Negative and stigmatising attitudes towards mental illness, and towards help-seeking and people with mental illness, further referred to as stigma, are other important barriers to help-seeking.[21–27]

Commonly, four stigma types that influence help-seeking can be distinguished: perceived public stigma (PublicS), personal stigma (PersonS), self-stigma (SelfS) and attitudes towards help-seeking (HelpA). PublicS and PersonS are two types of public stigma (also referred to as social or enacted stigma), defined as the stigmatising perception about a person who has a mental illness endorsed collectively by members of the general population.[22,28–31] More specifically, PublicS is understood to be the individual's perception of public stigma,[22] as measured by Link's Perceived Devaluation Discrimination Scale;[32] PersonS, on the other hand, describes personal attitudes towards members of a stigmatised group,[29,33–37] and can find a behavioural expression in the desire for social distance.[38] When these two types of public stigma were compared, endorsement of PublicS was substantially higher than PersonS.[33]

SelfS (also called internalised or anticipated stigma) occurs when an individual affected by a mental illness endorses stereotypes about mental illness, anticipates social rejection, considers stereotypes to be self-relevant and believes himself or herself to be a devalued member of society.[28–30,39–42] HelpA includes the perception of a need for help, stigma tolerance associated with seeking such services, openness regarding one's problems and confidence that the help will be of assistance.[43] Overall, stigma is a multifaceted concept and has, therefore, been measured with a variety of instruments.[28,44]

Recent reviews of the influence of mental health-related stigma on help-seeking have reported that stigma, in particular SelfS and HelpA, had negative effects on help-seeking.[21–27] Many of these studies did not distinguish between intended or recommended and active help-seeking, thereby referring to the Theory of Planned Behaviour,[45] which proposes that intentions correlate strongly with behaviour.[46] In practice, however, although most people would recommend seeking professional help for mental problems,[47] or report an intention to seek help when affected by mental problems themselves,[48] a considerably lower proportion actually sought it.[8] Stigma might be one reason for not putting help-seeking intentions into action. However, only active help-seeking will reduce the burden of the disorder. We conducted, for the first time, a systematic review and meta-analysis to estimate the association of the four types of stigma with active help-seeking in the general population. Additionally, we estimated the role of potential moderating study characteristics such as sample source or response rate.

Method

Our systematic review and meta-analysis was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (see online

supplement DS1).[49] Inclusion and exclusion criteria were specified and documented in advance by F.S.L. and N.S. (see online supplement DS2). We included only studies with general population rather than clinical samples to reduce potential selection bias towards active help-seeking. Quantitative, cross-sectional or longitudinal surveys examining the impact of at least one of the four stigma types on actual help-seeking were eligible. We searched three electronic databases (PubMed, PsycINFO and EMBASE) with no language restriction. The last search was carried out on 10 July 2015. Potentially relevant studies published in peer-reviewed journals since 1990 were identified using keywords (adapted to the respective database) related to mental disorder AND stigma AND help-seeking (see online supplement DS3 for full search strategies and details of keywords). We also scrutinised the reference lists of relevant papers,[21–27] and contacted expert researchers for potential additional studies.

Study selection and data extraction

We screened the titles and abstracts of all studies that met the search criteria and then consulted the full text to determine eligibility. We revised the data extraction sheet during the extraction process until it was applicable to all studies. Authors N.S. and N.G. extracted data independently, with potential disagreements resolved by discussion with F.S.L.. Authors of eligible studies were contacted for additional information or missing data, if necessary. We extracted the following information:

(a) publication details: author, year of publication, location and time of survey, setting and design;

(b) source of study population: general population sample (GPS) or subgroups of GPS such as students or military personnel (further referred to as selective GPS samples), total number of survey participants, number of participants used in analyses, random selection and representativeness;

(c) stigma measure: scale/items, reliability of scale and classification into one of the five stigma types – four specific stigmas, and 'general stigma' (GenS) for studies that did not survey a distinct stigma but combined more than one type into a single variable;

(d) help-seeking time-frame: help-seeking within the past 12 months v. lifetime help-seeking;

(e) statistical method;

(f) results: effect size of association with corresponding confidence interval or coefficient of association with corresponding standard error and covariates.

If a study reported more than one stigma type, we extracted all of them. We used estimates from the fully adjusted models. We recorded the direction of the stigma measure (e.g. higher scores indicate more stigma) and its range, as well as the direction of the association. Finally, we rated the quality of reporting according to the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement,[50] with a higher number of reported items representing a higher quality score.

Statistical analysis

The odds ratio (OR) for stigma effect on help-seeking was the main outcome. We calculated ORs and 95% confidence intervals if only regression coefficients and standard errors (s.e.) were provided. We combined ORs in random effect meta-analyses. We conducted separate meta-analyses for each stigma measure to detect their independent effect on help-seeking. ORs of studies reporting lower levels of stigma increasing (rather than higher

levels of stigma decreasing) the odds of help-seeking were inversed.[51] Heterogeneity was assessed using the I^2 statistic; this provides information about the percentage of total variation across individual studies that cannot be explained by chance.[52] Values range from 0% to 100%, with higher values showing an increase in heterogeneity: 25%, 50% and 75% have been commonly used to represent low, moderate and high heterogeneity, respectively.[52] We additionally examined the heterogeneity using τ^2 statistics. Unlike I^2, τ^2 is not affected by the number of participants included in the meta-analysis.[53] Its values range from 0 to infinity, with higher values indicating higher heterogeneity. Values of 0.04, 0.16 and 0.36 have been commonly used to represent low, moderate and high heterogeneity, respectively.[54] We assessed bias of small study effects with funnel plots and Egger's test.[55] Subgroup analyses were pre-specified to investigate whether effects of stigma on help-seeking depended on specific study characteristics. We stratified analyses according to study population (GPS v. selective GPS sample), time of help-seeking (within the past 12 months v. lifetime), survey period (before 2006 v. 2006 and after), response rate ($<70\%$ v. $\geqslant70\%$), quality of reporting (higher v. lower quality based on the median STROBE checklist score, with studies scoring 25 or above deemed higher quality) and setting (questionnaire v. interview). We defined two stratifications post hoc according to healthcare systems – private (USA) v. state-involved (other countries) – and study design (cross-sectional v. prospective). Stratification was only conducted if more than one study per group was found. All statistical analyses were done in Stata version 14 (Stata Corporation, College Station, Texas, USA).

Results

We identified 7968 papers in the initial search of databases and the reference lists of previous reviews (Fig. 1).[21–27] After removing 1163 duplicates we screened the titles and abstracts of 6805 potentially eligible studies. We assessed the full text of 201 articles. We contacted authors of nine studies for additional data, five of whom responded and their findings were thus included. One of the studies with missing data provided data for only one stigma type,[56] and was therefore only partially included. Two were excluded owing to missing data. One study used robust standard errors (RSE), did not report CIs, and the authors were not able to provide parametric standard errors or confidence intervals. This study was excluded because the calculation of confidence intervals from RSEs leads to different results from those when standard errors are used. One study reported a lower CI limit equal to the estimate;[64] we assumed it to be a rounding problem and with lack of an author response used data 'as is'. A final total of 27 studies were included in the meta-analyses.[16,33,56–80]

General study characteristics

Altogether, the 27 studies included 31 677 participants aged 15 years or older. They included GPS (13 studies) or subsamples of non-clinical GPS (14 studies). Four studies used a prospective design. All studies but one, from Singapore,[75] were conducted in Western societies (Europe, Australia or USA). Included studies investigated at least one of the four types of stigma, but varied greatly in their assessment (online supplement DS4). Thirteen assessed PublicS, with six of them using the Perceived Devaluation Discrimination (D-D) Scale,[32] or its adaptation.[81] Of the six studies that investigated PersonS, two used a social distance scale and two employed an adaptation of the D-D scale ('most people' replaced with 'I'). Three of the five studies investigating SelfS used a single-item assessment. Four of the 13 studies investigating
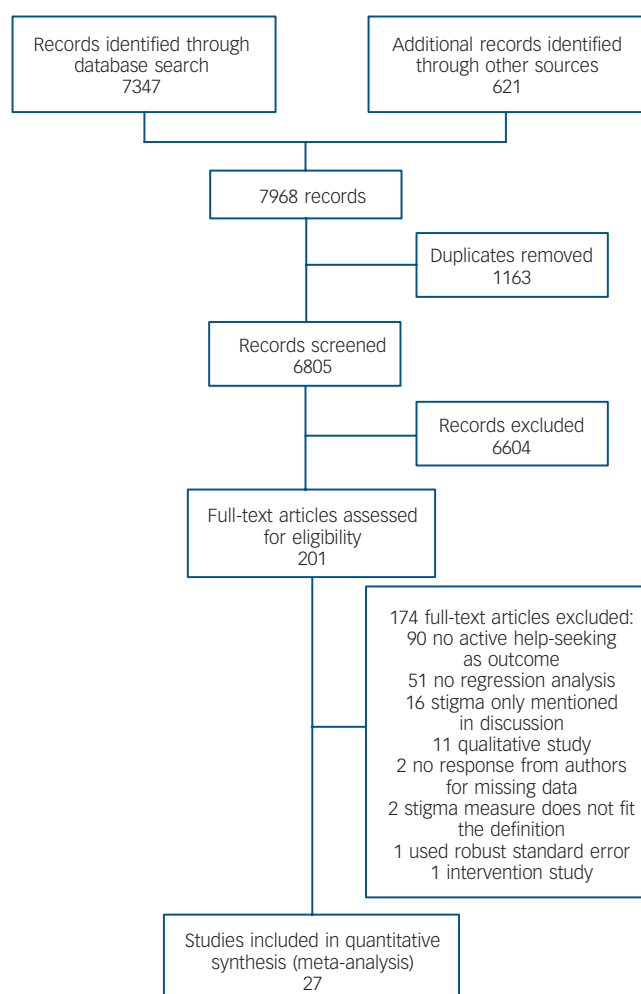
Fig. 1 PRISMA flowchart of selection of eligible studies, with reasons for full-text exclusion.

HelpA used Fischer's Attitudes Towards Seeking Professional Psychological Help scale,[43] and two used a single item scale. Seven studies used a non-specific general stigma measure (see online Table DS1). All studies reported help-seeking from a formal, professional source such as a psychiatrist, psychotherapist or general practitioner. Only one study also investigated informal, lay sources of help, such as family or a priest. To improve the homogeneity of our outcome measure we only extracted data for formal, professional sources. Twenty studies reported recent help-seeking (within the past 12 months), seven reported lifetime help-seeking and one study reported both.[64] From the latter we extracted only data for lifetime help-seeking.

Influence of stigma type on help-seeking

Figure 2 shows the results of the five random effect meta-analyses for each of the stigma types, as well as general stigma. Negative HelpA (OR = 0.80, 95% CI 0.73–0.88) and higher PersonS (OR = 0.82, 95% CI 0.69–0.98) were associated with less active help-seeking for mental health problems. Higher SelfS (OR = 0.88, 95% CI 0.76–1.03) showed an indication of less active help-seeking, but the results were not statistically significant. PublicS (OR = 0.97, 95% CI 0.93–1.02) and the unspecific GenS (OR = 0.98, 95% CI 0.84–1.15) were not associated with active help-seeking. There was substantial between-study heterogeneity in each of the meta-analyses, with I^2 ranging from 58% for PublicS to 91% for PersonS. Between-study variance τ^2, by

contrast, was low to moderate,[81,82] ranging from 0.003 for PublicS to 0.044 for PersonS. Only HelpA showed evidence of small-study bias (Egger's test, $P < 0.01$; all other stigma measures $P > 0.294$; see online figure DS1 for funnel plots and P values).

Subgroup analyses

The stratified meta-analyses for the most part did not demonstrate any major influence of study characteristics (Fig. 3; online supplement DS5). Associations between HelpA and help-seeking were weakly influenced by type of study population, time of help-seeking, setting, response rate, design and quality of reporting. We found stronger negative associations in surveys with random v. selective general population samples, recent v. lifetime help-seeking, personal assessments v. questionnaires, higher v. lower response rates, prospective v. cross-sectional design and lower v. higher reporting quality. Associations between SelfS and help-seeking were weakly influenced by study setting, survey period and response rate. We found stronger negative associations in surveys with personal assessments v. questionnaires, those conducted before v. after 2006, and with higher v. lower response rates. There was a small effect of year of study publication on the association between GenS and help-seeking, with older studies reporting slightly stronger effects. Associations between PersonS and help-seeking were weakly influenced by study design, with cross-sectional studies reporting negative associations whereas prospective studies did not report significant associations. Stratification by the country's type of healthcare insurance did not show any effect. Results of stratified analyses of PublicS and PersonS were robust across all the investigated strata. A decline in between-study heterogeneity was observed in some stratification analyses. None of the stratification analyses could fully explain the observed heterogeneity in all of the associations between stigma types and help-seeking.

Discussion

Our results confirm the notion that stigma related to mental illness or mental health services is directly associated with less active help-seeking for mental problems in the general population. The strength of association depends on the type of stigma, rather than being the case for stigma in general. We found associations between less active help-seeking and participants' levels of HelpA and PersonS. SelfS showed insignificant associations. PublicS and unspecific GenS showed no association. These findings are in line with social psychological studies demonstrating that attitudes towards a behaviour are associated with engaging in the behaviour itself in other situations.[84] Persons with pronounced PersonS might try to avoid contact with the stigmatised group,[85–87] and therefore refrain from help-seeking. PublicS and SelfS failed to show significant associations, but both pointed to the expected direction of more stigma predicting less active help-seeking. The majority of studies surveying SelfS used a single item asking about a person's embarrassment when thinking about help-seeking for his or her mental health problems. Even though embarrassment/shame seems to be a barrier to help-seeking intentions,[88] it is unclear whether this facet of SelfS can fully capture this stigma type.[89] Although a recent systematic review found a small association between SelfS and help-seeking (intentions/recommendations and active),[21] the influence of SelfS on active help-seeking in the general population needs further exploration. To assess stigma related to mental illness and its impact on help-seeking, future studies using GenS might also consider assessing one of the more specific stigma types.

Although the four stigma types revealed independent effects on help-seeking, they are interrelated.[66,90–94] Self-stigma seems

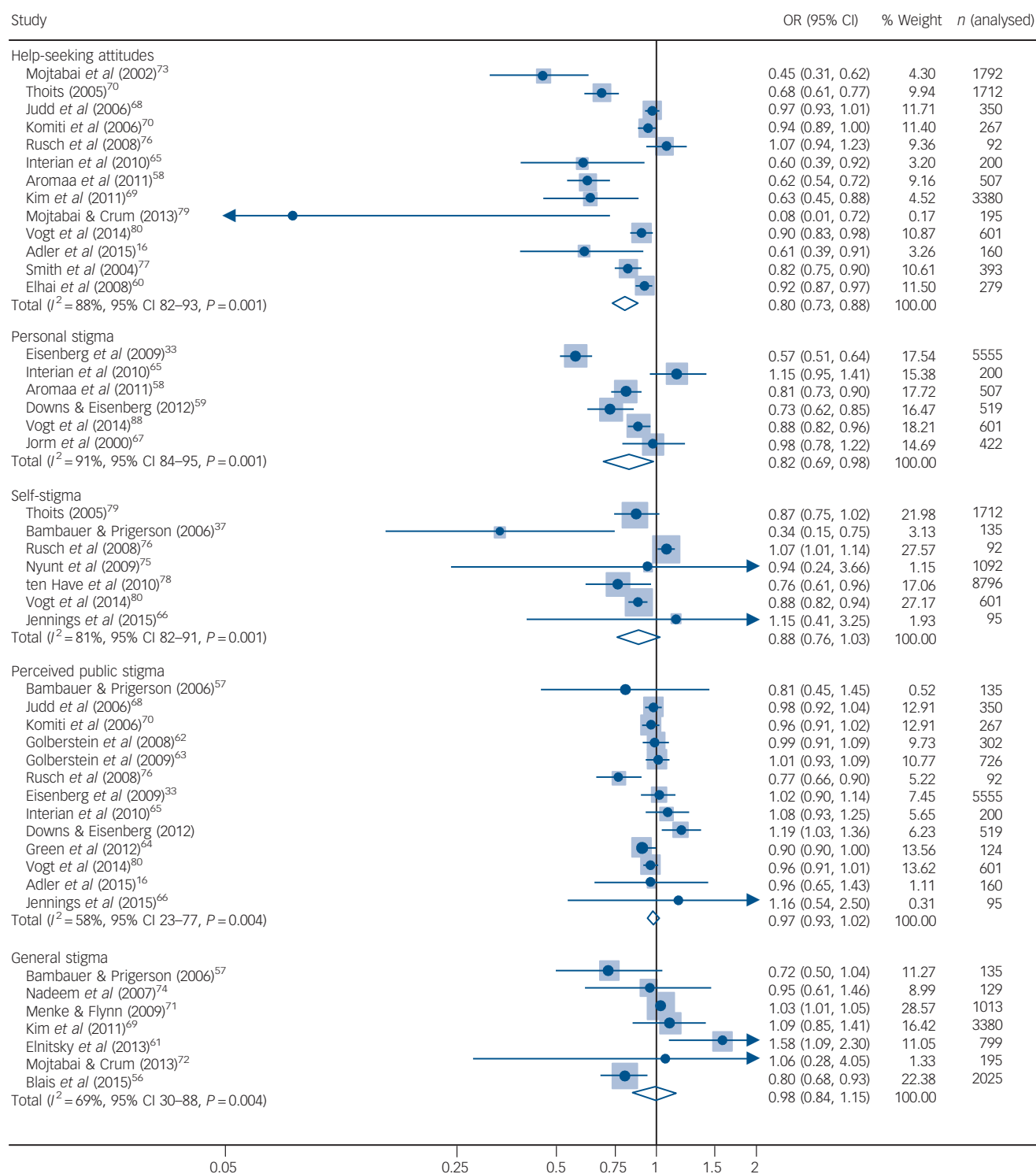| Study	OR (95% CI)	% Weight	n (analysed)
Help-seeking attitudes			
Mojtabai et al (2002)[73]	0.45 (0.31, 0.62)	4.30	1792
Thoits (2005)[70]	0.68 (0.61, 0.77)	9.94	1712
Judd et al (2006)[68]	0.97 (0.93, 1.01)	11.71	350
Komiti et al (2006)[70]	0.94 (0.89, 1.00)	11.40	267
Rusch et al (2008)[76]	1.07 (0.94, 1.23)	9.36	92
Interian et al (2010)[65]	0.60 (0.39, 0.92)	3.20	200
Aromaa et al (2011)[58]	0.62 (0.54, 0.72)	9.16	507
Kim et al (2011)[69]	0.63 (0.45, 0.88)	4.52	3380
Mojtabai & Crum (2013)[79]	0.08 (0.01, 0.72)	0.17	195
Vogt et al (2014)[80]	0.90 (0.83, 0.98)	10.87	601
Adler et al (2015)[16]	0.61 (0.39, 0.91)	3.26	160
Smith et al (2004)[77]	0.82 (0.75, 0.90)	10.61	393
Elhai et al (2008)[60]	0.92 (0.87, 0.97)	11.50	279
Total ($I^2 = 88\%$, 95% CI 82–93, $P = 0.001$)	0.80 (0.73, 0.88)	100.00	
Personal stigma			
Eisenberg et al (2009)[33]	0.57 (0.51, 0.64)	17.54	5555
Interian et al (2010)[65]	1.15 (0.95, 1.41)	15.38	200
Aromaa et al (2011)[58]	0.81 (0.73, 0.90)	17.72	507
Downs & Eisenberg (2012)[59]	0.73 (0.62, 0.85)	16.47	519
Vogt et al (2014)[88]	0.88 (0.82, 0.96)	18.21	601
Jorm et al (2000)[67]	0.98 (0.78, 1.22)	14.69	422
Total ($I^2 = 91\%$, 95% CI 84–95, $P = 0.001$)	0.82 (0.69, 0.98)	100.00	
Self-stigma			
Thoits (2005)[79]	0.87 (0.75, 1.02)	21.98	1712
Bambauer & Prigerson (2006)[37]	0.34 (0.15, 0.75)	3.13	135
Rusch et al (2008)[76]	1.07 (1.01, 1.14)	27.57	92
Nyunt et al (2009)[75]	0.94 (0.24, 3.66)	1.15	1092
ten Have et al (2010)[78]	0.76 (0.61, 0.96)	17.06	8796
Vogt et al (2014)[80]	0.88 (0.82, 0.94)	27.17	601
Jennings et al (2015)[66]	1.15 (0.41, 3.25)	1.93	95
Total ($I^2 = 81\%$, 95% CI 82–91, $P = 0.001$)	0.88 (0.76, 1.03)	100.00	
Perceived public stigma			
Bambauer & Prigerson (2006)[57]	0.81 (0.45, 1.45)	0.52	135
Judd et al (2006)[68]	0.98 (0.92, 1.04)	12.91	350
Komiti et al (2006)[70]	0.96 (0.91, 1.02)	12.91	267
Golberstein et al (2008)[62]	0.99 (0.91, 1.09)	9.73	302
Golberstein et al (2009)[63]	1.01 (0.93, 1.09)	10.77	726
Rusch et al (2008)[76]	0.77 (0.66, 0.90)	5.22	92
Eisenberg et al (2009)[33]	1.02 (0.90, 1.14)	7.45	5555
Interian et al (2010)[65]	1.08 (0.93, 1.25)	5.65	200
Downs & Eisenberg (2012)	1.19 (1.03, 1.36)	6.23	519
Green et al (2012)[64]	0.90 (0.90, 1.00)	13.56	124
Vogt et al (2014)[80]	0.96 (0.91, 1.01)	13.62	601
Adler et al (2015)[16]	0.96 (0.65, 1.43)	1.11	160
Jennings et al (2015)[66]	1.16 (0.54, 2.50)	0.31	95
Total ($I^2 = 58\%$, 95% CI 23–77, $P = 0.004$)	0.97 (0.93, 1.02)	100.00	
General stigma			
Bambauer & Prigerson (2006)[57]	0.72 (0.50, 1.04)	11.27	135
Nadeem et al (2007)[74]	0.95 (0.61, 1.46)	8.99	129
Menke & Flynn (2009)[71]	1.03 (1.01, 1.05)	28.57	1013
Kim et al (2011)[69]	1.09 (0.85, 1.41)	16.42	3380
Elnitsky et al (2013)[61]	1.58 (1.09, 2.30)	11.05	799
Mojtabai & Crum (2013)[72]	1.06 (0.28, 4.05)	1.33	195
Blais et al (2015)[56]	0.80 (0.68, 0.93)	22.38	2025
Total ($I^2 = 69\%$, 95% CI 30–88, $P = 0.004$)	0.98 (0.84, 1.15)	100.00	

0.05   0.25   0.5   0.75   1   1.5   2

Fig. 2 Forest plot of the results of meta-analyses of five stigma types on active help-seeking.

Odds ratios (OR) and 95% confidence intervals (CI) of individuals studies and pooled estimates of separate random effects meta-analyses. OR < 1 indicates negative associations between stigma or attitudes and help-seeking, i.e. higher levels of stigma are associated iwth less help-seeking. Estimates of between-study variance: $\tau^2 = 0.018$ for HelpA, $\tau^2 = 0.044$ for PersonS and $\tau^2 = 0.023$ for GenS. The study by ten Have et al (2010) estimated relative risk ratio; OR estimate was not reported and not available from study authors.

to arise from an individual's own attitudes towards people with mental illness, as well as from (perceived) public stigma.[66,89–91] Perceived public stigma, personal stigma and self-stigma seem to predict attitudes towards help-seeking.[66,92–95] Furthermore, studies have suggested that stigma is associated with a low perceived need for help,[66,96,97] and a strong desire to handle the problem on one's own.[98] These two factors were proposed as important barriers in considering delayed or no help-seeking.[97,98] Future studies might consider them as additional moderators of active help-seeking and in interaction with stigmatising attitudes.[66] It is crucial to understand the complexity of various types of stigma, their role in help-seeking for mental health problems, and their direct impact on mental problems such as suicidality,[99] in order to develop efficient public campaigns promoting help-seeking.

Several anti-stigma and information campaigns aiming to improve people's knowledge about mental illness (mental health
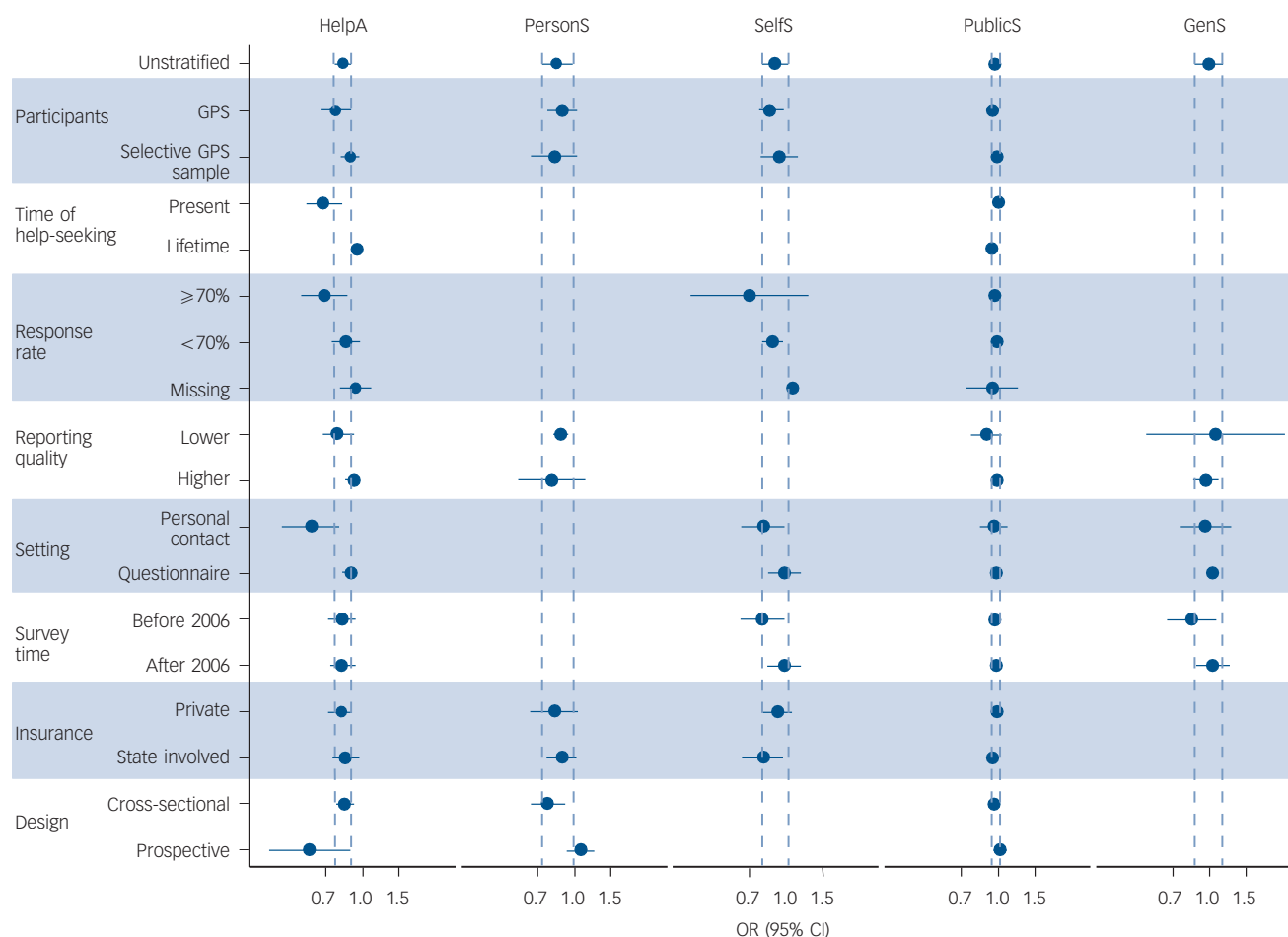
Fig. 3 Forest plot of the results of stratified meta-analyses of five stigma types on active help-seeking.

Pooled estimates (odds ratio; OR) and 95% confidence interval (CI) of each strata are reported. Dashed lines represent 95% CI of non-stratified analyses (top row). GenS, general stigma; HelpA, help-seeking attitude; PersonS, personal stigma; PublicS, perceived public stigma; SelfS, self-stigma. OR<1 indicates negative associations between stigma or attitudes and help-seeking, i.e. higher levels of stigma are associated with less help-seeking.

literacy) and to reduce stigma associated with mental illness have been conducted in recent years.[100] Whereas knowledge about the causes and treatment of mental illness seemed to improve over time and after campaigns,[101–104] reducing negative attitudes has proved to be more difficult.[102] Only 7% of the world population reported a belief that mental illness can be overcome,[105] and those most reluctant to seek help perceived the lowest benefits in engaging in this behaviour.[106] To promote help-seeking, findings from these meta-analyses suggest that campaigns should address negative personal attitudes by strengthening beliefs in the treatability of mental illness. Advanced, biologically oriented mental health literacy,[107] and activation of fear due to media reports,[108] can increase the desire for social distance towards people with mental illness. Therefore, the content of campaigns should be chosen thoughtfully to avoid unintended effects.[109]

Future studies

Subgroup analyses suggested that associations between stigma and help-seeking can depend on certain study characteristics, in particular response rate and assessment setting. Higher response rates were generally associated with stronger negative effects of stigma. As higher response rates can reduce a potential non-responder bias,[110] they lead to more reliable results.[111] Consequently, reporting of response rates is crucial for assessing the validity and reliability of research findings,[111] which should be considered in future surveys. With regard to differences in

setting, face-to-face assessments were associated with stronger negative effects than were self-reports by questionnaire. Since the expression of stigmatising attitudes towards people with mental illness or towards mental health services might be affected by social desirability bias,[112] this is a surprising finding. Social desirability should have a greater role in personal contact. Surveys investigating social taboos (such as stigmatising attitudes) showed increased levels of response accuracy when data were assessed using self-administration (such as questionnaires), compared with interviewer administration.[112] Questionnaires might therefore be more suitable when researching stigma. In our analyses three out of four studies with personal assessment reported high response rates;[72,73,79] the fourth did not report a response rate.[65] Four studies using questionnaires reported low rates,[58,67,77,80] two reported none,[60,76] and only three reported high response rates.[16,69,70] Inspection of single study effects indicates that across these questionnaire studies, those with high response rates reported a stronger negative association. Sampling bias associated with lower response rates might therefore have a more crucial role in detecting associations between stigma and active help-seeking than the mode of assessment.

The association between HelpA and help-seeking was stronger when recent rather than lifetime help-seeking was considered. Furthermore, the association between HelpA and help-seeking was stronger in prospective studies, whereas the association between PersonS and help-seeking disappeared in prospective studies. These results indicate the importance of a timely

association between current attitudes and active help-seeking. Past help-seeking might shape a person's attitude towards help-seeking. For future help-seeking, only attitudes towards help-seeking but not personal attitudes towards people with a mental illness seem to be obstructive. More prospective studies of stigma and help-seeking are needed to disentangle this interplay and to overcome the problem of reciprocal or reversed causation in cross-sectional studies.

Strengths and limitations

This is the first meta-analysis to extricate the influence of types of stigma on active help-seeking, focusing on the general population (the main target group of efforts to increase help-seeking) and considering study characteristics as potential moderators. However, our study has some limitations. We could have missed relevant studies owing to publication bias, although only HelpA showed some evidence of possible small-study bias. Several characteristics of the studies could have contributed to observed heterogeneity between them: studies used a large variety of stigma measures, differing in reliability and number of response categories. There was little information on exact operationalisation of stigma measures in the analyses; even if the number of categories was reported, it was often not specified whether stigma measures were used as dichotomous, categorical or continuous predictors, whether a cut-off for continuous measures was applied or whether the number of categories was collapsed. Future studies should report not only which stigma measure was used but also how it was handled during the analyses, all of which can affect the association with outcomes. Most studies adjusted for age and gender but differed greatly in their remaining adjustments. Future studies should adjust for variables such as mental health literacy,[19] perceived need,[95] or desire to handle the problem on one's own,[98] which seem to influence mental health help-seeking. We would encourage additional reporting of unadjusted associations in future studies to allow better comparison and research synthesis. All studies were conducted in high-income, mostly Western countries. The results of these meta-analyses may not generalise to non-Western or low-income countries. Despite these limitations, our results reinforce efforts to challenge mental health-related stigma as a major goal for global mental health.[113] Its reduction might facilitate help-seeking by those affected by mental illness.

Future research

The results confirmed the negative association between stigma and active help-seeking, underscoring the important differential role of stigma types, with a minor role of perceived public attitudes compared with the individual's own attitudes. Furthermore, sensitivity analyses highlighted the importance of a sufficiently high response rate, as well as the control of potential reciprocal causation, and point towards a smaller social desirability bias in interview studies than is commonly assumed. Future studies on the effect of stigma on help-seeking for mental problems in the general population should use questionnaires that differentially assess stigma types, employ a prospective design, take care to monitor and increase response rates, and assess potential confounders, such as an independent low perceived need for help or a strong desire to handle problems on one's own.[66,95–98] Well-designed general population studies are needed to develop and optimise campaigns promoting mental health by facilitating early help-seeking and fighting mental illness stigma.

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EXTRA CONTENT ONLINE

DS1

Inclusion and exclusion criteria for meta-analysis

General criteria

Participants

Inclusion criteria:

- General population samples
- Selective samples (such as only females or only elderly people or only one specific ethnical group) are included, as long as they were drawn from the general population and not from a clinical sample
- Student samples are included as long as they are from randomly selected or bigger students population and not from a clinical student sample
- Army samples are included as long as they are not from a selective clinical sample (soldiers that are in treatment for mental health related problems)

Exclusion criteria:

- Clinical samples, mental health patients
- Mental health professionals, general practitioners or other professionals working with people with mental illness

Language

Inclusion criteria:

- English
- German
- French
- Polish
- Spanish

Exclusion criteria

- Any other languages

Study design, setting, type

Inclusion criteria:

- Study published in peer reviewed journal
- Articles published between 1990 and July 2015
- Cross-sectional and longitudinal survey
- Quantitative studies
- Postal/internet questionnaire and/or interview with personal contact

Exclusion criteria:

- (evaluation) campaign / intervention / awareness studies with or without pre-post comparisons
- Reviews / meta-analysis / systematic reviews
- Qualitative studies
- Dissertations

Statistical analysis

Inclusion criteria:

- (logistic) regression (all studies that make a prediction of the influence of mental health related stigma on actual help-seeking)

Exclusion criteria:

- Group comparisons (Chi^2, t-test, ANOVA etc.)
- Correlation studies
- SEM
- Studies with missing data, when authors did not reply to our e-mails

Predictor variable(s)
Stigma
Inclusion criteria:
- Stigmatized group: people with mental illness, mental illness patients
- self-stigma / internalized stigma
- perceived public stigma
- personal stigma / social distance
- attitudes toward help-seeking / treatment stigma
- general stigma measures that contain more than one of the former stigma categories
- barriers towards help-seeking if stigma barriers were separate predictor and if they fit one of the former stigma categories
- single item stigma measures are included if they fit one of the former stigma categories

Exclusion criteria:
- Any other stigmatized group (HIV/AIDS, cancer patients, transgender etc.)
- 'perceived need for mental health treatment' as a single measure for attitudes towards treatment
- 'belief in helpfulness of a treatment' as a single measure for attitudes towards treatment

Outcome variable
Help-Seeking
Inclusion criterion:
- Actual help-seeking (past/lifetime or present/within last year)
- Help-seeking from informal (e.g. family, friend, priest) or formal source (e.g. mental health specialist such as psychotherapist or psychiatrist, general practitioner)

Exclusion criteria:
- Help-seeking intentions
- Help-seeking recommendations (for themselves or for others)
- Perceived need for help-seeking
- Attitudes towards help-seeking
- Having unmet need
- Any other hypothetical help-seeking measures
- Help-seeking on behalf of another individual (e.g. family member)

DS2

Searching Database Keywords

PubMed (we used MeSH Terms for all keywords)
Mental disorder related terms:
"mental disorder" OR "mental health" OR "mental illness"

AND

Help-seeking related terms:
„help-seeking" OR "help-seeking intentions" OR "willingness to use mental health service" OR "seeking mental health treatment" OR "attitudes to help-seeking" OR "attitudes to seeking mental health service" OR "treatment seeking" OR "barriers to treatment" OR "barriers to help-seeking" OR "help-seeking recommendation" OR "health behavio*" OR "health education" OR "service use" OR "health care utilization" OR "health care"

AND

Stigma related terms
"stigma*" OR "attitude" OR "discrimination" OR "social distance" OR "stereotyp*" OR "emotional reaction" OR "devaluation" OR "dangerousness"

PsycInfo/Ovid
Mental disorder related terms:
1. Mental disorder/
2. exp mental health/
3. 1 or 2

Stigma related terms:
4. exp stigma/
5. exp "mental illness (attitudes toward)"/ or exp attitudes/ or exp stereotyped attitudes/
6. exp stigma/ or exp "mental illness (attitudes toward)"/
7. exp prejudice
8. exp dangerousness
9. devaluation.mp.
10. 4 or 5 or 6 or 7 or 8 or 9

Help-seeking related terms:
11. exp mental health services/ or exp help seeking behavior/ or exp health care utilization/ or exp health care seeking behavior/
12. exp treatment barriers/
13. help-seeking.mp.
14. help-seeking recommendation.mp.
15. 11 or 12 or 13 or 14

Terms combined:
16. 3 and 10 and 15

EMBASE/MEDLINE

Mental disorder related terms:

"Mental disease"/exp OR "mental disease"

AND

Stigma related terms:

"Stigma"/exp OR "stigma" OR "attitude"/exp OR "attitude" OR "social distance"/exp OR "social distance" OR "stereotype"/exp OR "stereotype" OR devaluation OR dangerousness OR prejudice

AND

Help-seeking related terms:

"help seeking" OR "help-seeking intention" OR "attitudes to help-seeking" OR "treatment barriers" OR "help seeking barriers" OR "service use" OR "health care utilization" OR "help seeking recommendation"

DS3 stigma instrument

Source	Stigma scale / stigma barrier measure(s)	stigma type
Jorm et al (2000)[67]	Question: 'how do you think would person described in the vignette be in the long term compared to other people in the community?' 10 positive and negative outcomes such as 'to be violent', 'to have a good marriage' etc.	personal stigma
Mojtabai et al (2002)[73]	two items: 'how comfortable would you feel talking about personal problems?' and 'how embarrassing would it be if friends knew about professional help' (calculated sum score for both items)	general stigma measure
Smith et a l (2004)[77]	Attitudes towards seeking professional psychological help (ATSPPH, Turner & Fischer 1970)	help-seeking attitudes
Thoits et al (2005)[79]	two items: (a) 'how comfortable would you feel talking about personal problems?' (b) 'how embarrassing would it be if friends knew about professional help' (both items seperately)	(a) help-seeking attitudes (b) self-stigma
Bambauer et al (2006)[57]	Stigma Receptivity Scale (SRS, Prigerson 2003)	(a) general stigma measure (b) perceived public stigma (c) self-stigma
Judd et al (2006)[68]	(a) Perceived Stigma Scale (PSS, Wrigley et al. 2005; adapted from Perceived Discrimination Devaluation (PDD) Scale, Link, 1987/1989) (b) ATSPPH	(a) perceived public stigma (b) help-seeking attitudes
Komiti et al (2006)[70]	(a)PSS and (b) ATSPPH	(a) perceived public stigma (b) help-seeking attitudes
Nadeem et al (2007)[74]	3 barriers: 'beeing embarrassed', 'being afraid what others might think', and 'afraid that family members do not approve'	general stigma measure
Elhai et al (2008)[60]	Attitudes towards seeking professional psychological help - short form (ATSPPH-SF, Turner & Fischer 1970)	help-seeking attitudes
Golberstein et al (2008)[62]	adapted from 'Stigma Scale for Receiving Psychological Help (Pyne et al. 2004, Komiya et al. 2000)	perceived public stigma
Golberstein et al (2009)[63]	adapted from 'Stigma Scale for Receiving Psychological Help (Pyne et al. 2004, Komiya et al. 2000)	perceived public stigma
Rusch et al (2008)[76]	Depression Self-Stigma Scale (DSSS, Kanter et al. 2008)	(a) perceived public stigma (b) help-seeking attitudes (c) self-stigma
Eisenberg et al (2009)[33]	(a) PDD Scale (b) PDD Scale replacing 'most people' with 'I'	(a) perceived public stigma (b) personal stigma

|		
Menke *et al* (2009)[71]	Link Stigma Scale (LSCS) Secrecy and PDD Subscales (Link et al. 1997)	general stigma measure
Nyunt *et al* (2009)[75]	one item: 'are you embarrassed or ashamed about personal mental ill health or emotional problems?'	self-stigma
Interian *et al* (2010)[65]	(a) PDD Scale (b) Stigma Concerns about Mental Health Care (SCMHC, Interian et al. 2010) (c) Social Distance Scale (SD, Angermeyer et al. 1997)	(a) perceived public stigma (b) help-seeking attitudes (c) personal stigma
ten Have *et al* (2010)[78]	one item: 'how embarrassed would you be if your friends kenw you were getting prof help for an emotional problem?'	self-stigma
Aromaa *et al* (2011)[58]	(a) 16 statements integrating different stigma concepts (Aromaa et al. 2011) (b) Social Distance	(a) help-seeking attitudes (b) personal stigma
Kim *et al* (2011)[69]	17 barriers, found 3 factor with factor analysis, two of them were stigma-related	(a) general stigma measure (b) help-seeking attitudes
Downs & Eisenberg (2012)[62]	(a) PDD Scale (b) PDD Scale replacing 'most people' with 'I'	(a) perceived public stigma (b) personal stigma
Green *et al* (2012)[64]	PSS	perceived public stigma
Elnitsky *et al* (2013)[61]	stigma and barriers to care (developed by Hoge et al. 2004)	general stigma measure
Mojtabai & Crum (2013)[72]	27 barriers	(a) general stigma measure (b) help-seeking attitudes
Vogt *et al* (2014)[80]	Endorsed and Anticipated Stigma Inventory (EASI, Vogt et al. 2014)	(a) perceived public stigma (b) self-stigma (c) personal stigma (d) help-seeking attitudes
Adler *et al* (2015)[16]	17 items (11 originally from Hoge et al. 2004; 6 originally from Britt 2000 & Kim et al. 2011)	(a) perceived public stigma (b) help-seeking attitudes
Blais *et al* (2015)[56]	Perceived Stigma and Barriers to Care Scale (Britt, 2000)	(a) general stigma measure (b) help-seeking attitudes (missing data of this measure)
Jennings *et al* (2015)[66]	(a) Self-Stigma of Seeking Help Scale (SSOSH, Vogel et al. 2006) (b) Perceived stigma-TS (Jennings et al. 2015; 7 items adapted from Britt et al. 2008, 2014)	(a) self-stigma (b) perceived public stigma

DS5 output stratification

Stratified by		personal stigma OR (95%CI)	personal stigma I^2 (p-value) / τ^2	help-seeking attitudes OR (95%CI)	help-seeking attitudes I^2 (p-value) / τ^2	self-stigma OR (95%CI)	self-stigma I^2 (p-value) / τ^2	perceived public stigma OR (95%CI)	perceived public stigma I^2 (p-value) / τ^2	general stigma OR (95%CI)	general stigma I^2 (p-value) / τ^2
participant groups	GPS	0.87 (0.73-1.03)	56.2% (ns)/ *0.010*	0.73* (0.63-0.87)	93.9% (p<0.001)/ *0.034*	0.83* (0.73-0.95)	0% (ns) / *0.000*	0.95 (0.90-1.00)	60.5% (ns)/ *0.001*		
	selective sample	0.80 (0.61-1.04)	94.5% (p<0.05)/ *0.069*	0.86* (0.78-0.95)	72.5% (p<0.001)/ *0.009*	0.92 (0.75-1.13)	84.3% (p<0.001)/ *0.022*	0.99 (0.93-1.02)	55.3% (p<0.05)/ *0.004*	0.98 (0.83-1.16)	73.8% (p<0.01)/ *0.025*
help-seeking	lifetime			0.93* (0.87-0.99)	73.9% (p<0.01)/ *0.004*			0.94 (0.88-1.00)	72.6% (p<0.01)/		
	present	0.77* (0.65-0.93)	90.8% (p<0.001)/ *0.037*	0.64* (0.53-0.79)	85.6% (p<0.001)/ *0.049*	0.84* (0.75-0.94)	29.1% (ns)/ *0.005*	1.00 (0.96-1.05)	22.7% (ns)/ *0.001*	0.98 (0.84-1.15)	68.5% (p<0.01)/ *0.023*
insurance	private	0.80 (0.61-1.04)	94.5% (p<0.001)/ *0.069*	0.78* (0.68-0.89)	85.7% (p<0.001)/ *0.023*	0.91 (0.77-1.07)	85.6% (p<0.001)/ *0.020*	0.99 (0.93-1.06)	60.3% (p<0.05)/ *0.005*	0.98 (0.84-1.15)	68.5% (p<0.01)/ *0.023*
	state-involved	0.87 (0.73-1.03)	56.2% (ns)/ *0.010*	0.82* (0.70-0.96)	92.3% (p<0.001)/ *0.019*	0.77* (0.61-0.96)	0% (ns) / *0.000*	0.94* (0.90-0.99)	40.9% (ns)/ *0.001*		
setting	interview			0.56* (0.40-0.77)	65.2% (p<0.05)/ *0.060*	0.77* (0.60-0.98)	47.7% (ns)/ *0.025*	0.96 (0.82-1.12)	62.7% (ns)/ *0.010*	0.95 (0.71-1.28)	67.6% (p<0.05)/ *0.068*
	questionnaire	0.77* (0.65-0.93)	90.8% (p<0.001)/ *0.037*	0.87* (0.80-0.94)	85.7% (p<0.001)/ *0.010*	0.98 (0.81-1.18)	89.2% (p<0.001)/ *0.017*	0.98 (0.94-1.03)	51.6% (p<0.05)/ *0.002*	1.03* (1.01-1.05)	0% (ns)/ *0.000*
survey period	before 2006			0.79* (0.69-0.92)	91.5% (p<0.001)/ *0.021*	0.77* (0.60-0.98)	47.7% (ns)/ *0.025*	0.97 (0.94-1.01)	0% (ns)/ *0.000*	0.82 (0.62-1.07)	0% (ns)/ *0.000*
	2006 or later	0.80* (0.66-0.97)	92.6% (p<0.001)/ *0.045*	0.79* (0.69-0.92)	86.2% (p<0.001)/ *0.026*	0.98 (0.81-1.18)	89.2% (p<0.001)/ *0.017*	0.98 (0.91-1.05)	71.0% (p<0.001)/ *0.006*	1.03 (0.86-1.25)	80.4% (p<0.01)/ *0.026*

DS5 output stratification *(continued)*

	Stratified by	personal stigma OR (95%CI)	personal stigma I² (p-value) / τ²	help-seeking attitudes OR (95%CI)	help-seeking attitudes I² (p-value) / τ²	self-stigma OR (95%CI)	self-stigma I² (p-value) / τ²	perceived public stigma OR (95%CI)	perceived public stigma I² (p-value) / τ²	general stigma OR (95%CI)	general stigma I² (p-value) / τ²
response rate	≥ 70%			0.65* (0.50-0.84)	89.5% (p<0.001)/ *0.072*	0.66 (0.34-1.28)	62% (ns)/ *0.021*	0.96 (0.91-1.02)	0% (ns)/ *0.000*	0.98 (0.77-1.24)	66.2% (p<0.05)/ *0.051*
	< 70%	0.77* (0.65-0.93)	90.8% (p<0.001)/ *0.037*	0.83* (0.71-0.96)	92.9% (p<0.001)/ *0.021*	0.86* (0.77-0.96)	25.4% (ns)/ *0.003*	0.99 (0.94-1.04)	66.8% (p<0.01)/ *0.003*		
	not reported			0.92 (0.77-1.10)	76.0% (p<0.05)/ *0.016*	1.07 (1.01-1.14)	0% (ns) / *0.000*	0.94 (0.70-1.26)	79.5% (p<0.01)/ *0.044*		
quality of reporting	< 25 stars	0.86* (0.80-0.93)	30.3% (ns)/ *0.002*	0.76* (0.64-0.90)	90.8% (p<0.001)/ *0.038*	0.91 (0.78-1.07)	82.0% (p<0.001)/ *0.019*	0.88 (0.74-1.04)	59.0% (ns)/ *0.014*	1.07 (0.49-2.31)	88.6% (p<0.01)/ *0.277*
	≥ 25 stars	0.78 (0.53-1.13)	94.7% (p<0.001)/ *0.107*	0.90* (0.83-0.97)	72.8% (p<0.01)/ *0.005*			0.99 (0.95-1.04)	60.2% (p<0.05)/ *0.003*	0.96 (0.83-1.11)	60.9% (p<0.05)/ *0.013*
design	cross-sectional	0.74* (0.61-0.90)	92.4% (p<0.001)/ *0.037*	0.82* (0.75-0.90)	90.2% (p<0.01)/ *0.016*	0.88 (0.76-1.03)	81.2% (p<0.001)/ *0.020*	0.96 (0.92-1.01)	63.6% (p<0.01)/ *0.003*	0.96 (0.83-1.16)	73.8% (p<0.01)/ *0.025*
	prospective	1.07 (0.91-1.25)	15.5% (ns)/ *0.002*	0.55* (0.35-0.87)	40.5% (ns)/ *0.061*			1.02 (0.96.1.10)	0% (ns)/ *0.000*		

empty cells indicate that stratification was not possible due to small number of studies in this group (≤ 1 study); I^2 between study heterogeneity; ns= no statistically significant between study heterogeneity; τ^2 between study variance, written in *italics* in the table; * = significant effect size
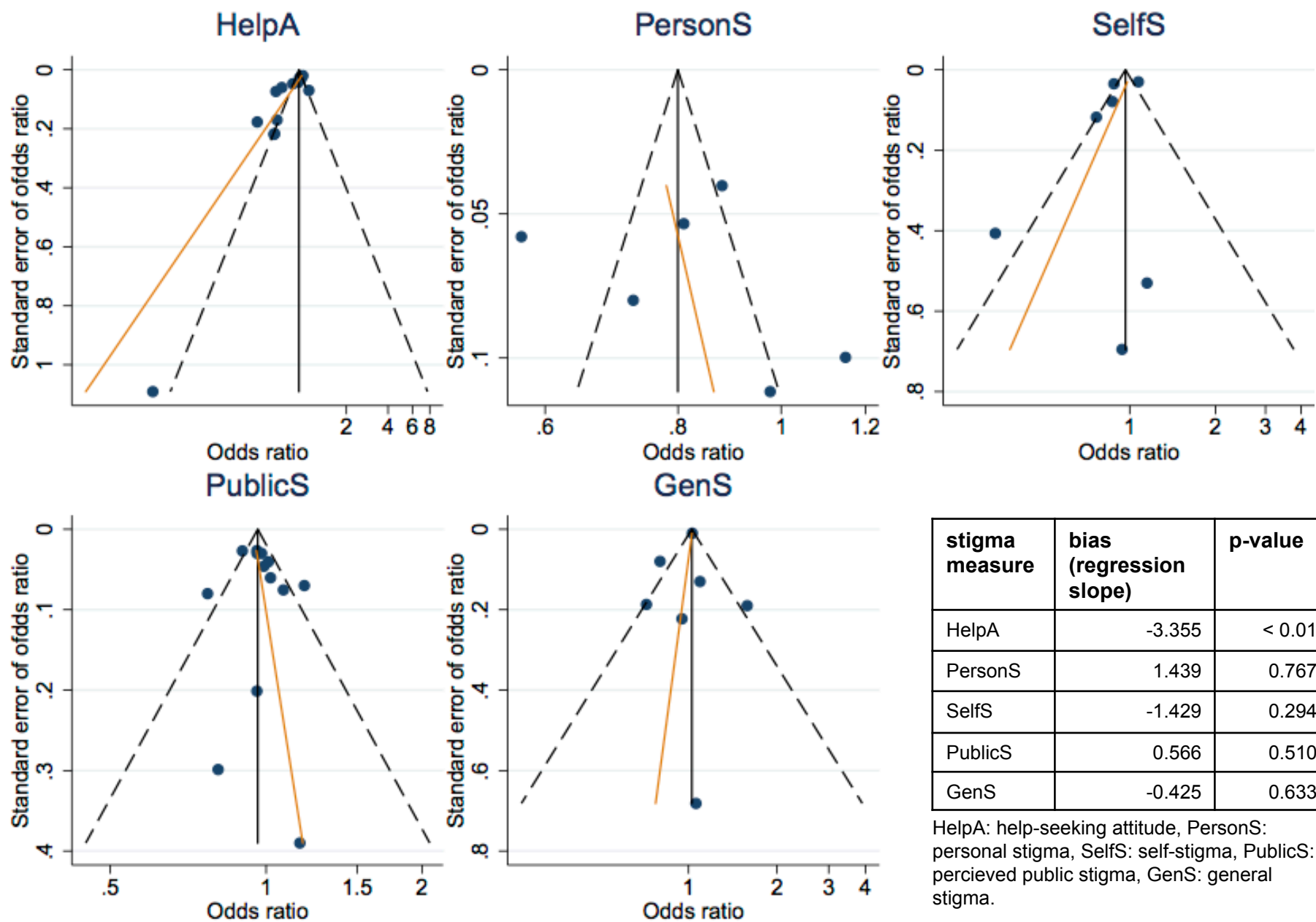
stigma measure	bias (regression slope)	p-value
HelpA	-3.355	< 0.01
PersonS	1.439	0.767
SelfS	-1.429	0.294
PublicS	0.566	0.510
GenS	-0.425	0.633

HelpA: help-seeking attitude, PersonS: personal stigma, SelfS: self-stigma, PublicS: percieved public stigma, GenS: general stigma.

Dashed line: pseudo 95% confidence limits. Orange line: fitted regression line from Egger's test
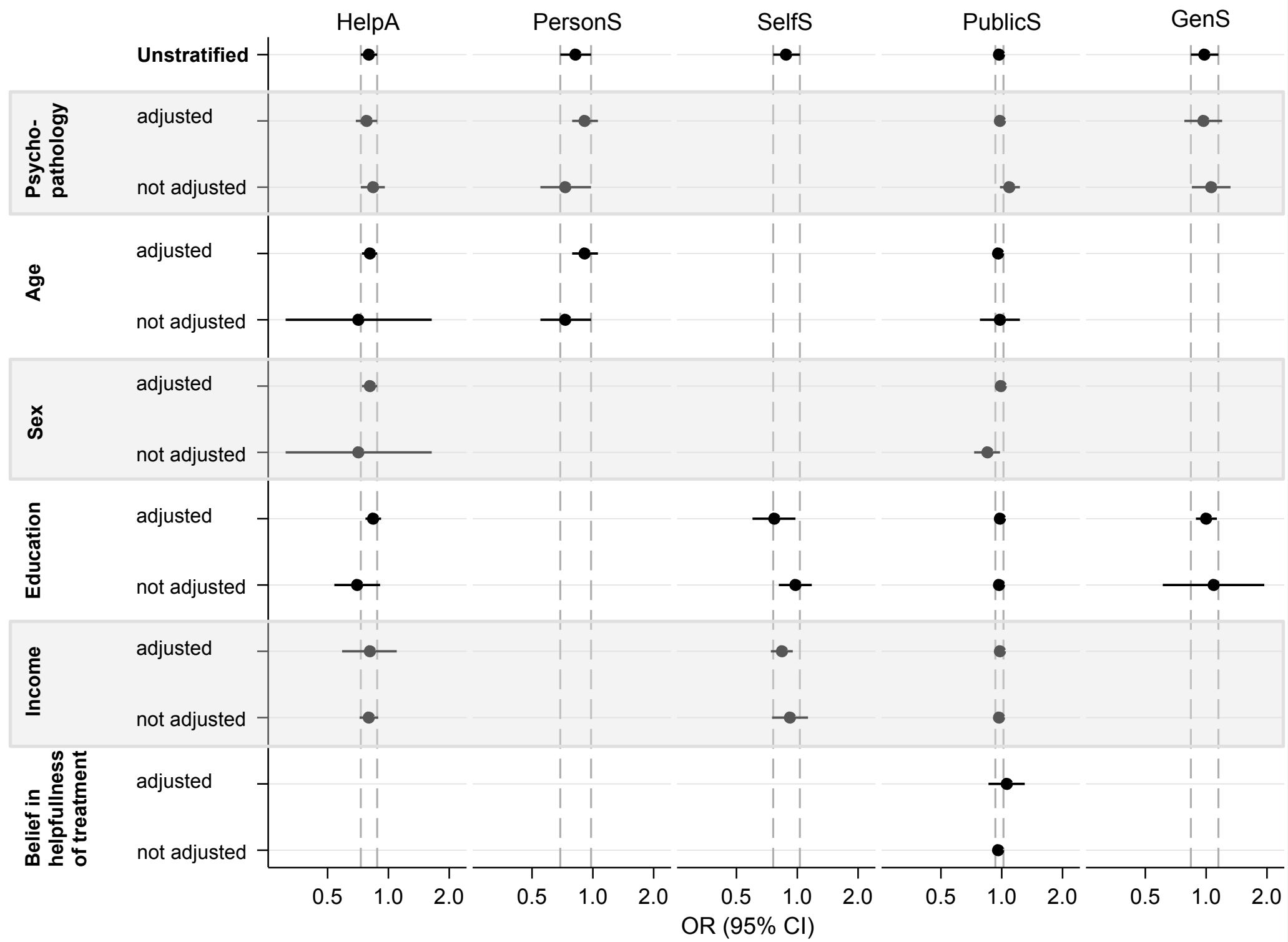
Fig. DS1

Fig. DS2

Forest plot of the results of stratified meta-analyses of five stigma types on active hep-seeking. Pooled estimates (Odds Ratio, OR) and 95% confidence interval (CI) of each strata are reported. Dashed lines represent 95% CI of non-stratified analyses (top row). Abbreviations: HelpA: help-seeking attitude; PersonS: personal stigma; SelfS: self-stigma; PublicS: perceived public stigma; GenS: general stigma. OR<1 indicates negative associations between stigma or attitudes and help-seeking, i.e. higher levels of stigma are associated with less help-seeking.

Table DS1 Study characteristics

Source	time period	country	participants (total N study/n analyzed)	study design	method of data collection	stigma type	Cronbach's α stigma measure[b]	help-seeking	regression adjusted for
Jorm *et al* (2000)[67]	1996	Australia	randomly selected general population sample (3109/422)	prospective (6 month)	questionnaire	PersonS	0.84	recent[a]	
Mojtabai *et al* (2002)[73]	1990-1992	USA	randomly selected general population sample (1792/1792)	cross-sectional	interview	HelpA		recent[a]	psychopathology
Smith *et al* (2004)[77]		USA	rural adults selected from comprehensive white page listing (438/393)	cross-sectional	questionnaire	HelpA	0.88	lifetime	age, gender, education
Thoits (2005)[79]	1990-1992	USA	randomly selected general population sample (5877/1712)	cross-sectional	interview	(a) HelpA (b) SelfS		recent[a]	age, gender, education, income, relationship, ethnicity, urbanity, psychopathology, perceived need
Bambauer & Prigerson (2006)[57]	1999-2003	USA	unbiased and comprehensive sample of bereaved older adults (265/135)	cross-sectional	interview	(a) GenS (b) PublicS (c) SelfS	(a) 0.64 (b) 0.69 (c) 0.45	recent[a]	age, gender, education, psychopathology
Judd *et al* (2006)[68]		Australia	randomly selected general population sample (467/350)	cross-sectional	questionnaire	(a) PublicS (b) HelpA		lifetime	age, gender, education, relationship, physical health, psychopathology
Komiti *et al* (2006)[70]		Australia	randomly selected general population sample (300/267)	cross-sectional	questionnaire	(a) PublicS (b) HelpA	(a) 0.84 (b) 0.85	lifetime	age, gender, education, income, relationship, physical health, psychopathology, belief in helpfulness of treatment
Nadeem *et al* (2007)[74]	1997-2001	USA	low-income women from women entering care (15383/129)	cross-sectional	interview	GenS		recent[a]	age, education, relationship, ethnicity
Elhai *et al* (2008)[60]	2005	USA	representative student sample (297/296)	cross-sectional	questionnaire	HelpA	0.82	lifetime	age, gender, education, relationship, ethnicity
Golberstein *et al* (2008)[62]	2005	USA	randomly selected general population sample (2782/302)	cross-sectional	questionnaire	PublicS	0.74	recent[a]	age, gender, income, ethnicity, psychopathology
Golberstein *et al* (2009)[63]	2007	USA	randomly selected general population sample (732/726)	prospective (24 month)	questionnaire	PublicS	0.74	recent[a]	age, gender, income, ethnicity, psychopathology
Rusch *et al* (2008)[76]		USA	low income African American adults recruited from a large nonprofit organization (92/92)	cross-sectional	questionnaire	(a) PublicS (b) HelpA (c) SelfS	(a) 0.80 (b) 0.78 (c) 0.93	lifetime	psychopathology
Eisenberg *et al* (2009)[33]	2007	USA	randomly selected general population sample (5555/5555)	cross-sectional	questionnaire	(a) PublicS (b) PersonS	(a) 0.89 (b) 0.78	recent[a]	gender, ethnicity

Table DS1 Study characteristics *(continued)*									
Menke *et al* (2009)[71]		USA	primary care patients (1013/1013)	cross-sectional	questionnaire	GenS	0.84	recent[a]	gender, education, ethnicity, psychopathology
Nyunt et al (2009)[75]	2003	Singapore	randomly selected general population sample of older adults (1092/1092)	cross-sectional	interview	SelfS		recent[a]	age, gender, education, income, employment status, relationship, ethnicity, psychopathology, perceived need, self management, previous service use, belief in helpfulness of treatment
Interian *et al* (2010)[65]	2007-2008	USA	primary care patients from two large clinics for underserved population (200/200)	prospective (5 month)	interview	(a) PublicS (b) HelpA (c) PersonS	(a) 0.69 (b) 0.71 (c) 0.75	lifetime	age, gender, education, relationship, insurance, psychopathology
ten Have *et al* (2010)[78]	2001-2003	Europe	randomly selected general poulation sample (21425/8796)	cross-sectional	interview	SelfS		recent[a]	age, gender, education, income, employment status, relationship, urbanity, psychopathology, previous service use, familiarity with mental illness
Aromaa *et al* (2011)[58]		Finland	randomly selected general population sample (5160/507)	cross-sectional	questionnaire	(a) HelpA (b) PersonS	(a) 0.42 (b) 0.70	recent[a]	age, gender, psychopathology
Kim *et al* (2011)[69]	2008-2009	USA	military personnel (3380/3380)	cross-sectional	questionnaire	(a) GenS (b) HelpA	(a) 0.93 (b) 0.83	recent[a]	age, gender, education
Downs & Eisenberg (2012)[59]	2009	USA	randomly selected students sample (8487/519)	cross-sectional	questionnaire	(a) PublicS (b) PersonS	(a) 0.83 (b) 0.73	recent[a]	gender, ethnicity, social support, belief in helpfulness of treatment, familiarity with mental illness
Green *et al* (2012)[64]		Australia	randomly selected general population sample (2639/124)	cross-sectional	interview	PublicS	0.80	lifetime	age, urbanity, psychopathology
Elnitsky *et al* (2013)[61]	2009-2010	USA	military personnel (799/799)	cross-sectional	interview	GenS	0.84	recent[a]	age, gender, employment status, relationship, ethnicity, psychopathology
Mojtabai & Crum (2013)[72]	2001-2002	USA	randomly selected general population sample (43093/195)	prospective (24-48 month)	interview	(a) GenS (b) HelpA		recent[a]	age, gender, ethnicity, insurance, psychopathology
Vogt *et al* (2014)[80]	2007-2009	USA	randomly selected military personnel (640/601)	cross-sectional	questionnaire	(a) PublicS (b) SelfS (c) PersonS (d) HelpA	0.84-0.93[c]	recent[a]	age, gender, relationship, ethnicity, psychopathology, social desirability
Adler *et al* (2015)[16]	2011-2012	UK	military personnel (529/160)	prospective (8 month)	questionnaire	(a) PublicS (b) HelpA	(a) 0.96 (b) 0.90	recent[a]	age, gender, self-management
Blais *et al* (2015)[56]	2011	USA	randomly selected military personnel (2025/2025)	cross-sectional	interview	(a) GenS (b) HelpA[d]		recent[a]	age, gender, relationship, ethnicity, physical health, psychopathology, belief in helpfulness of treatment
Jennings *et al* (2015)[66]		USA	students recruited from an online research participation pool (246/95)	cross-sectional	questionnaire	(a) SelfS (b) PublicS	(a) 0.89 (b) 0.83	recent[a]	age, gender, self-management

GenS, general stigma; HelpA, attitudes towards help-seeking; PersonS, personal stigma; PublicS, public stigma; SelfS, self-stigma.

Association between mental health-related stigma and active help-seeking: systematic review and meta-analysis

Nina Schnyder, Radoslaw Panczak, Nicola Groth and Frauke Schultze-Lutter

Psychological Medicine

Influence of knowledge about causes of mental disorders and stigma related to mental disorders on healthcare utilisation in a general population sample: a structural equation model

--Manuscript Draft--

Influence of knowledge about causes of mental disorders and stigma related to mental disorders on healthcare utilisation in a general population sample: a structural equation model

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1   **Abstract**

2   **Background:** The stigma of mental illness, especially personal attitudes towards psychiatric

3   patients and mental health help-seeking, is an important barrier in healthcare utilisation. These

4   attitudes are not independent of each other and are also influenced by other factors, such as

5   mental health literacy, especially the public's causal explanations for mental problems. We

6   aimed to disentangle the interrelations between the different aspects of stigma and causal

7   explanations with respect to their influence on healthcare utilisation. **Methods:** Stigma and

8   causal explanations were assessed using established German questionnaires with two

9   unlabelled vignettes (schizophrenia and depression) in a random-selection representative

10 community sample (N=1375, aged 16-40 years). They were interviewed through a prior

11 telephone survey for current mental disorder (n=192) and lifetime healthcare utilisation

12 (n=377). Structural equation modelling, with healthcare utilisation as outcome and stigma and

13 causal explanations as latent variables, was conducted and supplemented by sensitivity

14 analysis of the final model based on the vignettes. **Results:** We identified two major

15 pathways. One stimulated healthcare utilisation, with high psychosocial stress and low

16 constitution/personality related causal explanations, via positive perception of help-seeking

17 and more help-seeking intentions. The other impeded healthcare utilisation, with high

18 biogenetic and constitution/personality, and low psychosocial stress related explanations, via

19 negative perception of psychiatric patients and a strong wish for social distance. Sensitivity

20 analysis generally supported both pathways with some differences in the role of biogenetic

21 causal explanation. **Conclusion:** Our results indicate that campaigns promoting early

22 healthcare utilisation should focus on different strategies to promote facilitation and reduce

23 barriers to mental healthcare.

Introduction

Mental disorders are prevalent and cause significant personal and societal costs and burdens (Whiteford *et al.*, 2013; Gustavsson *et al.*, 2011; Wittchen *et al.*, 2011). One reason is the often delayed or absent help-seeking (Wang *et al.*, 2007; Penttilä *et al.*, 2014), although mental disorders are treatable and potentially preventable (Barrera *et al.*, 2009; Bienvenu *et al.*, 2009; Waddell *et al.*, 2007). Of the several reported structural and personal barriers towards help-seeking for mental disorders (Andrade *et al.*, 2014; Bonabi et al, 2015; Clement *et al.*, 2015; Corrigan *et al.*, 2014; Schomerus & Angermeyer, 2008; Thornicroft, 2008; Gulliver *et al.*, 2010), low perceived need for help (Kanehara *et al.* 2015), the desire to handle the problem on one's own (Andrade *et al.*, 2014), and negative, stigmatising attitudes are important (Clement *et al.*, 2015; Schnyder *et al.*, 2017).

The term "stigma" comprises public and personal attitudes and behavioural responses towards people with mental problems and towards help-seeking for mental disorders that are formed by cognition and affect (Dividio *et al.* 2010; Fiske, 1998). A recent meta-analysis identified two aspects of mental disorder-related stigma associated specifically with healthcare utilisation in the general population: personal attitudes towards individuals with mental disorders (PersonS) and attitudes towards mental health help-seeking (HelpA) (Schnyder *et al.*, 2017). Both these attitudes consist of a cognitive-behavioural and cognitive-affective component differentially related to help-seeking. The cognitive-behavioural aspect of PersonS is often measured as a wish for social distance from persons with a mental disorder (WSD) (Link *et al.*, 1999), whereas the cognitive-affective aspect of PersonS is often measured as perceived dangerousness of persons with mental disorder (Link *et al.*, 1999; Jorm *et al.*, 2012). WSD consistently showed negative associations with help-seeking (Interian *et al.*, 2010; Aromaa *et al.*, 2011), while cognitive-affective aspects including perceived dangerousness did not show direct associations with help-seeking (Cooper *et al.*, 2003; Schomerus *et al.*, 2009) but mediated the former relationship (Lee *et al.*, 2014). The cognitive-affective aspect of HelpA includes assumed feelings such as embarrassment about one's own (potential) help-seeking or what others might think about one's own (potential) help-seeking for mental problems (ten Have *et al.*, 2010). The cognitive-behavioural aspect of HelpA includes help-seeking intentions and people's willingness to seek help in case of mental problems (Picco *et al.* 2016; ten Have *et al.*, 2010). Similar to PersonS and in line with the theory of planned behaviour (Ajzen, 1991), the cognitive-behavioural, but not the cognitive-affective aspect of HelpA, was related to help-seeking behaviour (Mojtabai *et al.*, 2016; McEachan *et al.*, 2011).

58 Stigmatising attitudes, however, are not independent of each other and are also influenced by
59 other factors, an important one being mental health literacy (MHL) (Svensson & Hansson,
60 2016). MHL is defined as knowledge about mental disorders, including etiological and help-
61 seeking knowledge (Jorm *et al.*, 1997; Wei *et al.*, 2015). The public's causal explanations for
62 mental health problems as part of MHL were associated with stigmatising attitudes toward
63 individuals with mental disorders (Reavley & Jorm, 2014). Of these, biogenetic causal
64 explanations were repeatedly related to more stigmatisation in terms of perceived
65 dangerousness that, in turn, increased WSD (Schomerus *et al.*, 2014; Kvaale *et al.*, 2013). At
66 present, little is known about how the various effects of stigma, biogenetic, and other causal
67 explanations are interrelated with respect to their influence on healthcare utilisation for mental
68 problems. Furthermore, to the best of our knowledge, studies of the interrelations between
69 causal explanations and help-seeking attitudes, and help-seeking intentions and healthcare
70 utilisation are still missing.

71 We aimed to disentangle the interrelations between the various aspects of stigma and causal
72 explanation, as possibly the most influential aspect of MHL on stigma. Finally, we examined
73 the influence of MHL and stigma on healthcare utilisation for mental problems, using
74 structural equation modelling (SEM). This enabled us to account for potential correlations and
75 associations between these constructs (Coppens *et al.*, 2013). A better understanding of the
76 interplay among these variables will advance the development of combined information and
77 anti-stigma campaigns. This would help overcome the two important barriers to adequate and
78 timely mental health help-seeking (Corrigan *et al.*, 2015; Griffiths *et al.*, 2014; Mehta *et al.*
79 2015; Thornicroft *et al.*, 2016).

80

81 **Method**

82 *Study design*

83 Our study is based on the cross-sectional data of an add-on to the 'Bern Epidemiological At-
84 Risk' (BEAR) study, a random-selection representative population telephone study in the
85 semi-rural Canton Bern, Switzerland (Schultze-Lutter *et al.*, 2014). Between June 2011 and
86 June 2015, we recruited participants between 16-40 years. We chose this age range because
87 most axis-I mental disorders have their onset after 15 and before 41 years (Kessler *et al.*,
88 2005). Besides appropriate age, eligibility criteria were main residency in Canton Bern (i.e.
89 having a valid address in Canton Bern, and not abroad during the assessment period) and an
90 available telephone number. Exclusion criteria included past or present psychosis, and

91   insufficient language skills in German, French, English, or Spanish. To increase response rate,

92   we sent an information letter prior to the first telephone contact with study details and goals.

93   After each interview, we asked German-speaking participants to enrol in the add-on study and

94   complete a questionnaire on MHL and attitudes. The questionnaires focussed on either

95   depression or schizophrenia and were randomly posted in turn. To increase response rate, we

96   reminded participants thrice to complete the questionnaire and offered help in case of

97   difficulties.

98   The ethics committee at the University of Bern approved the studies. All participants gave

99   informed consent for both studies.

100   *Measures*

101   In the telephone interview, we assessed socio-demographic variables and lifetime healthcare

102   utilisation with the WHO Pathways-to-Care questionnaire (Gater *et al.*, 1991), and axis-I

103   disorders with the Mini-International Neuropsychiatric Interview (M.I.N.I; Sheehan *et al.*,

104   1998).

105   Adapted from Angermeyer *et al.* (2004), the questionnaire of the add-on study started with an

106   unlabelled vignette (see appendix to Angermeyer *et al.* 2004) on either schizophrenia or major

107   depression referred to in subsequent questions. For assessment of causal explanations,

108   participants were asked to rate the 18 causes on a five-point Likert scale from 0='certainly not

109   a cause' to 4='certainly a cause'. For assessment of the cognitive-affective aspect of PersonS,

110   participants were asked to rate 11 stereotyping attributes about the described person on a five-

111   point Likert scale from 0='certainly not agree with' to 4='certainly agree with'. For

112   assessment of the cognitive-behavioural aspect of PersonS, participants were asked to rate

113   their willingness to engage in seven social relationships with the described person (adapted

114   social distance scale developed by Link *et al.*, 1987) on a five-point Likert scale from

115   0='definitely willing' to 4='definitely not willing'. Higher values on the PersonS scales

116   indicated stronger stigmatising attitudes. The cognitive-affective aspect of HelpA was

117   assessed based on the response of the participants to the following two questions: 'how

118   comfortable would you feel talking with a specialist about your personal problems' (four-

119   point Likert scale from 0='not at all comfortable' to 3='very comfortable') and 'how

120   embarrassed would you feel if your friends knew that you seek help for an emotional

121   problem' (four-point Likert scale from 0='very embarrassed' to 3='not at all embarrassed').

122   We assessed the cognitive-behavioural aspect of HelpA (i.e., help-seeking intentions) based

123   on the participants willingness to seek help from a specialist for an emotional problem (four-

5

124 point Likert scale from 0='definitely not' to 3='definitely yes'). For both HelpA concepts

125 higher values indicate positive HelpA.

Statistical Analyses

127 For group comparisons of categorical or non-normally distributed continuous data, we

128 computed χ^2-tests or Mann-Whitney U tests, respectively. Prior to the structural equation

129 models (SEM), we computed orthogonal exploratory factor analyses (EFA) with varimax

130 rotation on the basis of polychoric correlation matrices for participant's causal explanations

131 and PersonS, to obtain independent factors. We computed SEMs with the weighted least

132 squares and variance adjusted estimator (WLSMV) (Brown, 2006) based on diagonally

133 weighted least squares (DWLS) for categorical variables (Muthén, 1993). Missing data were

134 deleted listwise. We assessed the model fit with four commonly used indices that were as

135 follows: the χ^2 test, the comparative fit index (CFI), the standardized root mean square

136 residual (SRMR), and the root-mean-square error of approximation (RMSEA) including 90%-

137 confidence interval (90%CI). A non-significant χ^2-test, CFI$\geq$0.95, SRMR$\leq$0.08, and

138 RMSEA$\leq$0.06 (90%CI should not contain 0.08) indicated good model fit (Kline, 2011;

139 Hooper *et al.* 2008). In the evaluation of model fit, we focussed on CFI, SRMR, and RMSEA,

140 because the χ^2-test is sensitive to sample size resulting usually in a rejected model in large

141 samples such as ours (Bentler & Bonnet, 1980).

142 We formed latent variables for causal explanations and for PersonS according to results of the

143 EFA, and for the cognitive-affective aspect of HelpA 'not embarrassing/feeling comfortable',

144 to generate the measurement models. Help-seeking intentions and lifetime healthcare

145 utilisation were observed variables. Following recommendations for confirmatory factor

146 analysis (Acock, 2013), we dropped items with factor loadings $\leq$0.4 from the analyses. We

147 computed all parameters based on standardisation of latent and manifest variables.

148 We first tested the hypothesised base model including all likely associations between latent

149 and manifest variables (eFigure 1). Then we dropped latent variables with non-significant

150 associations as well as other non-significant associations from the model. For sensitivity

151 analysis, we analysed the final model in the two subgroups (depression and schizophrenia

152 vignette) separately. Finally, we included socio-demographic variables and axis-I disorder

153 potentially confounding healthcare utilisation. Statistical analyses were done using Stata

154 version 14 (Stata Corporation, College Station, TX, USA) and R (R Core Team) package

155 lavaan (Rosseel, 2012).

156

Results

Sample characteristics

Of the 2683 representative participants of the telephone study, 2519 spoke German. Of these eligible participants, 1519 returned the questionnaire; thus, the response rate was 60.3% (Figure 1). There was no indication of a response bias related to the vignette, presence of any current mental disorder, or lifetime healthcare utilisation for mental problems. However, non-responders were mostly young males with a low education level. All response biases had a small effect size (eTable 1).

- Figure 1 -

Of the responders, 377 (24.8%) reported lifetime healthcare utilisation for mental problems in the telephone survey (Table 1). Healthcare utilisers were more likely older, educated females, currently meeting the criteria for a non-psychotic mental disorder (Table 1).

- Table 1 -

Factors of causal explanations and stigmatising attributes

EFA of the 18 causal explanations resulted in five independent factors: 'psychosocial stress', 'childhood adversities', 'biogenetics', 'substance abuse', and 'constitution/personality' (eTable 2). 'Psychosocial stress' was the main causal explanation for the depicted symptoms, followed by 'substance abuse', 'biogenetics', 'childhood adversities', and 'constitution/personality' (eTable 2).

EFA of the 18 items on PersonS led to four independent factors as follows: 'perceived unpredictability/dangerousness', 'wish for social distance' (WSD), 'dependent', and 'needy' (eTable 3). Further analyses only considered 'perceived unpredictability/dangerousness' and WSD due to their dominance in prior studies (Link *et al.*, 2004). Participants mostly attributed unpredictability to a person with a mental disorder and expressed the strongest WSD with respect to child-care and job-recommendation (eTable 3).

Most participants expressed high help-seeking intentions, i.e. they would likely or certainly seek help in case of mental problems (eFigure 2). Participants anticipated generally feeling comfortable talking to a professional about potential mental problems, and not feeling embarrassed if others knew about the assumed help-seeking (factor 'pleasant/not embarrassing') (eFigure 2).

187   *Associations between causal explanations and attitudes and their influence on healthcare*

188   *utilisation*

189   Little missing data (between 0.2-1.2% per item) resulted in 10% missing data in total, using

190   the list wise deletion method. The initial model showed a good fit, and most hypothesised

191   stigmatising attitudes and associations became significant (eFigure 3). No significant

192   associations were found between causal explanations related to substance abuse or childhood

193   adversity and 'perceived unpredictability/dangerousness' or 'pleasant/not embarrassing', and

194   between WSD and help-seeking intentions (eFigure 3). Consequently, we dropped these two

195   latent variables from the model and removed non-significant associations.

196   The final resultant SEM had a good model fit and indicated two main paths from causal

197   explanations via attitudes to healthcare utilisation (Figure 2, Table 2). One path, increasing

198   healthcare utilisation, led from high psychosocial stress and low constitution/personality

199   related causal explanations via perceiving help-seeking as pleasant/not embarrassing and

200   help-seeking intentions to more likely healthcare utilisation. The other path, decreasing

201   healthcare utilisation, led from high biogenetic as well as constitution/personality and low

202   psychosocial stress related causal explanations via strongly perceived

203   unpredictability/dangerousness and a strong WSD to less likely healthcare utilisation.

204   Furthermore, a perception of unpredictability/dangerousness increased help-seeking

205   intentions, whereas a perception of help-seeking as pleasant/not embarrassing was decreased

206   by a stronger WSD (Figure 2).

207   *- Figure 2 -*

208   *- Table 2 -*

209   *Sensitivity analyses and influence of sociodemographic and clinical variable*

210   The sensitivity analyses of the influence of the vignettes revealed models of comparable good

211   fit. They differed slightly, especially with respect to the role of biogenetic causal explanations

212   (Figure 3). These played no significant role in the depression–vignette model. However,

213   compared to the general model, their influence on perceived unpredictability/dangerousness

214   became more pronounced in the schizophrenia-vignette model. The two main paths of the

215   general model remained generally stable for both vignettes; however, for the schizophrenia

216   vignette the association between WSD and healthcare utilisation became non-significant.

217   *- Figure 3 -*

218 To control for potentially confounding variables of healthcare utilisation, we included socio-
219 demographic and clinical variables in an extended SEM (eFigure 4). Although current axis-I
220 disorder, female sex, and higher age were positively associated with healthcare utilisation and
221 slightly increased the explained variance of healthcare utilisation, all paths of the general
222 model (Figure 2) remained significant at a slightly decreased model fit.

223

224 **Discussion**

225 Our unique, comprehensive community study on the pathways from causal explanations of
226 mental disorders via attitudes towards mental disorders and help-seeking, and help-seeking
227 intentions to healthcare utilisation provides important insights, thereby extending our
228 knowledge on the interplay of previously reported single associations. We identified two
229 major pathways, one that stimulates healthcare utilisation for mental problems and another
230 that impedes it. These pathways are largely independent of the clinical picture illustrated in
231 the two vignettes, as well as of sociodemographic variables and presence of a non-psychotic
232 axis-I disorder.

233 The stimulating pathway went from high psychosocial stress and low constitution/personality
234 related causal explanations via pleasant/not embarrassing perception of help-seeking, and
235 high help-seeking intentions to an increased probability of healthcare utilisation. Help-seeking
236 attitudes in general (incl. help-seeking intentions) had been related to healthcare utilisation
237 earlier (Schnyder *et al.*, 2017); however, the role of causal explanations was unknown.
238 Interestingly, biogenetic causal explanations that received a strong focus in stigma research,
239 especially for their effect on the attitude towards persons with mental disorders (Kvaale *et al.*,
240 2013; Schomerus *et al.*, 2014), played no significant role in the stimulating pathway (Lee *et*
241 *al.*, 2014). They only exhibited relatively small negative associations with stress- and
242 constitution/personality-related causal explanations. They have been substituted by
243 constitution/personality related causal explanations having a moderately negative impact on
244 the perception of help-seeking as pleasant/not embarrassing. Jorm and Griffiths (2008) have
245 also reported personal weakness (a main factor of our latent variable
246 'constitution/personality'), as opposed to biogenetic causal explanation, to be an important
247 determinant of stigmatising attitudes. In contrast, psychosocial stress-related causal
248 explanations with a moderately positive association with constitution/personality related
249 explanations had a minor positive effect on help-seeking attitudes. In line with the results of
250 previous studies (Mojtabai *et al.*, 2016; McEachan *et al.*, 2011), perception of help-seeking as

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251 pleasant/not embarrassing strongly stimulated help-seeking intentions, which moderately
252 stimulated healthcare utilisation. The moderate path between intended help-seeking and
253 healthcare utilisation supports the notion that intentions and behaviour are associated (Ajzen,
254 1991), but not the same. Although most people would recommend seeking help from a
255 professional (Holzinger *et al.* 2011), a much lower proportion actually engaged in it (Wang *et*
256 *al.*, 2007). Future studies should therefore distinguish between intended help-seeking and
257 healthcare utilisation when examining impact of stigmatising attitudes on help-seeking,
258 particularly if the focus is on promoting early help-seeking.

259 A surprising finding was the small positive effect of perceived unpredictability/dangerousness
260 on help-seeking intentions. This association seems to depend on the strength of the perceived
261 unpredictability/dangerousness and was only included in the sensitivity analyses for the
262 schizophrenia vignette model (Angermeyer *et al.*, 2004). This counterintuitive finding might
263 reflect persons' wish to prevent being stigmatised themselves by symptoms like the ones
264 depicted in the vignette, thus voicing stronger intentions to seek help in case of their own
265 potential mental problems. Further studies looking deeper into this possible link are required.

266 The impeding pathway went from low psychosocial stress and high constitution/personality
267 related causal explanations as well as biogenetic causal explanations via perceived
268 unpredictability/dangerousness and high WSD to a decreased probability of healthcare
269 utilisation. Earlier studies on the impact of causal explanations on stigma had often focussed
270 on biogenetic causal explanations (Kvaale *et al.*, 2013), while other causal models received
271 less attention. Interestingly, despite supporting a significant moderate role of biogenetic
272 causal explanations, our results indicated a strong role of the commonly neglected
273 psychosocial stress and constitution/personality related causal explanations on stigmatisation
274 of persons with mental disorder. Altogether, our results on causal explanations indicate that
275 causal models related to person factors increase perceived unpredictability/dangerousness
276 while those related to stressful environmental factors decrease it. In line with the results of
277 other studies (Lee *et al.*, 2014; Schomerus *et al.*, 2014), perceived
278 unpredictability/dangerousness increased WSD. However, this had a minor negative effect on
279 healthcare utilisation. A recent meta-analysis reported a slightly smaller effect of attitudes
280 towards persons with mental disorder compared to attitudes towards help-seeking on
281 healthcare utilisation in the general population (Schnyder *et al.*, 2017). Furthermore, the
282 higher impact of help-seeking attitudes on healthcare utilisation supports earlier theories and
283 findings of a strong association between the two (Ajzen, 1991; O'Connor *et al.*, 2014). In the

schizophrenia vignette model, this direct link between WSD and healthcare utilisation disappeared. This was surprising in light of the commonly reported greater link of WSD with schizophrenia compared to its link with depression (Angermeyer *et al.*, 2004); and therefore it was expected to exert a stronger impact on healthcare utilisation.

Contrary to our expectations, we did not find a direct association between WSD and help-seeking intention. However, WSD had a negative impact on the stimulating pathway because of the perception of help-seeking as potentially embarrassing/unpleasant. Other studies have shown negative effects of WSD on help-seeking intentions (Schomerus *et al.*, 2009; Yap *et al.*, 2011). However, to the best of our knowledge, our study was the first to differentially assess this relationship in one model together with the perception of help-seeking as potentially embarrassing/unpleasant as a moderator of help-seeking intentions.

The presence of the two largely independent pathways from causal models via stigmatising attitudes to healthcare utilisation, if replicated in future studies, is relevant to the planning of campaigns promoting early healthcare utilisation. These could focus on reducing barriers to healthcare, promoting facilitators of health care utilisation, or both, by differential strategies. In both cases, however, childhood adversity and substance use related causal explanations seem to play a negligible role on stigma-related barriers to healthcare utilisation, at least not in cases of schizophrenia and depression. Our results indicate that these pathways, albeit sharing many features, do differ in some respects. Thus, future studies might further address the question of similarities and differences with respect to different mental disorders; this will improve the focus on common links in general campaigns and address specific features, related to specific risk groups, in special campaigns.

Strengths and limitations

Despite the two obvious strengths of our study: (1) examining various relevant associations of the pathway from causal models via stigmatising attitudes to healthcare utilisation in one study, and (2) using healthcare utilisation, rather than only hypothetical help-seeking intentions, as an outcome in a randomly selected, representative community sample, some limitations have to be considered. One of the limitations our study shares with other studies (Clement *et al.*, 2015; Schnyder *et al.*, 2017) is its reliance on cross-sectional data of a high-income, Western society. We can therefore neither exclude the problem of reversed causation nor can we translate our findings to low-income or non-western societies. Another limitation shared with other studies (Eisenberg *et al.*, 2009; Nederhof, 1985) is the possibility of a

316 response bias towards social desirability. Future studies might use implicit association tests or

317 direct behavioural observations.

318 In our sample, we detected a small response bias in favour of female sex, higher age, and

319 higher education. Since only few studies have reported potential response biases (Gronholm

320 *et al.*, 2017), we cannot estimate if other similar studies share these biases. However, they are

321 frequently reported in general population studies (Cull *et al.*, 2005; Guyll *et al.*, 2003).

322 Education, age, and sex had no significant impact on our outcome. Thus, these small biases

323 are likely to be negligible.

324 *Conclusion*

325 Our unique study indicated the presence of two largely independent pathways from causal

326 models via stigmatising attitudes to healthcare utilisation. The stimulating pathway included

327 help-seeking attitudes, the impeding pathway included attitudes towards persons with mental

328 disorder. Interestingly, in both pathways, biogenetic causal models played only a minor role,

329 indicating that other causal explanations should be considered equally in future studies. In

330 line with the theory of planned behaviour (Ajzen, 1991, Ajzen, 2001), future studies should

331 distinguish between help-seeking intentions and healthcare utilisation. They might

332 additionally take past behaviours (e.g. past treatment) into account when examining

333 influencing factors such as attitudes and causal explanations. Furthermore, our sensitivity

334 analyses indicated that, while mental disorders share certain crucial features in attitude-related

335 barriers and facilitators, they might also be associated with distinct features that could be

336 relevant for disorder-specific campaigns.

337

338 **Figure and table legends** (writing in *italics* for tables are not to be printed, they just serve as

339 information for the typesetter)

340 **Figure 1:** Survey outcome rates of the Bern Epidemiological At Risk (BEAR) telephone and

341 its add-on questionnaire study according to the definitions of the American Association for

342 Public Opinion Research (Ref: Standard Definitions: Final Dispositions of Case Codes and

343 Outcome Rates for Surveys. 9th edition. The American Association for Public Opinion

344 Research. AAPOR; 2016. http://www.aapor.org/AAPOR_Main/media/publications/Standard-

345 Definitions20169theditionfinal.pdf. Accessed May 20, 2017)

346 **Figure 2:** Final model of associations between causal explanations, stigmatising attitudes and

347 healthcare utilisation (n=1375).

348 Model fit indices: $\chi^2_{(338)}$=1731, p<0.001; CFI=0.966; SRMR=0.055; RMSEA=0.055

349 (90%CI=0.052-0.057).

350 *** p≤0.001; standardised path coefficient and corresponding standard error (in parentheses);

351 explained variance (R^2) for each endogenous variable in *italics*. Rectangles represent

352 observed manifest variables, ovals represent unobserved latent variables; rounded arrows

353 represent covariances; straight arrows represent regressions. Bolt black arrows indicate paths

354 that decreased healthcare utilisation, bolt grey arrows indicate paths that increased healthcare

355 utilisation.

356

357 **Figure 3:** Final model of associations for depression and schizophrenia vignette separately.

358 *p ≤0.05 ** p ≤0.01, *** p≤0.001; standardised path coefficient and corresponding standard

359 error (in parentheses); explained variance (R^2) for each endogenous variable in *italics*.

360 Rectangles represent observed manifest variables, ovals represent unobserved latent variables;

361 rounded arrows represent covariances; solid straight arrows represent significant, dashed

362 straight arrow represents non-significant regression. Results of two models are presented here:

363 MFI, R^2 and results of solid arrows relate to reduced model (non-significant paths dropped

364 from model). Result of dashed arrow relates to full model.

365

366 *Title of table 1:*

367 **Table 1: Socio-demographic and clinical characteristics of sample**

368 *Legend of table 1:*

369 [a] according to International Standard Classification of Education (ISCED) (UNESCO Institute

370 for Statistics, 2012).

13

371   [b] according to Mini-International Neuropsychiatric Interview.

372   [c] Cramer's *V* of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

373   [e] Pearson's *r* of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

374   [*] cell frequency significantly higher or lower than expected with the standardised residuum of

375   cell of >1.96 and of <-1.96, respectively.

376   Sum scores of different axis-I disorders do not add up to current axis-I disorder 'yes' due to

377   comorbidity.

378

379   *Title of table 2*

380   **Table 2: Standardized factor loadings of latent variables from final model and their**

381   **corresponding standard errors**

382   *Legend of table 2:*

383   [a] Reference indicator with fixed factor loadings in unstandardized solution

384   *** $p \leq 0.001$

385

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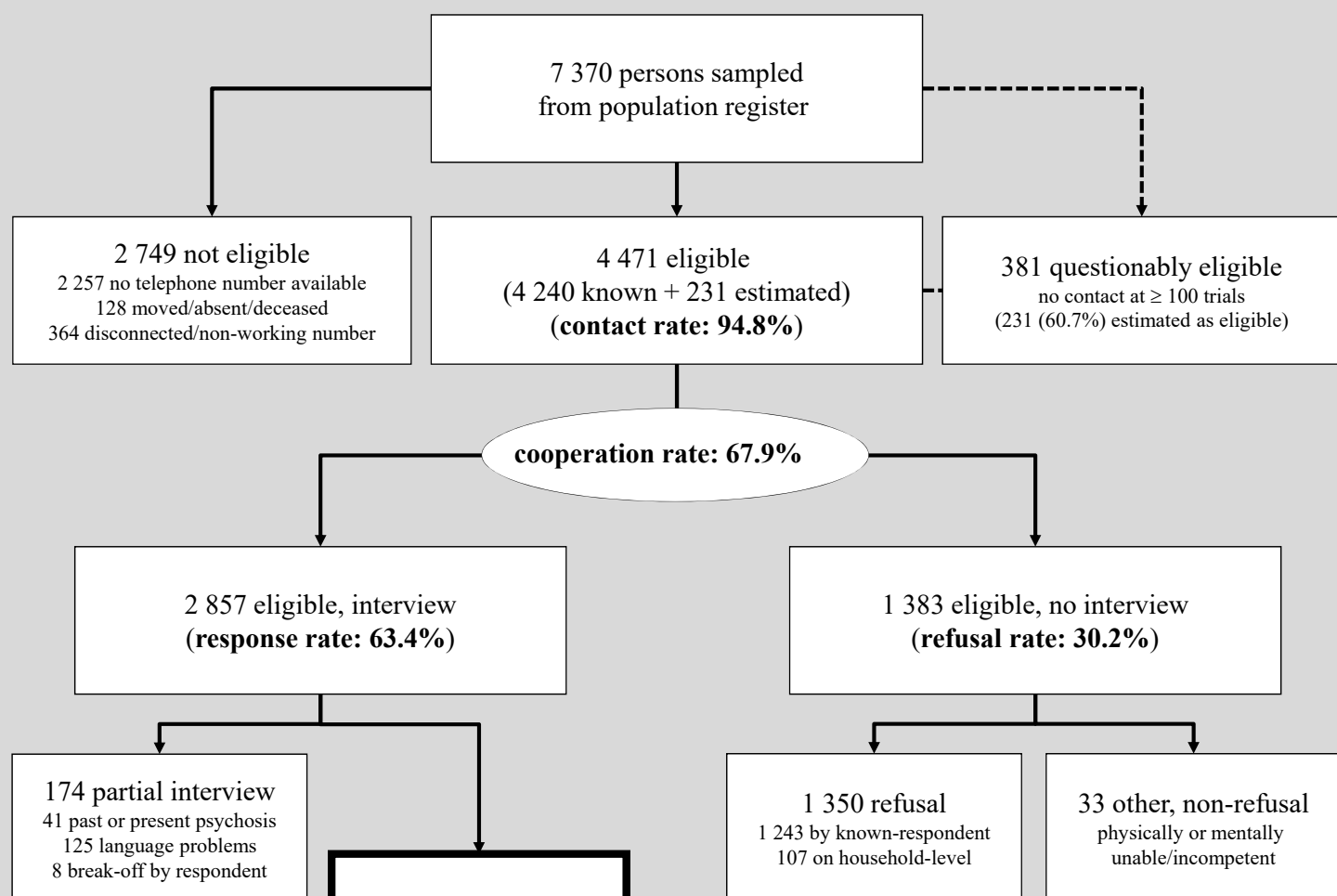553   *and Clinical Neuroscience* **259**, 298-306.

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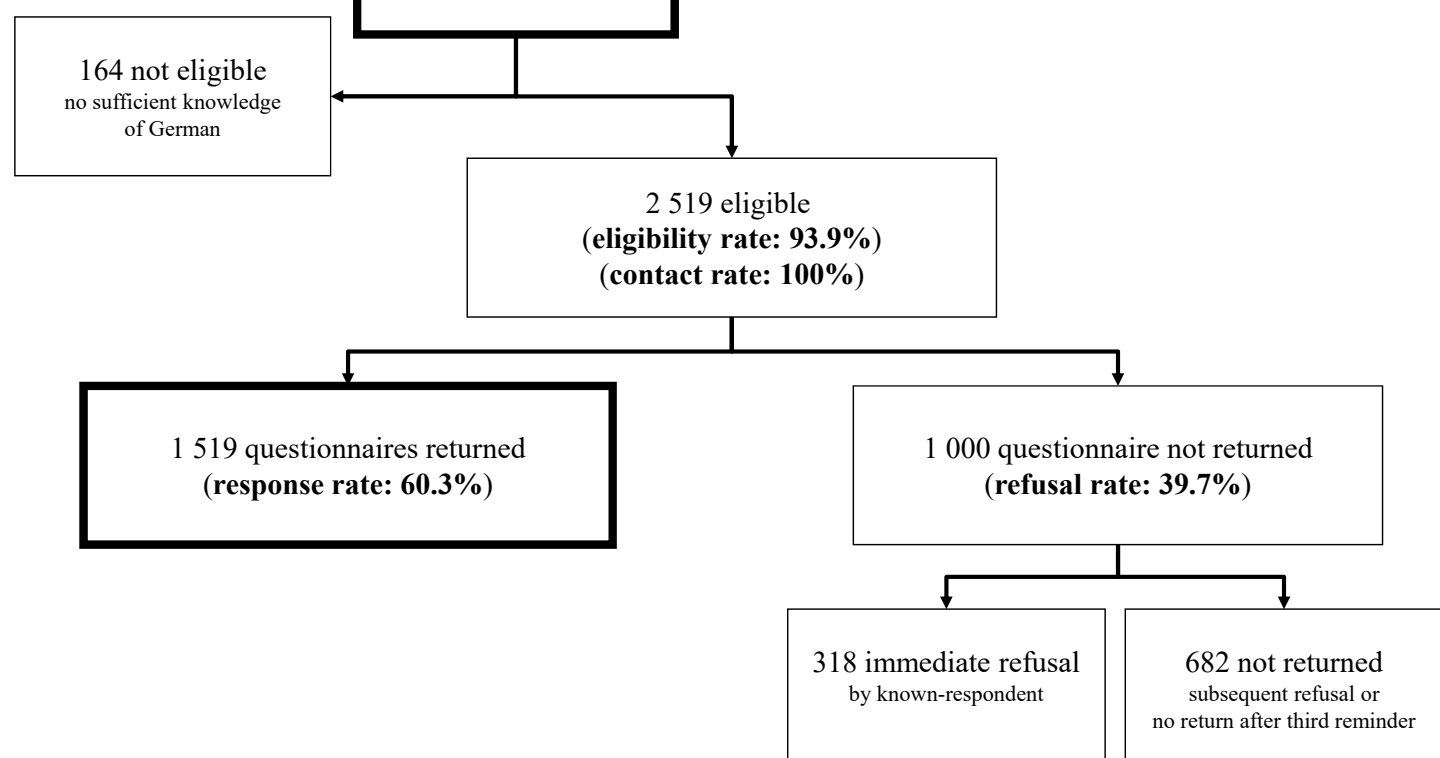593   and burden of mental disorders and other disorders of the brain in Europe 2010.
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BEAR telephone study

Add-on questionnaire study

7 370 persons sampled
from population register

2 749 not eligible
2 257 no telephone number available
128 moved/absent/deceased
364 disconnected/non-working number

4 471 eligible
(4 240 known + 231 estimated)
(contact rate: 94.8%)

381 questionably eligible
no contact at ≥ 100 trials
(231 (60.7%) estimated as eligible)

cooperation rate: 67.9%

2 857 eligible, interview
(response rate: 63.4%)

1 383 eligible, no interview
(refusal rate: 30.2%)

174 partial interview
41 past or present psychosis
125 language problems
8 break-off by respondent

1 350 refusal
1 243 by known-respondent
107 on household-level

33 other, non-refusal
physically or mentally
unable/incompetent

2 683
complete interview

164 not eligible
no sufficient knowledge
of German

2 519 eligible
(eligibility rate: 93.9%)
(contact rate: 100%)

1 519 questionnaires returned
(response rate: 60.3%)

1 000 questionnaire not returned
(refusal rate: 39.7%)

318 immediate refusal
by known-respondent

682 not returned
subsequent refusal or
no return after third reminder

A: depression vignette only (n=691).

Model fit indices (MFI): $\chi^2_{(291)}=861$, p<0.001; CFI=0.957; SRMR=0.060; RMSEA=0.053 (90%CI=0.049-0.057)

B: schizophrenia vignette only (n=694).

Model fit indices: $\chi^2_{(339)}=958$, p<0.001; CFI=0.956; SRMR=0.061; RMSEA=0.051 (90%CI=0.047-0.055)
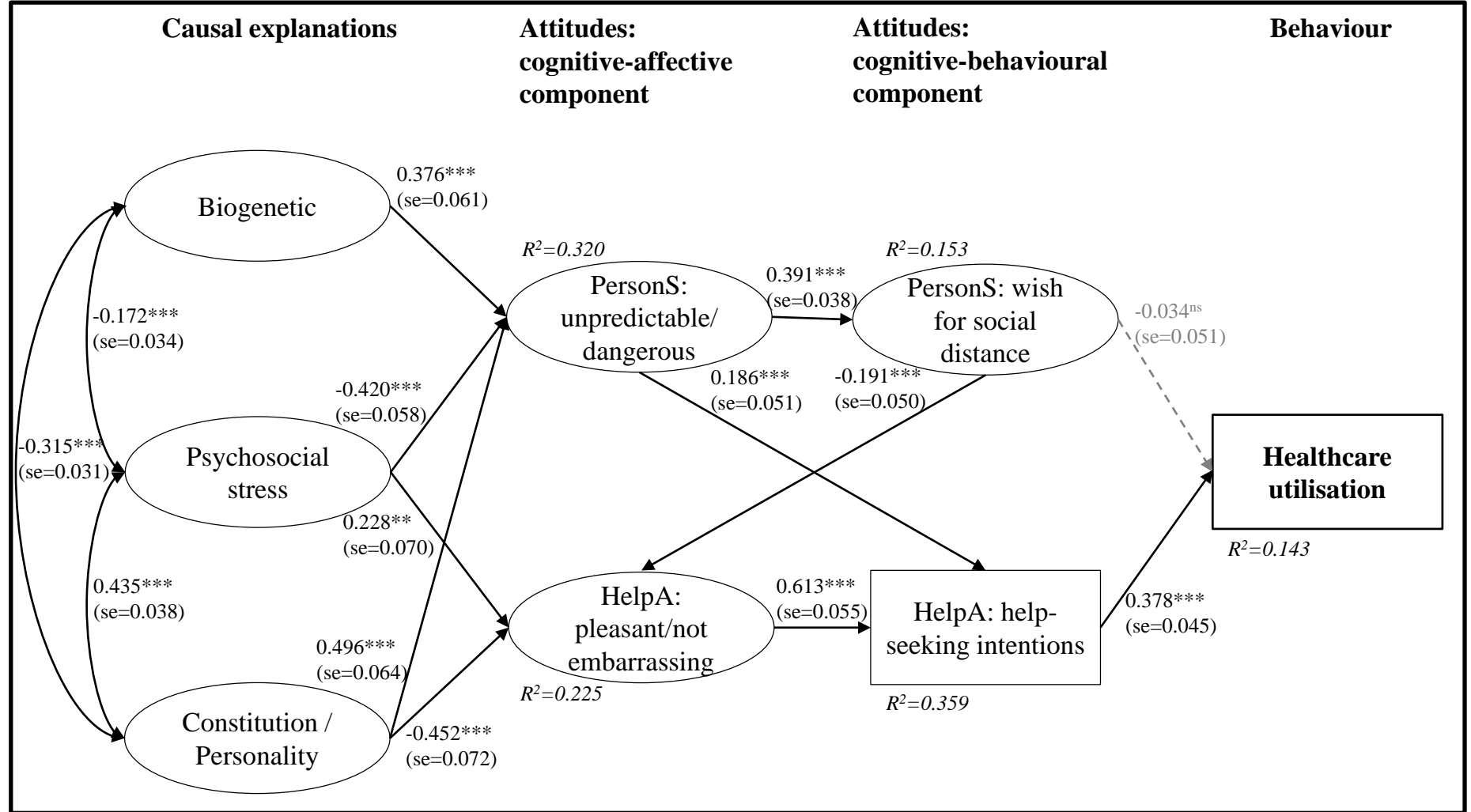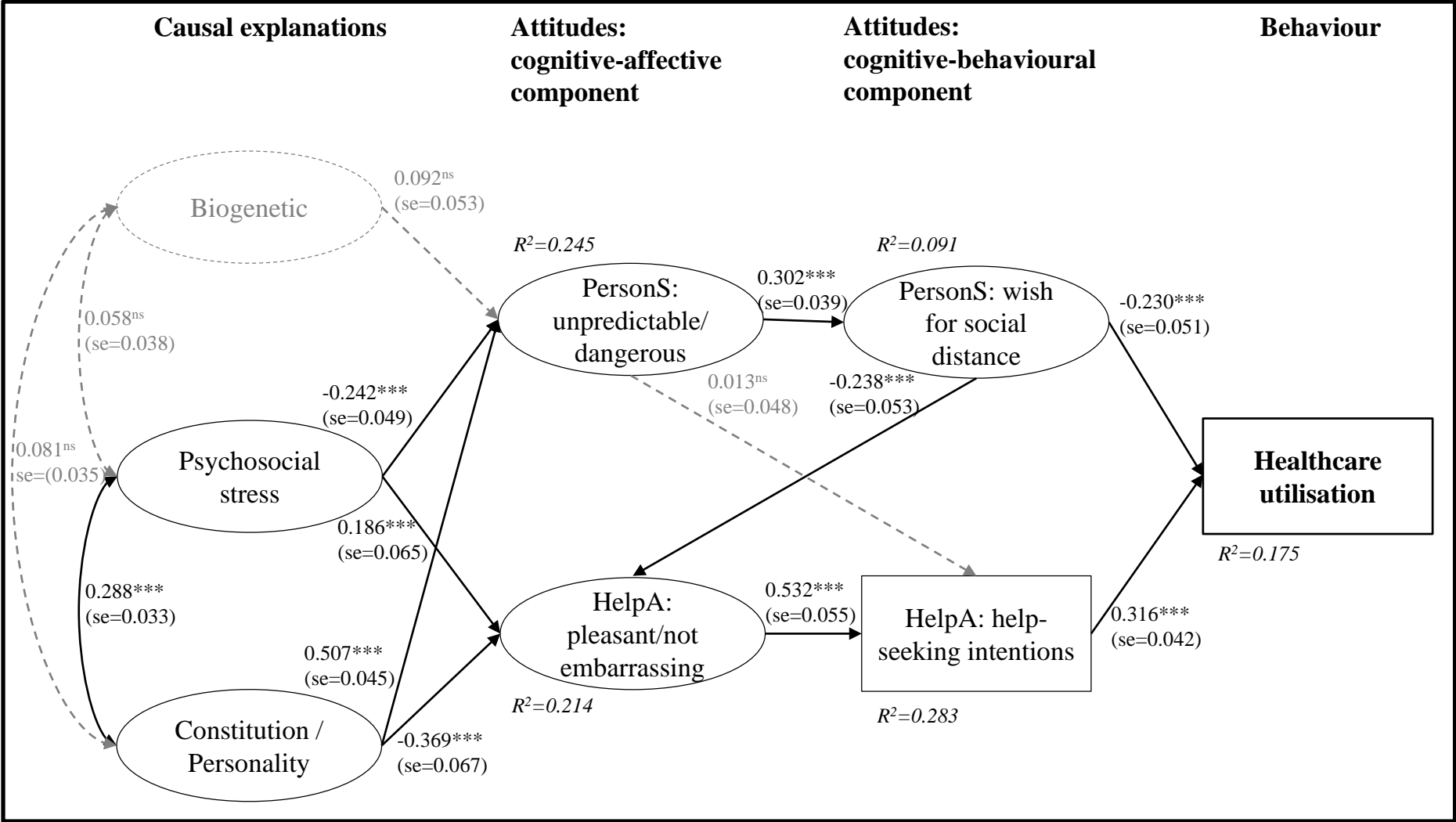
Table 1: Socio-demographic and clinical characteristics of sample

	Total sample (N=1519)	No lifetime healthcare utilisation (n=1142; 75.2%)	Lifetime healthcare utilisation (n=377; 24.8%)	Statistics $\chi^2_{(df)}$ and Cramer's V^c / U (p) and Pearson's r^d
Sex, n (%)				
Male	717 (47.2)	603 (52.8)[*]	114 (30.2)[*]	$\chi^2_{(1)}$=57.900, p<0.001, V=0.195
Female	802 (52.8)	539 (47.2)[*]	263 (69.8)[*]	
Age: median (mean ± SD)	33.9 (31.3±7.3)	32.9 (30.8±7.4)	35.3 (33.0±6.6)	U=179 289.5, p<0.001, r=0.125
Highest professional qualification[a], n (%)				
Secondary school (ISCED 2)	42 (2.8)	30 (2.6)	12 (3.2)	
High School (ISCED 3)	98 (6.4)	83 (7.3)	15 (4.0)[*]	$\chi^2_{(6)}$=14.126, p<0.05, V=0.096
Post-secondary non-tertiary education (ISCED 4)	13 (0.9)	9 (0.8)	4 (1.1)	
Short cycle tertiary education (ISCED 5)	794 (52.3)	590 (51.7)	204 (54.1)	
Master (ISCED 7)	548 (36.1)	417 (36.5)	131 (34.7)	
Doctoral (ISCED 8)	24 (1.6)	13 (1.1)	11 (2.9)[*]	
Current axis-I disorder[b], n (%)				
No	1327 (87.4)	1044 (91.4)	283 (75.1)[*]	$\chi^2_{(1)}$=68.635, p<0.001, V=0.213
Yes	192 (12.6)	98 (8.6)[*]	94 (24.9)[*]	
Any affective disorder	60 (3.9)	14 (1.2)[*]	46 (12.2)[*]	$\chi^2_{(1)}$=89.996, p<0.001, V=0.243
Any anxiety disorder	138 (9.1)	84 (7.4)	54 (14.3)[*]	$\chi^2_{(1)}$=16.662, p<0.001, V=0.105
Any eating disorder	7 (0.5)	2 (0.2)	5 (1.3)[*]	$\chi^2_{(1)}$=8.188, p<0.01, V=0.073
Any somatoform disorder	15 (1.0)	4 (0.4)[*]	11 (2.9)[*]	$\chi^2_{(1)}$=19.110, p<0.001, V=0.112
Alcohol misuse	18 (1.2)	8 (0.7)	10 (2.7)[*]	$\chi^2_{(1)}$=9.223, p<0.01, V=0.078
Drug misuse	22 (1.4)	13 (1.1)	9 (2.4)	$\chi^2_{(1)}$=3.097, p=0.078, V=0.045

[a] according to International Standard Classification of Education (ISCED) (UNESCO Institute for Statistics, 2012).

[b] according to Mini-International Neuropsychiatric Interview.

[c] Cramer's V of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

[e] Pearson's r of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

[*] cell frequency significantly higher or lower than expected with the standardised residuum of cell of >1.96 and of <-1.96, respectively.

Note: sum scores of different axis-I disorders do not add up to current axis-I disorder 'yes' due to comorbidity.

Table 2: Standardized factor loadings of latent variables from final model and their corresponding standard errors

Latent Variable *Item*	Standardized factor loadings	Standard error
Causal explanations		
Psychosocial Stress		
Work-related stress	0.846***	0.016
Problems or sorrows in family	0.705***	0.019
Too high self-expectations	0.647***	0.021
Severe life event	0.523***	0.025
Daily hustles	0.640***	0.021
Biogenetic		
Brain disease[a]	1.116***	0.127
Heredity	0.364***	0.046
Constitution/Personality		
Weak will	0.771***	0.027
Weak constitution	0.531***	0.027
Immoral lifestyle	0.539***	0.028
Personal Stigma (PersonS)		
Cognitive-behavioural aspect (Wish for social distance)		
Babysit your children for a couple of hours[a]	0.764***	0.019
Sublet a room in your apartment	0.748***	0.015
Accept as a co-worker	0.640***	0.019
Accept as a neighbour	0.789***	0.014
Agree on marrying into your family	0.726***	0.016
Introduce to a friend	0.697***	0.017
Recommend for a job	0.675***	0.018
Cognitive-affective aspect (Unpredictable/Dangerous)		
Aggressive[a]	0.646***	0.018
Unpredictable	0.698***	0.017
Lacking self-control	0.737***	0.015
Unreasonable	0.531***	0.022
Strange and different	0.741***	0.015
Frightening	0.684***	0.018
Dangerous	0.788***	0.014
Help-seeking attitudes (HelpA)		
Cognitive-affective aspect		
How comfortable[a]	0.552***	0.034
How embarrassed	0.627***	0.036

[a] Reference indicator with fixed factor loadings in unstandardized solution

*** p≤0.001

Supplementary Material to:

Influence of knowledge about causes of mental disorders and stigma related to mental disorders on healthcare utilisation in a general population sample: a structural equation model

Schnyder, N.[1], Michel, C.[1], Panczak, R.[2], Ochsenbein, S.[1], Schimmelmann, B.G.[1,3], Schultze-Lutter, F.[1,4]

Content: 4 eFigures, 3 eTables

- eFigure 1: proposed model derived from theory and according to explorative factor analysis.

- eTable 1: response bias of questionnaire

- eTable 2: Results of the explorative factor analysis (EFA) of the 18 causal explanations and their frequencies (n=1391).

- eTable 3: Results of the explorative factor analysis (EFA) of the 11 stigmatising attributes (cognitive-affective aspect of personal stigma (PersonS)) and of the 7 social situations (cognitive-behavioural aspects of PersonS) and their frequencies (n=1452).

- eFigure 2: Frequencies of help-seeking attitudes (HelpA).

- eFigure 3: Results of the hypothesized base model derived from theory and according to explorative factor analysis (n=1354).

- eFigure 4: final model with potentially confounding sociodemographic variables (n=1375).
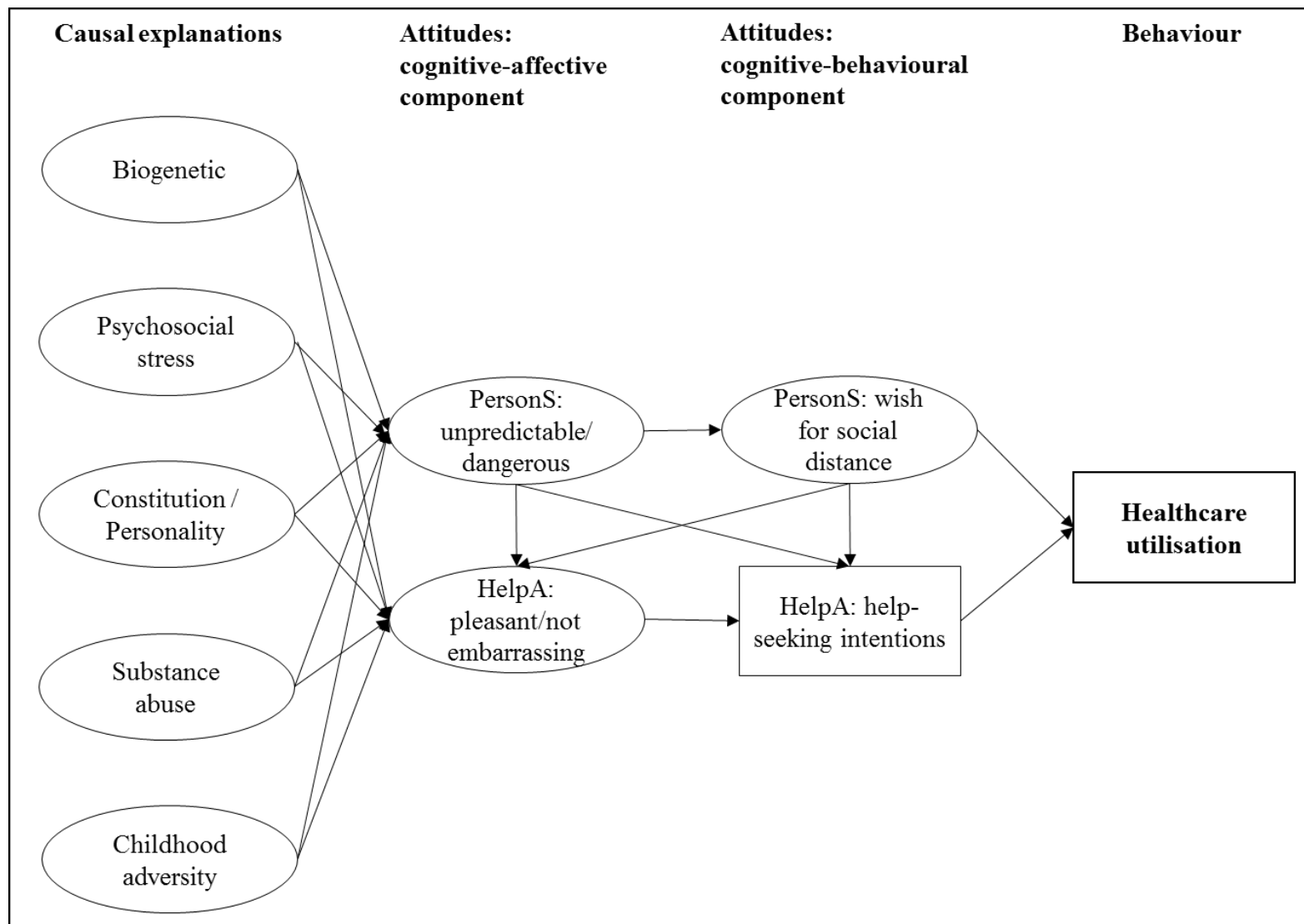
eFigure 1: proposed model derived from theory and according to explorative factor analysis.

Note: rectangles represent observed variables, ovals represent unobserved latent variables

eTable 1: response bias of questionnaire

	Responder (n=1519; 69.3%)	Non-responder (n=682; 30.7%)	Statistics $\chi^2_{(df)}$ and Cramer's V^c / U (p) and r^d
Vignette, n (%)			
Depression	750 (49.3)	349 (51.2)	$\chi^2_{(1)}$=0.677, p=0.410
Schizophrenia	769 (50.7)	333 (48.8)	V=0.018
Sex, n (%)			
Male	718 (47.2)[*]	423 (62.0)[*]	$\chi^2_{(1)}$=41.227, p<0.001
Female	801 (52.8)[*]	259 (38.0)[*]	V=0.137
Age: median (mean ± SD)	33.9 (31.3 ± 7.3)	32.0 (30.3 ± 7.5)	U=479 772.5, p<0.01, r=0.060
Highest professional qualification[a], n (%)			
Secondary school (ISCED 2)	42 (2.8)[*]	43 (6.3)[*]	
High School (ISCED 3)	98 (6.5)	53 (7.8)	$\chi^2_{(7)}$=57.599, p<0.001
Post-secondary non-tertiary education (ISCED 4)	13 (0.9)	4 (0.6)	V=0.162
Short cycle tertiary education (ISCED 5)	794 (52.3)	416 (61.0)[*]	
Master (ISCED 7)	548 (36.1)[*]	159 (23.3)[*]	
Doctoral (ISCED 8)	24 (1.6)	7 (1.0)	
Current axis-I disorder[b], n (%)			
No	1326 (87.3)	587 (86.1)	$\chi^2_{(1)}$=0.629, p=0.428
Yes	193 (12.7)	95 (13.9)	V=0.017
Lifetime help-seeking			
No	1142 (75.2)	537 (78.7)	$\chi^2_{(1)}$=3.293, p=0.070
Yes	377 (24.8)	145 (21.3)	V=0.039

[a] according to International Standard Classification of Education (ISCED) (UNESCO Institute for Statistics, 2012).

[b] according to Mini-International Neuropsychiatric Interview.

[c] Cramer's V of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

[d] Pearson's r of 0.1, 0.3, and 0.5 represent small, medium, and large effect size.

[*] cell frequency significantly higher or lower than expected with the standardised residuum of cell of >1.96 and of <-1.96, respectively.

eTable 2: Results of the explorative factor analysis (EFA) of the 18 causal explanations[a] and their frequencies (n=1391)

Items	% rated as agree[b] to a cause	% rated as disagree[c] to a cause	Factor 1: **Psychosocial stress**	Factor 2: **Childhood adversity**	Factor 3: **Substance abuse**	Factor 4: **Constitution /Personality**	Factor 5: **Biogenetics**
Little support others	40	24		0.458			
Grown up in a broken home	35	33		0.826			
Brain disease	52	24					0.510
Problems or sorrows in family	68	10	0.723				
God's will	4	90				0.538[d]	
Spoiling or over-protective parents	10	64		0.603			
Weak constitution	46	22				0.649	
Immoral lifestyle	13	61				0.629	
Medication or drug abuse	66	13			0.855		
Weak will	22	53				0.758	
Too high self-expectation	52	23	0.721				
Alcohol abuse	46	25			0.827		
Heredity	45	29					0.770
Unconscious conflict	49	20	0.489[d]				
Severe or very stressful life event	77	7	0.629				
Daily hustles	54	20	0.682				
Lack of parental affection	30	34		0.791			
Work-related stress	68	10	0.836				
Eigenvalue			3.117	2.085	2.057	1.974	1.432

Results are from varimax rotated orthogonal EFA based on polychoric correlation matrices; factor loadings of items (in cells) are only shown for the corresponding factor.

[a] Each cause had to be rated on a five-point Likert scale from 0='certainly not a cause' to 4='certainly a cause'.

[b] Percentage refers to persons that 'agreed' or 'totally agreed' with the cause.

[c] Percentage refers to persons that 'disagreed' or 'totally disagreed' with the cause.

[d] variables were dropped in structural equation model (SEM) due to their low factor loadings (≤ 0.4) in SEM.

eTable 3: Results of the explorative factor analysis (EFA) of the 11 stigmatising attributes[a] (cognitive-affective aspect of personal stigma (PersonS)) and of the 7 social situations[b] (cognitive-behavioural aspects of PersonS) and their frequencies (n=1452)

Items	% of not willing[b], or agree with[c]	% willing, or disagree with[c]	Factor 1: **Wish for social distance, WSD**	Factor 2: **Unpredictable/ dangerous**	Factor 3: **Dependent**	Factor 4: **Needy**
PersonS: cognitive-behavioural aspect						
Sublet a room in your apartment	46	19	0.736			
Accept as your co-worker	13	62	0.692			
Accept as your neighbour	13	60	0.762			
Babysit your children for some hours	81	6	0.728			
Agree on marrying into your family	30	35	0.755			
Introduce to a friend	21	50	0.754			
Recommend for a job	47	19	0.781			
PersonS: cognitive-affective aspect						
In need of help	85	4				0.829
Unpredictable	47	27		0.771		
Lacking self-control	31	41		0.806		
Aggressive	14	62		0.783		
Unreasonable	27	47		0.526		
Dependent on others	45	26			0.546	
Strange and different	38	36		0.569		
Frightening	31	46		0.626		
Dangerous	13	64		0.746		
Dependent	35	37			0.803	
Unintelligible	23	51			0.685	
Eigenvalue			4.137	3.697	1.962	1.280

Results are from varimax rotated orthogonal EFA based on polychoric correlation matrices; factor loadings of items (in cells) are only shown for the corresponding factor.

[a] Each attribute had to be rated on a five-point Likert scale from 0='totally disagree with' to 4='totally agree with'.

[b] Each of the social situations had to be rated on a five-point Likert scale from 0='definitely willing' to 4='definitely not willing'.

[c] Percentages refer to 'rather not willing' or 'not willing' (WSD) and to 'agree' or 'totally agree' with (stigmatising attributes).

[d] Percentages refer to 'willing' or 'definitely willing' (WSD) and to 'disagree' or 'totally disagree' with (stigmatising attributes).
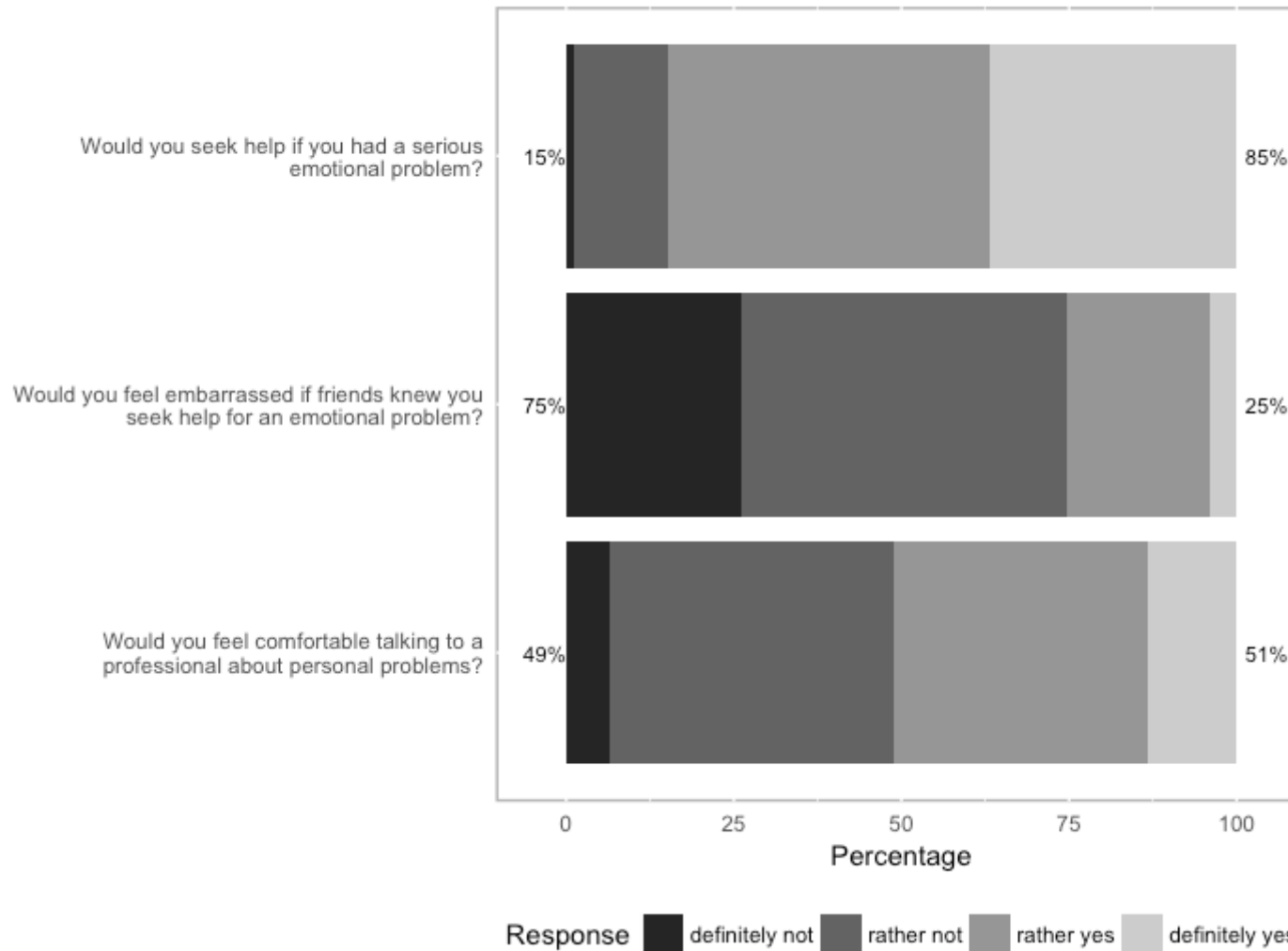
eFigure 2: Frequencies of help-seeking attitudes (HelpA). Percentages on the left side of the graph refer to 'definitely not' and 'rather not', while percentages on the right refer to 'rather yes' or 'definitely yes'
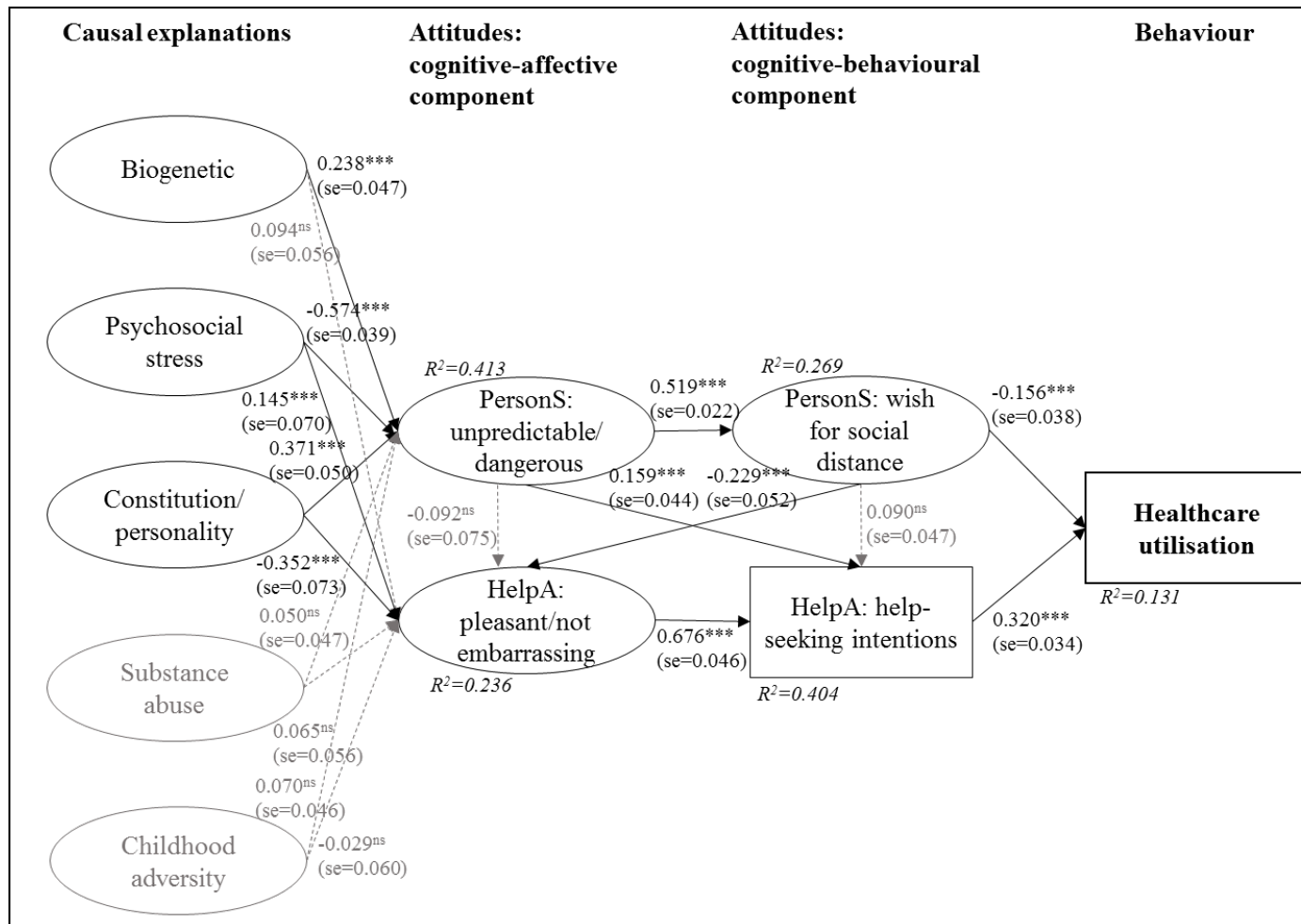
eFigure 3: Results of the hypothesized base model derived from theory and according to explorative factor analysis (n=1354).

Model fit indices: $\chi^2_{(501)}$=2626, p<0.001; CFI=0.957; SRMR=0.057; RMSEA=0.056 (90%CI=0.054-0.058)

Note: * p≤0.05, ** p≤0.01, ***p≤0.001; standardised path coefficient and corresponding standard error (in parentheses); explained variance (R^2) for each endogenous variable in *italics*. Rectangles represent observed variables, ovals represent unobserved latent variables; solid arrows represent significant, dashed arrows represent non-significant regressions.
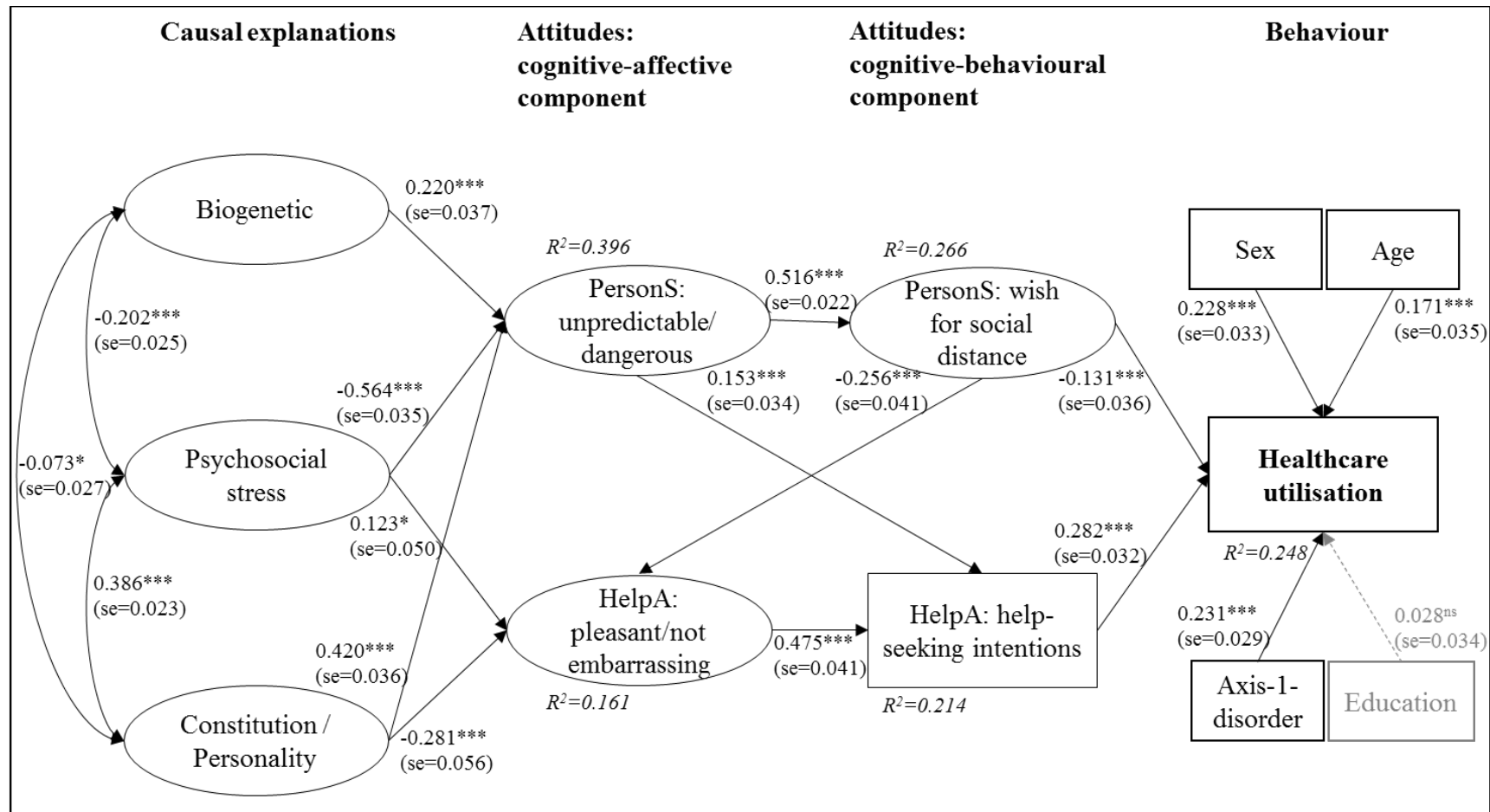
eFigure 4: final model with potentially confounding sociodemographic variables (n=1375).

Model fit indices: $\chi^2_{(419)}$=2242, p<0.001; CFI=0.957; SRMR=0.052; RMSEA=0.056 (90%CI=0.054-0.059)

Note: ** p ≤0.05, ** p ≤0.01, *** p≤0.001; standardised path coefficient and corresponding standard error (in parentheses); explained variance (R^2) for each endogenous variable in *italics*. Rectangles represent observed manifest variables, ovals represent unobserved latent variables; rounded arrows represent covariances; solid straight arrows represent significant, dashed straight arrows represent non-significant regressions. Results of two models are presented here: MFI, R^2 and results of solid arrows relate to reduced model (non-significant paths dropped from model). Result of dashed arrow relates to full model.