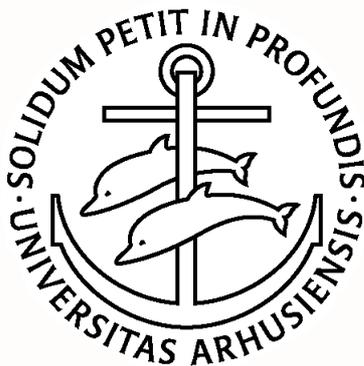


Perceptions of Depression - and their Relation to Attitude and Adherence

By Jon Johansen

A PhD thesis submitted to
School of Business and Social Sciences, Aarhus University,
in partial fulfilment of the requirements of
the PhD degree in
Management

February 2016



Contents

Contents – brief version.....	7
Acknowledgements.....	9
Papers included in the thesis – Overview and status	11
Acronyms and Abbreviations.....	13
Introduction	15
1: Aim of the thesis and structure of the introduction	15
2: Summary of the thesis	15
Study 1: Universal vs. Particular beliefs	18
Study 2: Identity concerns	18
Study 3: Mental models.....	20
Dansk resumé / Danish translation of the summary.....	23
Studie 1: Parallel-test.....	25
Study 2: Identitetsbekymringer	26
Study 3: Mentale modeller	27
3: Key concepts	29
Beliefs	29
Attitudes	31
Adherence.....	32
Identity.....	33
4: State of the art	35
Depression: Nature, prevalence and treatment	35
Adherence to antidepressants	35
Beliefs about depression 1: Theories and approaches	36
Beliefs about depression 2: The link to adherence and attitudes.....	43
5: Progression from state of the art.....	49
Methods.....	51

References	53
Paper 1 Beliefs behind antidepressant adherence - A parallel test of two measures (BMQ & ADCQ).....	63
Abstract	65
Objective.....	65
Method	65
Results.....	65
Conclusion	65
Introduction.....	67
Aims of the study.....	68
Materials and Methods	68
Sample	68
Beliefs about Medicines Questionnaire	69
Antidepressant Compliance Questionnaire	70
Morisky	71
Scales and scoring.....	71
Statistical methods	71
Results	72
Psychometric properties.....	72
Linear relationship.....	73
Discriminative powers	73
Discussion.....	76
Acknowledgements.....	78
Declaration of interest	78
References.....	78
Paper 2 Identity concerns predict attitudes towards antidepressants	81
Abstract	83
Background.....	83
Methods.....	83
Results.....	83

Conclusions.....	83
Introduction.....	85
Materials and Methods.....	86
Data collection.....	86
Attitude measure.....	86
Belief measure – item pool.....	87
Statistical measures.....	89
Results.....	89
Population characteristics.....	89
Internal validity.....	89
Correlations and regression.....	90
Discussion.....	91
Conclusion.....	94
Acknowledgements.....	94
Declaration of interest.....	95
References.....	95
Paper 3 Mental models of depression and their relation to attitude.....	97
Abstract.....	99
Objective.....	99
Method.....	99
Results.....	99
Introduction.....	101
Background.....	101
Theoretical approach and terminology.....	101
Materials and Methods.....	103
Recruitment of participants.....	103
Attitude measure.....	104
Diagrammatic Concept Elicitation Interviews (DiCE).....	104
Coding.....	107

Inter-coder reliability test.....	109
Frequency scores	109
Statistical methods	110
Results	111
Clustering results	111
Discussion.....	123
Summary of findings.....	123
Interpretation of findings	124
Relation to previous research.....	130
Limitations	132
Conclusion	133
Acknowledgements.....	134
Declaration of interest	134
References.....	135
Supporting information.....	141
General discussion	143
The search for more particular depression beliefs	144
Identity concerns.....	145
Mental models	147
Limitations.....	147
Clinical implications.....	149
Future research	151
References.....	152
Appendices.....	153
Popular scientific account of my research	153
Perception(s) of depression.....	153
Depression: Taler vi om det samme?	157
Alphabetical list of all references in the thesis	161

Contents – brief version

Acknowledgements	9
Introduction	15
Aim of the thesis and structure of the introduction	15
Summary of the thesis	15
Summary in Danish / Dansk resumé	23
Key concepts	29
State of the art	35
Progression from state of the art	49
Methods	51
Paper 1: Parallel test	63
Paper 2: Identity concerns	81
Paper 3: Mental models	97
General discussion	114
Appendices	153
Popular scientific account of my research	153
Alphabetical list of all references in the thesis	161

Acknowledgements

Although research can be a solitary endeavour, I did not complete this thesis alone. Many people collaborated, cheered, coached, sparred and supported. To them, I am extremely grateful. They helped bring about this thesis and strengthened its contents.

I wish send out a large amount of gratitude to the following people. My academic supervisor, Klaus Grunert, for letting a complete stranger with a degree in cognitive semiotics attempt to write a health psychological thesis at a business department in Århus while working and living in Copenhagen. To my industrial supervisor, Torsten Meldgaard Madsen, for tireless coaching, extending far beyond any contractual agreements (and to his parents for making me feel at home in Århus). To my collaborators Joachim Scholderer and Bjarne Taulo Sørensen.

I also wish to thank Bjarke Ebert and Johan Gersel for amazingly precise and constructive feedback and the committee whose comments have made this thesis considerably better.

Lastly, I wish to thank the people who contributed indirectly with direct support and love.

Rosa, an infinite source of love and inspiration and a great antidote to thinking about thinking. Our daughter Alvide, an infinite source of love, light and colour, and a great antidote to thinking about thinking. Never cease from exploration.

Mom, dad, siblings and the rest of my family as well as my brothers and sisters by friendship – for adventures, advice and what lies ahead.

And to the 700+ people who have answered my questionnaires and the 40+ people whom I've interviewed. My work ultimately belongs to anyone who is perceived, by self or others, as being ill in the mind.

Papers included in the thesis – Overview and status

The thesis consists of three papers.

- Beliefs about antidepressants adherence – A parallel test of two measures (BMQ and ADCQ).
 - Target journal: Acta Psychiatrica Scandinavica
 - Status: Ready for submission
- Identity concerns predict attitudes towards antidepressants
 - Target journal: Depression & Anxiety
 - Status: Ready for submission
- Mental models of depression and their relation to attitude
 - Target journal: Social Science & Medicine
 - Status: Ready for submission

Furthermore, the appendix contains a short article for which I won the Industrial PhD Association's Communication Prize, 2013:

- Link to the original Danish version published on videnskab.dk, which is an independent Danish site specialized in news about science:
<http://videnskab.dk/krop-sundhed/depression-taler-vi-om-det-samme>
- Link to the translated English version published on Science Nordic, which is an English-language source for science news from the Nordic countries:
<http://sciencenordic.com/perceptions-depression>

Acronyms and Abbreviations

- ADCQ: Antidepressant Compliance Questionnaire
- BMQ: Beliefs about Medicines Questionnaire
- RFD: Reasons For Depression Questionnaire
- ADM: Antidepressant Medication
- DiCE: Diagrammatic Concept Elicitation

Introduction

1: Aim of the thesis and structure of the introduction

The thesis consists of three studies which are all steps in the search for illness and treatment beliefs of *particular* import to attitudes and adherence towards treatment for depression. The thesis is motivated by observing that the relation between beliefs and antidepressant adherence is often measured by an instrument, which is designed to measure beliefs which are significant across illnesses rather than beliefs which are of unique importance to certain illnesses, such as depression. The thesis aims to investigate whether other instruments or methods can be used to complement generic scales, survey based instruments and traditional qualitative interviews. Consequently, part of the dissertation consists in the development of a new investigatory model. Aim and approach is unfolded in further detail after the summary below.

The introduction and dissertation is structured as follows: I start by summarizing my individual studies and their motivation (section 2). Subsequently I move onto to define the key concepts that play a central role in the dissertation (section 3). I then proceed to present a state of the art within research related to beliefs concerning depression and their effects on attitudes and adherence (section 4). Finally, I present in more detail how my work builds upon and progresses the state of the art (section 5).

Immediately, before the presentation of the three individual papers there will also be a separation section presenting the methodology employed. After the three individual papers, I present a conclusion overviewing the consequence of my work both in relations to treatment suggestions as well as suggestions for future research motivated by my findings.

2: Summary of the thesis

The thesis contains three studies, which are summarized below. The studies are all steps in the search for illness and treatment beliefs of particular import to attitudes and adherence towards treatment for depression.

Relations between beliefs and adherence to antidepressant medication have been most convincingly demonstrated with the Beliefs about Medicine Questionnaire (BMQ) ¹. The BMQ was originally designed to investigate adherence related common belief themes of relevance across illness and cultural groups. Thereby, the BMQ looks above and beyond singular illnesses and their corresponding medications in order to identify universal belief patterns that influence adherence.

One of the strongest patterns identified by the BMQ is that medication adherence is influenced by the balance between positive treatment expectations (necessity) and adverse effect expectations (concerns). This can be seen as an affirmation of Leventhal's common-sense hypothesis of how people generally cope with illness threats.² I argue, that the necessity-concerns relation is also an affirmation of the fact that people rely on cost-benefit analysis in their evaluation of medications and that this theory is in line with the common-sense hypothesis.

However, as the BMQ was developed in order to identify commonly held beliefs across illness and medication types, it might not be optimal for identifying uncommon beliefs of importance to particular illness and medication types, e.g. depression and antidepressants. I have therefore searched the literature for instruments developed specifically for identifying and rating beliefs of import to attitude and adherence towards treatment for depression particularly. During this search, I found the Antidepressant Compliance Questionnaire (ADCQ) which is fairly widely used in studies about beliefs and adherence related to antidepressants.³ However, the ADCQ has never been validated, and I therefore decided to do so (study 1).

As the generic BMQ represents current state of the art, I used it as a benchmark in the study. The study was unable to validate ADCQ.

In my continued search for illness and treatment beliefs of particular import to attitude and adherence towards treatment for depression, I hypothesize that identity related beliefs might play a vital role in this regard. This hypothesis is tested in study 2 and confirmed in both study 2 and 3. I.e., both studies indicate that identity plays a vital role in relation to attitudes towards antidepressants. Thus, the identity hypothesis is confirmed by triangulation.

Study 2 explicitly seeks to test the identity hypothesis by use of a fairly traditional survey based exploratory factor analysis, building partially on items from ADCQ and BMQ.

Study 3 seeks to provide deeper insight into whether there are relations or groupings between individual beliefs or beliefs types, such as identity related beliefs, that are significant to attitudes and adherence in relation to treatment for depression. In order to investigate belief relations, study 3 develops a new mixed method for eliciting attributes, based on prototype theory.

Study 3 does not explicitly seek to test the identity hypothesis, yet identity emerges as a seemingly significant component in mental models of depression.

Moreover, study 3 indicates that subjects' beliefs about depression and treatment for depression cluster in distinct groups along three dimensions. Differences in conceptual structures relating to causes of depression seem structured along a biomedical vs psychosocial dimension. Differences in conceptual structures relating to depression itself as well as its consequences seem structured along a causality vs intentionality dimension. Differences in conceptual structures relating to treatment of depression seem structured along an identity dimension, where people with negative attitudes towards antidepressant medication see the latter as a threat to authentic self-identity, whereas people with positive attitudes are likely to see antidepressant medication as an enabler of identity when it has been compromised by depression.

People's beliefs groupings are shown to reliably indicate their attitude towards antidepressants.

The three main contributions of the thesis are:

1. ADCQ is not a valid measure of beliefs related to antidepressant adherence (study 1). Currently, there does not seem to exist a validated instrument which measures illness and treatment beliefs of particular import to adherence to treatment for depression.
2. Identity concerns are strongly related to attitudes towards antidepressant (study 2 and 3). Identity should therefore be accounted for in a given attempt to develop a measure of illness and treatment beliefs of particular import to either attitudes or adherence towards treatment for depression.
3. Study 3 describes the development of a new mixed methods design for eliciting mental models, i.e. prototypes, which is likely also useful for investigating beliefs groups related to other subject areas.

In the following the three studies will be summarised in greater detail. Please note, that the summary of study 1 is briefer than the other two in order to prevent repetition, as much of the rationale behind study 1 has already been described above.

Study 1: Universal vs. Particular beliefs

Beliefs behind antidepressant adherence - A parallel test of two measures (BMQ & ADCQ)

Based on a larger survey (described in the method section), a subset of respondents who had indicated that they were current users of antidepressants completed both the Beliefs about Medicines Questionnaire (BMQ) and the Antidepressant Compliance Questionnaire (ADCQ). Scores were analysed in relation to a self-reported measure of adherence (the Morisky scale)⁴.

We could not establish any meaningful significant linear relations between any of the scales and adherence. However, the BMQ, contrary to the ADCQ, exhibited fairly solid discriminative powers, especially when two of its factors were calculated as a composite score. BMQ was able to discriminate significantly ($P \leq 0.01$) between high and low adherence on 3 out of 4 items on the Morisky (MMAS-4) scale as well as on the Morisky total score.

Thus, beliefs measured by the BMQ relate to self-reported antidepressant adherence whereas this is not the case for beliefs measured by the ADCQ. Further research should pursue a stronger measure of illness and treatment beliefs of particular import to adherence to treatment for depression.

Study 2: Identity concerns

Identity concerns predict attitudes towards antidepressants

Negative attitudes towards antidepressants might lead to decreased adherence, increased stigma and lower quality of life for patients and relatives. Study 2 aimed at identifying beliefs that predict negative attitudes towards antidepressants. We hypothesized that seeing medicine as a potential threat to identity would correlate negatively with attitude.

This hypothesis was partially based on a study about preferences for fictive enhancement pharmaceuticals, in which the participants were more reluctant to enhance traits considered fundamental to self-identity (e.g. mood, motivation and self-confidence) compared to traits considered less fundamental to self-identity (e.g. wakefulness, concentration and absentmindedness)⁵.

To the degree that depression is conceptualized as a mood disorder and correspondingly, that mood is considered an antidepressant treatment target, it would seem likely that antidepressant treatment can conflict in some way with people's notions of fundamental traits, i.e. traits that are considered central to self-identity. Study 2 is a preliminary test of this hypothesis.

31 constituted the original item pool. 24 items were based on two existing questionnaires, i.e. the Beliefs about Medicines Questionnaire (BMQ) and the Antidepressant Compliance Questionnaire (ADCQ). 7 additional belief items as well as a 3-item antidepressant attitude measure were developed specifically for study 2 and 3. We hypothesized that 5 of the 31 items would reflect aspects of identity concerns.

Based on 11 of the original 31 items, we identified three factors, all of which correlated negatively with attitude towards antidepressants. These factors were interpreted as belief constructs reflecting 1: *Identity concerns*, 2: *Drug dependency* and 3: *Antidepressant over prescription*.

All three components were significantly correlated with attitude towards antidepressants at the 0.01 level (2-tailed). This was most pronounced for Identity concerns ($r = -.685, p < .001$) and Antidepressant overuse ($-.559, p < .001$), but also to a fair degree for Drug dependency ($-.331, p < .001$).

However, regression analysis revealed *Drug dependency* to be accounted for by the other two factors. That is, with attitude as dependent variable, the three factors as a whole had an R square of .511 ($F = 238.12, p < .001$), but Drug dependency turned out to be minuscule and insignificant ($B = .010, p = .811$).

Identity concerns seem to be an important and overlooked factor in depression treatment. Our results indicate that seeing medication as a potential threat to identity might be one of the strongest reasons for negative medication attitude. We suggest that identity concerns should be addressed in the clinic on the same priority level as more traditional subjects, such as treatment regimen practicalities and side effects.

Study 3: Mental models

Mental models of depression and their relation to attitude

- A detailed comparative view of two discrete belief models associated with positive and negative attitudes towards antidepressants

The basic idea behind this study was that while most people, if asked directly, would accept much the same statements about depression, they would disagree on a more implicit and fundamental level. Even a very biomedically oriented person would be hard pressed to deny that psychosocial elements, such as interpersonal relations or existential dilemmas, could play a role in depression. Conversely, even a very psychosocially oriented person would be hard pressed to deny that antidepressants could be beneficial in at least some cases of depression.

Therefore, I speculated, that in concept elicitation interviews about depression and its treatment, much the same notions would be mentioned by persons with fundamentally different attitudes (e.g. stress *can* cause depression but so *can* genetic dispositions). However, in real life these persons would intuitively think and react very differently in relation to instances of depression. Despite much the same background knowledge, I suspect that people will respond differently to potential depression symptoms in themselves or others and that they will favour certain aspects of depression and its treatment in conversations about depression in general.

In study 3, I attempted to operationalize prototype theory by means of attribute elicitation and cluster analysis. As mentioned above, my hypothesis was that people with different attitudes towards depression and antidepressants would mention many of the same things during elicitation interview. However, I speculated that subsequent analysis would reveal patterns that could be identified as relatively discrete models.

Elicitation interviews were conducted with 36 participants. These were selected among the 688 original survey respondents. The 36 participants consisted of equal amounts of people with positive and negative attitudes respectively. Half had at some point in their life been prescribed antidepressants for depression (patients) whereas this was not the case for the other half (non-patients). The elicited depression attributes were analysed by content coding. Subsequently, the coded attributes were subjected to cluster analysis.

Two clusters were identified. The clusters differed significantly in terms of attitudes towards antidepressants ($p < .001$) but not in terms of patient status ($p = .75$). In my interpretation, the conceptual structures revealed by the clusters were differentiated along three dimensions (as mentioned above).

Dansk resumé / Danish translation of the summary

Afhandlingen indeholder tre undersøgelser. Undersøgelserne bidrager alle til at kaste lys over sygdoms- og behandlingsopfattelser, som har særlig relevans for attituder og adhærens i relation til behandling af depression.

Hidtil er relationer mellem opfattelser og adhærens til antidepressiva primært blevet påvist med et spørgeskema kaldet Beliefs about Medicines Questionnaire (BMQ)¹. BMQ blev oprindeligt udviklet som et redskab til at undersøge adhærensrelaterede opfattelsestemaer på tværs af sygdomme og kulturelle opfattelser. Derved kan BMQ siges at sætte sig ud over individuelle forskelle imellem sygdomme og medicintyper med henblik på at kunne udsige noget om de universelle opfattelsesmønstre, som har betydning for behandlingsadhærens.

Et af de tydeligste mønstre, som er blevet identificeret i kraft af BMQ er, at behandlingsadhærens er påvirket af balancen mellem positive forventninger til behandlingseffekt (nødvendighed) og negative forventninger til utilsigtede effekter (bekymringer). Dette kan ses som en bekræftelse af Leventhal's 'common-sense'-hypotese vedrørende hvordan folk normalt forholder sig til sygdomstrusler. Jeg argumenterer i afhandlingen for, at 'nødvendighed-bekymrings'-relationen også er en bekræftelse af, at folk benytter sig af cost-benefit-analyser i deres evaluering af medicintyper og at denne teori er i tråd med 'common-sense'-hypotesen.

Eftersom BMQ blev designet til at identificere almindelige opfattelser på tværs af sygdoms- og behandlingstyper, er det muligvis ikke et optimalt redskab til at identificere mindre almindelige opfattelser med relevans for partikulære sygdoms- og medicintyper, fx depression og antidepressiva. Jeg har derfor søgt i litteraturen efter redskaber, som er designet specifikt med henblik på at kunne identificere og måle opfattelser af relevans for attitude og adhærens i forhold til depressionsbehandling specifikt. Via denne søgning fandt jeg et spørgeskema kaldet the Antidepressant Compliance Questionnaire (ADCQ)³, som er hyppigt anvendt i studier af opfattelser og adhærens i forhold til antidepressiva. ADCQ er dog aldrig blevet valideret og jeg besluttede derfor for at gøre netop det (studie 1).

Da det mere generiske spørgeskema BMQ repræsenterer 'state of the art', benyttede jeg det som benchmark. Studiet fandt at ADCQ ikke var et gyldigt spørgeskema i forhold til adhærens.

I min fortsatte søgen efter sygdoms- og behandlingsopfattelser med særlig relevans for attitude og adhærens i forhold til depressionsbehandling, antager jeg at identitetsrelaterede opfattelser muligvis kan spille en rolle i denne henseende.

Denne hypotese testes i studie 2 og bekræftes i studie 3. Dvs. begge studier indikerer, at identitet spiller en vigtig rolle i for attituder til antidepressiva. Derved bekræftes identitets-hypotesen i kraft af triangulering.

Studie 2 søger eksplicit, at teste identitets-hypotesen via traditionel spørgeskemabaseret eksplorativ faktoranalyse, som bygger delvist på ADCQ og BMQ.

Studie 3 søger at belyse hvorvidt der er relationer mellem opfattelser, så som identitetsopfattelser, som er signifikante i forhold til attituder og opfattelser i forhold til depressionsbehandling. Med udgangspunkt i prototypeteori og med henblik på at kunne undersøge opfattelsesrelationer, udvikler jeg i studie 3 en ny metode til elicitering af attributter.

Studie 3 søger ikke eksplicit at teste identitetshypotesen, men identitet fremkommer alligevel som en tilsyneladende betydningsfuld komponent i mentale modeller af depression.

Endvidere indikerer studie 3 at folks opfattelser af depression og depressionsbehandling er tilbøjelige til at klynge sammen i grupper, som synes strukturerede i kraft af tre dimensioner. Forskelle i konceptuelle strukturer relateret til årsager til depression var strukturerede i forhold til en biomedicinsk-psykosocial dimension. Forskelle i konceptuelle strukturer relateret til depression og konsekvenser heraf var strukturerede i forhold til en kausal-intentionel dimension. Forskelle i konceptuelle strukturer relateret til behandling af depression var struktureret i forhold til en identitets-dimension, hvor folk med negative antidepressiva-attituder ser antidepressiva som en identitets-trussel, hvorimod folk med positive antidepressiva-attituder er mere tilbøjelige til at se antidepressiva som et redskab til genopbygning af identitet i det omfang den er kompromitteret af depression.

Ydermere påvises det, at folks opfattelsesstrukturer er signifikant relaterede til deres antidepressiva-attituder.

afhandlingens tre hovedbidrag er følgende:

1. ADCQ er ikke et gyldigt mål af opfattelser med relevans for antidepressiva-adhærens (studie 1). Pt. synes der ikke at eksistere en valideret skala, som kan måle sygdoms- og behandlingsopfattelser med særlig relevans for antidepressiva-adhærens.

2. Identitetsbekymringer er kraftigt relaterede til antidepressiva-attituder (studie 2). Der bør derfor tages højde for identitetsbekymringer i fremtidige forsøg på at udvikle mål for sygdoms- og behandlingsopfattelser med særlig relevans for enten attituder eller adhærens i forhold til depressionsbehandling.
3. Studie 3 beskriver udviklingen af en ny metode (mixed-method) til elicitering af mentale modeller, dvs. prototyper. Det er sandsynligt at denne metode kan anvendes til at undersøge opfattelsesstrukturer inden for andre emner.

I det følgende vil de tre studier blive mere grundigt refererede. Bemærk venligst at resuméet af studie 1 er kortere end de andre to med henblik på at begrænse redundans, da meget af rationalet bag studie 1 allerede er beskrevet ovenfor.

Studie 1: Parallel-test

Opfattelser i forhold til antidepressiv-medicinsk adhærens - En paralleltest af to mål (BMQ og ADCQ)

Respondenter, der som del af en større spørgeskemaundersøgelse (beskrevet i metodesektionen), havde indikeret at de var i behandling med antidepressiv medicin, besvarede både BMQ (Beliefs about Medicines Questionnaire) og ADCQ (Antidepressant Compliance Questionnaire). Deres besvarelser blev analyseret i forhold til et mål for selvrapporert adhærens (Morisky scale)⁴.

Vi kunne ikke påvise signifikante lineære relationer mellem spørgeskemaerne og adhærens. Til gengæld udviste BMQ rimeligt solide diskriminative egenskaber, især når to af dets faktorer blev beregnet som en sammensat score. BMQ var i stand til at diskriminere signifikant ($P \leq 0.01$) i mellem høj og lav adhærens på 3 ud af 4 items på Morisky-skalaen (MMAS-4) og tillige på MMAS-4 total-scoren.

Således var opfattelser målt via BMQ relaterede til selvrapporert adhærens, hvorimod dette ikke var tilfældet for ADCQ. Det er dog stadigvæk et åbent spørgsmål hvorvidt generelle og generiske medicin-opfattelser er mere eller mindre prædiktive for ADM-adhærens (ADM = antidepressiv medicin) end specifikke depressionsrelaterede sygdoms og medicin-opfattelser, da ADCQ ser ud til at være et tvivlsomt mål for sidstnævnte. Fremtidige studier kunne søge at skabe et stærkere mål for specifikke depressionsrelaterede sygdoms og medicin-opfattelser med relation til ADM-adhærens.

Study 2: Identitetsbekymringer

Identitetsbekymringer kan forudsige attituder i forhold til antidepressiv medicin

Negative attituder i forhold til antidepressiv medicin (ADM-attituder) kan føre til lavere adhærens, forøget stigma og lavere livskvalitet for patienter og pårørende. Studie 2 havde til hensigt at identificere opfattelser som forudsiger negative ADM-attituder. Vi antog, at det at se ADM som en potentiel trussel mod identitet ville korrelere negativt med ADM-attituder.

Denne hypotese var delvist baseret på et studie om præferencer for fiktive nootropics, i hvilket deltagerne var mindre villige til at øge egenskaber, der blev set som grundlæggende for selv-identitet (fx humør, motivation og selvtillid) end egenskaber der blev set som mindre grundlæggende for selv-identitet (fx opvækthed, koncentration og distræthed) ⁵.

Der er selvfølgelig forskel på fiktive nootropics og eksisterende psykofarmaka og det er uvist hvorvidt modvillighed i forhold til at øge grundlæggende egenskaber kan oversættes til modvillighed i forhold til at *behandle* grundlæggende egenskaber. Det kunne også være tilfældet, at folk fandt det ok at behandle grundlæggende egenskaber, hvis disse blev betragtet som dysfunktionelle.

Ikke desto mindre, i det omfang at depression opfattes som en sygdom der rammer følelserne og endvidere, at følelser ses som et behandlingsmål for antidepressiv medicin, vil det forekomme sandsynligt, at behandling med antidepressiv medicin kan komme i konflikt med folks opfattelser af grundlæggende egenskaber, dvs. egenskaber der ses som centrale for selv-identitet. Studie 2 er en indledningsvis test af denne hypotese.

Den indledende item-pool bestod af 31 items. 24 items var baseret på to eksisterende spørgeskemaer, BMQ (Beliefs about Medicines Questionnaire) og ADCQ (Antidepressant Compliance Questionnaire). Syv ekstra items og et mål for attitude blev udviklet specielt til formålet. Vi antog at 5 af de 31 items ville reflektere aspekter af identitetsbekymringer.

Baseret på 11 ud af de 31 originale items, identificerede vi tre faktorer, som alle korrelerede negativt med ADM-attituder. Disse faktorer blev fortolket på følgende vis: 1: Identitetsbekymringer, 2: Afhængighed og 3: For høj udskrivning af ADM.

Alle tre komponenter var signifikant korreleret med ADM-attituder (0.01 level , 2-tailed). Dette var mest udtalt for identitetsbekymringer ($r = -.685, p < .001$) og For høj udskrivning af ADM ($-.559, p < .001$), men også rimelig udtalt for Afhængighed ($-.331, p < .001$).

Imidlertid afslørede regressionsanalysen at Afhængighed var overflødig når de andre to faktorer var til stede. Dvs. med attitude som afhængig variabel havde tre faktorer en overordnet R square på .511 ($F = 238.12, p < .001$), men Afhængighed var i den sammenhæng insignifikant ($B = .010, p = .811$).

Identitetsbekymringer synes at være en overset faktor i medicinsk behandling af depression. Vores resultater indikerer at det at se medicin som en potentiel trussel mod identitet er en signifikant årsag til negative ADM-attituder. Vi foreslår at identitetsbekymringer bliver adresseret i klinikken på samme niveau som mere traditionelle emner så som mere praktiske omstændigheder vedrørende det at tage medicin, mulige bivirkninger, etc.

Study 3: Mentale modeller

Mentale modeller i forhold til depression

- En detaljeret komparativ analyse af to forskellige opfattelsesmodeller associeret med positive og negative attituder til antidepressiv medicin

Den grundlæggende idé bag dette studie var at selvom de fleste mennesker, hvis direkte adspurgt, ville acceptere mange af de samme udsagn omkring depression, så ville de være uenige på et mere implicit og fundamentalt niveau. Selv en meget biomedicinsk orienteret person vil have svært ved at afvise at psykosociale elementer, så som interpersonelle relationer eller eksistentielle dilemmaer, kunne have noget at gøre med depression. Omvendt vil en meget psykosocialt orienteret person have svært ved totalt at afvise at antidepressiv medicin kan have en godartet effekt i visse tilfælde af depression.

Jeg antog derfor, at i elicitations-interviews omhandlende depression ville mange af de samme ytringer kunne blive nævnt af personer med fundamentalt forskellige attituder (fx stress *kan* forårsage depression, men det *kan* genetiske dispositioner også). Men i praksis ville disse personer intuitivt tænke og handle meget forskelligt i forhold til konkrete tilfælde af depression. På trods af at mange mennesker er i besiddelse af mere eller mindre den samme baggrundsviden om depression, er det

sandsynligt at de vil reagere forskelligt på potentielle depressionssymptomer i dem selv eller i andre og jeg antager at de vil fremhæve forskellige aspekter i samtaler omkring depression generelt.

Denne teori er i tråd med resultater inden for mindst to forskningsretninger. Den første er prototypeteori, som ser kategorier som flydende fænomener med flydende grænser som varierer fra person til person ⁶. Den anden er teorier om kognitive heuristikker og bias-tendenser, som har beskæftiget sig med hvordan folk har en tendens til at reducere komplekse fænomener i forhold til foretrukne og ofte implicite synspunkter og holdninger.

Jeg har i studie forsøgt at operationalisere prototypeteori ved hjælp af attribut-elicitering og klyngeanalyse. Som nævnt ovenfor, var det min hypotese at hvis man foretog elicitations-interviews med folk med meget forskellige attituder i forhold til antidepressiv medicin (ADM-attituder), så ville have mange ytringer til fælles. Jeg antog også at efterfølgende analyse ville afdække mønstre i form af relativt forskellige modeller.

Jeg foretog sådanne elicitations-interviews med 36 deltagere. Disse var udvalgte blandt de 688 originale spørgeskema-respondenter. De 36 deltager bestod af lige dele folk med henholdsvis positive og negative attituder. Halvdelen havde på et tidspunkt i deres liv modtaget en recept på antidepressiv medicin (patienter) mens dette ikke var tilfældet for den anden halvdel (ikke-patienter). De eliciterede ytringer om depression blev analyseret via indholdsanalyse (content analysis). Dernæst blev de kodede ytringer udsat for klyngeanalyse.

Analysen resulterede i to klynger. Disse klynger adskilte sig signifikant i forhold til ADM-attituder ($p < .001$), men ikke i forhold til patient-status ($p = .75$). I min fortolkning var klyngernes konceptuelle strukturer differentieret i forhold til tre dimensioner (beskrevet ovenfor).

3: Key concepts

The thesis evolves around the relations between:

- Beliefs
- Attitudes
- Adherence
- Identity

Beliefs

The meaning of the term 'belief' is rarely explicitly defined in the literature on illness and treatment beliefs (longer review below). In its simplest form it signifies what people take to be true about the world. Quantitatively, this is often understood in graded form, measured by agreement to a certain statement, which is, of course, in contrast to a simple yes/no rating scale. The example below is an item from the BMQ:

- Medicines do more harm than good

The item is meant to be rated on the following scale: strongly agree, agree, uncertain, disagree, strongly disagree. As can be seen, the scale contains a neutral option (uncertain). This is not always the case for other scales.

Graded measurements of beliefs are probably often necessary because beliefs-statements very rarely represent objective and clear-cut matters, such as "two plus two is five" or "H. C. Andersen was born in China". On the contrary, they often represent matters which depend on definition, assessment, valuation and opinion. For instance, the BMQ-item above, will depend on what people understand by 'medicines', 'harm' and 'good' and maybe even 'do'. This is maybe one of the reasons, why the terms beliefs and attitudes are sometimes used interchangeably. It is of vital importance for the arguments and investigations of the present thesis, that beliefs and attitudes are understood as different phenomena. I explain how attitudes are different from beliefs in the section below.

Ajzen and Fishbein (1980) mentions that a belief associates an "object" with some "attribute". In case of behavioural beliefs, the object is the behaviour of interest (e.g. taking antidepressants) and the associated attribute is usually a consequence or outcome of the behaviour. Furthermore, people may differ in terms of the perceived likelihood that performing the behaviour will lead to (or is associated with) the outcome under consideration.⁷

In study 1 and 2, I use operationalisations of beliefs in line with the ones described above. In study 3 I seek to supplement the research on beliefs from study 1 and 2 with prototype theory. While prototypes are not beliefs in themselves, they probably influence beliefs, and especially the relative subjective importance and salience of beliefs.

Prototype theory rests on the shoulders of Wittgenstein's notion of family resemblance⁸, and was popularized in cognitive psychology by Rosch et al. in the seventies^{6,9}. Prototype theory maintains that categorization is often a graded phenomenon structured around central members of a category. This is a departure from classical set-theoretic Aristotelian logic, where category membership is determined by discrete rules. In graded categorization, category membership is determined by resemblance to a prototype regardless of whether the category itself is defined by discrete rules⁶. Correspondingly, prototypes themselves are organized in hierarchical category membership, where central members of the category have more attributes in common than non-central members and non-members.

Prototype theory was influential within the literature on illness representations in the eighties. However, as a research guiding perspective, it seems to have been lying relatively dormant in recent times, except for a few papers^{10,11}, most of which refer to the early work of George D. Bishop et al.^{12,13}.

My primary motivation for attempting to revive prototype theory is that I believe that beliefs are best understood as parts of coherent wholes, which in this case are operationalized as prototypes. I believe that this type of research can facilitate interaction with beliefs and belief structures, which can often seem somewhat change resistant.

This, I speculate, is related to confirmation bias, which maintain that people have a tendency to overemphasize information that resonates with their current beliefs and attitudes while downplaying information that does the opposite. Confirmation bias¹⁴ is related to cognitive dissonance¹⁵, prior attitude effect¹⁶ and attitude polarization¹⁷. Confirmation bias can be seen as motivated by a need for cognitive closure, that is, a desire to reduce confusion and ambiguity by ending the potentially infinite epistemic sequence related to knowledge formation in a broad sense. This is sometimes referred to as "seizing and freezing", where seizing refers to the mental selection of closure affording evidence and freezing refers to the mental outcome whether it is an answer, a belief or a category.

It has often been suggested that people's beliefs and attitudes in relation to depression and antidepressants might be somewhat change resistant according to cognitive models such as those mentioned above 18,19. To the best of my knowledge this has yet to be proved, but I find it very likely to be the case for the following reasons: firstly, because cognitive bias is such a ubiquitous phenomenon, secondly, because depression is a complex concept covering a disparate array of instances (stimulating a need for complexity reduction) and thirdly, because people tend to harbour strong attitudes towards depression and its treatment, as illustrated by the frequent media debates ^{20,21}.

In summary, I use traditional survey based operationalisations of beliefs to validate the ADCQ (without success) and to test my identity hypothesis, while I use prototype theory to investigate belief *structures*, which I take to be products of cognitive processes such as confirmation bias and need for cognitive closure.

Attitudes

In the literature relating to patient's perspectives on antidepressants, the term *attitude* is used somewhat inconsistently. Often it seems to be used more or less synonymously with beliefs ^{22,23}. At other times it approximates a *tendency to respond with some degree of favourableness or unfavourableness to antidepressant treatment* ^{24,25}, which is in line with the commonly accepted definition of attitudes ^{7,26}. Ajzen and Fishbein (1980, pp. 64) define attitude the following way:

“Quite simply, an attitude is an index of the degree to which a person likes or dislikes an object, where “object” is used in the generic sense to refer to any aspect of the individual's world”. ⁷

If the “object” is a behaviour, then attitude is a person's positive or negative evaluation of that behaviour. Just like “object”, evaluation is understood in the generic sense.

Practically, I have operationalised attitudes towards antidepressants with the following items using a basic semantic differential ²⁷, also referred to as a bipolar scale ⁷:

Treating depression with antidepressant medication is:
Extremely bad: 3, 2, 1, 0, 1, 2, 3 :Extremely good

Treating depression with antidepressant medication is:
Extremely foolish: 3, 2, 1, 0, 1, 2, 3 :Extremely wise

I am:
Strongly against: 3, 2, 1, 0, 1, 2, 3 :Strongly for (treating depression with antidepressant medication)

Thus, the difference between beliefs and attitudes is that a belief is the perceived likelihood of something being the case, whereas an attitude is the subjective desirability of something being the case.

Both clinical outcome and antidepressant adherence are likely to be influenced by attitude, but how and how much is still unknown. One study found that people with negative ADM attitudes at 18 months reported to be less adherent than people with neutral or positive attitudes²⁴. In this study ADM attitudes were assessed by repeated interviews using a scale with the following items: attitudes towards treatment are 1) very positive, 2) positive, 3) neutral, 4) negative, 5) very negative 6) could not answer.

An approximation to answering whether medication attitude influences clinical outcome can be found in a study by Demyttenaere et al. 2011²⁸. In this study, satisfaction with ADM medication was correlated with clinical outcome but not medication persistence. Satisfaction was measured by item 15 from the Q-LES-Q scale: "Taking everything into consideration, during the past week how satisfied have you been with your medication? (If not taking any, leave item blank)."

Satisfaction with current medication and attitudes towards medication in general are not one and the same, but the finding definitely encourages further research into these matters.

Adherence

Adherence is defined as 'the extent to which the patient's behaviour matches *agreed* recommendations from the prescriber'. The concept of agreement is what separates the term adherence from the term compliance, which is defined as 'the extent to which the patient's behaviour matches the prescriber's recommendations'.²⁹ However, this difference does not seem to influence adherence measurements in general as the latter do not tend to include any measures of agreement. A third term, concordance, is sometimes used, primarily in the United Kingdom. Concordance is a somewhat wider term than compliance and adherence, stretching from prescribing communication to patient support in medicine taking.²⁹

In the present thesis the term adherence is used, following the guidelines of Horne et al. 2005.

Types of non-adherence include not filling or re-filling prescriptions to suboptimal dosing.²⁹ Dosing is the focus of the adherence measure used in the present thesis. It should be mentioned that adherence is quite difficult to measure. The three most

accepted methods seem to be electronic monitoring, prescription refills and self-report. Electronic monitoring is often associated with MEMS, which is an acronym for Medication Event Monitoring System³⁰. Prescription refills is a simple way of controlling whether patients at least acquire their medicine as prescribed. It is often operationalized as MPR, i.e. Medication Possession Ratio³¹. Self-reported adherence is very commonly measured by Morisky's 4-item scale or variations thereof⁴. This is particularly true for the many studies on ADM adherence, including study 1 in the present thesis. The 4 Morisky items, which are scored either by a Likert scale or by a yes/no option, are worded as follows:

1. Do you ever forget to take your medicine?
2. Are you careless at times about taking your medicine?
3. When you feel better do you sometimes stop taking your medicine?
4. Sometimes if you feel worse when you take the medicine, do you stop taking it?

I chose to use the both the Morisky scale and the BMQ in study 1 in order to have a reliable benchmark to earlier studies which had demonstrated significant correlations between the Morisky scale and the BMQ^{18,32}.

Identity

Much research indicate that people tend to believe in a fundamental and essential self or soul, which can be explained by particular stable traits. Furthermore, people are highly motivated to express their self-identities, often through consumption. They are also highly motivated to maintain a consistent and stable self-identity and will reject information that challenges this self-identity⁵.

Notions of identity and authenticity seem relatively absent from quantitative studies about antidepressant adherence. However, it is a relatively prominent theme in the qualitative literature. This is particularly evident from a recent analysis of 107 narrative interviews³³. Here it was found that in many cases reservations about antidepressant medication has to do with self-identity, personhood and authenticity. This creates a crisis of legitimacy which is further corroborated by perceived analogies between antidepressants and illicit drugs.

These findings support the need for looking further into the role of perceptions of identity in relation to use of antidepressant medication.

In this thesis, identity concern is defined as the notion that certain elements, in a broad sense, can pose a threat to authentic identity. This is related to stereotype

threat and social identity threat, while not being exactly the same, because none of my studies investigate identity in relation to a specific groups or roles³⁴. Rather, identity is construed as something which can be more or less authentic, pure and correct. Furthermore, I assume that people associate different things with authenticity. That is, some people might see depression as a threat to their identity in the sense that the illness compromises traits that, to them, are identity defining. Other people might see depression as a natural state, which is a product of a natural reaction between identity and circumstance. This latter view, might see antidepressants as threats to such a natural reaction.

In study 2, identity concerns are reflected by the following statements:

- *Antidepressant medication inhibits personal development*
- *In the medical perspective, mind and soul are reduced to chemistry and biology*
- *When you take antidepressants, you have less control over your thoughts and feelings*

In study 3, identity concerns were a coded category which figured prominently in the mental model related to negative attitudes towards antidepressants. It was based on statements such as:

- *“antidepressants can change a man totally”*
- *“[medicine] can inhibit working with oneself”*
- *“antidepressants can inhibit personal development”*
- *“medicine turns people off”*

4: State of the art

Depression: Nature, prevalence and treatment

Depression is a fairly common illness. When defined as major depressive disorder (MDD) it has an estimated prevalence of 4,7 % in the global population and it is ranking 11th among the causes of disability adjusted life years (DALYs).³⁵

While often conceived of as a mood disorder leading to sadness or anhedonia, depression is also characterized by cognitive and somatic symptoms.³⁶

Furthermore, depression is often associated with huge negative impact on daily life, ability to function normally, health related quality of life, professional performance and interpersonal relationships.³⁷⁻³⁹

In 2010, the global economic burden of depression was estimated to be US\$800 billion.⁴⁰

While depression is not a chronic condition in the classical sense, it is often very persistent. Chances of relapse are great and increasing with each episode. In addition, residual symptoms often persist even when someone is not considered clinically depressed on traditional scales.⁴¹

Medication aimed at treating depression is commonly referred to as antidepressants. Currently, the most widely used type of antidepressants are SSRI medications, although newer types have been developed and although older types are still widely prescribed. Use of antidepressants is controversial due to disputed effects and diverging opinions on diagnostic criteria and practise.⁴²

Adherence to antidepressants

Non-adherence is a surprisingly common problem across illnesses in general, especially for long term and chronic conditions⁴³. Depression is no exception.

Average antidepressant non-adherence rates have been found to be 52% for psychiatric populations and 46,2% for primary care populations in a review published in 2012⁴⁴. This is in line with an earlier review (2002) which assessed the median antidepressant non-adherence prevalence to be 53%⁴⁵. The latter review also found that 30-60% of patients discontinue their prescribed ADM within the first 12 weeks of treatment.

These numbers resonate with a Dutch study about first-time depressed patients diagnosed in general practice, which found that 25% never filled the first prescription or only filled in one⁴⁶. A Danish register data study published in 2004

found even higher numbers of early discontinuation, in this case defined as no purchase at all during the first 6 months after prescription. Among 4275 first-time users 33.6% lived up to this criterion ⁴⁷. These general practice numbers are quite significant since general practice is where 95% of antidepressants are prescribed ⁴⁷.

The high numbers of premature discontinuation stand in stark contrast to the fact that antidepressants are a long-term treatment medication; it is generally recommended that first-time patients take them for at least 12 months ^{18,48}.

It has been found that premature discontinuation of antidepressant medication is associated with a 77% increase in the risk of relapse ⁴⁹. This is significant, not least because relapse is already a common risk factor for depressed patients. First-time depressed patients have 50% chance of relapse, after a second episode this chance rises to 70%, and after third to 80% ⁵⁰.

Beliefs about depression 1: Theories and approaches

Since the early 80s an increasing amount of research has been devoted to the question of how people understand and respond to illness threats.

Illness belief research can be seen as a subsection within health psychology ⁵¹, but it also seems to draw on two other research traditions. Firstly, the subject of how people perceive illness and treatment has deep roots in historical, anthropological and sociological literature ⁵²⁻⁵⁴. Secondly, by viewing people's understandings of illness as one of many other cognitive processes governed by the same general principles, the field went into co-development with cognitive science in a broad sense ⁵⁵. This was in large part due to a seminal paper by Leventhal ².

A number of different contemporary research agendas and perspectives take different approaches to illness belief research related to mental illness and depression. I have sought to create a brief overview of some of the most pronounced differences below.

Competing (or supplementary) perspectives: Common sense vs Literacy vs Lifeworld

The cognitive approach

The cognitive approach pioneered by Leventhal and colleagues led to the common-sense model of self-regulation. This model positions itself within the field of other self-regulation theories, which have come to span a variety of social cognition models (SCMs), such as the theory of reasoned action (TRA), the theory of planned

behaviour (TPB), the health belief model (HBM) and the health action process approach (HAPA) ⁵⁶.

The common-sense model emphasizes the idea that people are active problem solvers who apply logical reasoning to their problems ⁵⁷. Thus, if their resulting conclusions, attitudes and behaviours are flawed it is not because people are illogical information processors as such, it is because their illness representations are inaccurate. So, despite a growing body of social science research mapping the patterns of irrational behaviour ^{58,59}, the common-sense model asserts that people will be more inclined to keep performing a deliberately chosen action over a longer course of time if the perceived benefits of said action outweighs the perceived costs.

Cognitive approaches are often aimed at investigating how lay people form illness representations. Among other things, this involves understanding the process by which bodily sensations are interpreted, construed as potential danger and maybe, maybe not, identified as illness or some other form of non-health.

Mental health literacy

Another research tradition investigates lay perceptions of mental illness and its treatment in relation to the sum of expert knowledge on the area. This is not directly a contrasting view, since deviations of lay concepts from expert knowledge can be explained in a common-sense framework, but it does represent a different focus. We can refer to this agenda as a mental health literacy agenda or in short, the literacy view.

Mental health literacy approaches are often more concerned with how illness representations lead to stigma ⁶⁰ and non-adherence ⁶¹. The literacy view of lay concepts also seems to be the guiding principle in mental models approaches to risk perceptions ^{62,63}.

Life world view

Haslam (2005) has criticised the mental health literacy approach for being limited by seeing lay concepts as mere *“pale reflections of professional concepts, filtered through the media and hence shallow, incomplete, and outdated”* ⁶⁴. Haslam maintains that this view has three clear limitations. First, it ignores that lay concepts are actively constructed guided by broader cultural understandings of human nature. That is, lay concepts consist of more than just watered down expert knowledge. Second, the literacy view tends to see lay concepts as declarative knowledge, when they are likely susceptible to other cognitive processes and modes.

Third, the literacy view tends to see and present lay concepts in expert terms rather than in their own terms.

Thus a third view, which is exemplified by Haslam among others, is what I would call the life world view. This view seeks to understand lay concepts as intricately related to people's life worlds, both in a philosophical (Kant, Husserl, Wittgenstein, etc.) and sociological sense (Weber, Bourdieu, etc.). This view tends to be represented mostly by qualitative research of which Conrad (1985) is a seminal example ⁶⁵.

Attribution theory and further developments

Much research on beliefs about mental illness in general and depression specifically has been focused on causal attributions ⁶⁶. According to classical attribution theory, causal beliefs are dominantly structured by dimensions of controllability and stability.

Haslam et al. ⁶⁷ has proposed four new dimensions for understanding beliefs about mental illness, namely, pathologising, moralising, medicalising and psychologising. Pathologising denotes the identification of something, e.g. deviant behaviour, as mental illness. Moralising is related to the controllability dimension by referring to perceived intentionality as a central construct. Whenever something is perceived as being under volitional control it can be judged to reflect bad intentions, inadequate self-restraint, weak character or deliberate flouting of social norms. Medicalising occurs when deviant behaviour is explained somatically and thus seen in a biomedical perspective. Psychologising explains behaviour in terms of mental states that are not fully conscious or rational.

Biomedical vs. psychosocial perspectives

The distinction between biomedical and psychosocial perspectives seems to be fairly common in some genres of the literature on beliefs about mental illnesses, including depression, while relatively absent from others. The biomedical model occurs frequently in research on stigma and mental health literacy ⁶⁸, in research on treatment preferences ⁶⁹ and in qualitative studies of beliefs about depression in general ^{70,71}. However, antidepressant adherence related research of the quantitative kind tends to focus more on medication beliefs than on beliefs about depression as being either biological or psychosocial in nature ^{18,72}.

Stigma research

There is a fairly large body of research which demonstrates that mentally ill people are held more responsible for their own illness if its causes are seen as controllable (under some degree of volitional control) and unstable (not constant) ⁶⁷. In line with

this finding, seeing mental illness as biologically caused is related to less blaming of the mentally ill ⁷³ and greater acceptance of medical treatment ⁶⁸. It is, however, also related to greater stigma and social distance ^{68,73}.

Frequently used instruments for measuring beliefs about depression

The three studies in this thesis all try to relate beliefs about depression and depression treatment to quantitative measures of either ADM adherence (study 1) or ADM attitudes (study 2 and 3). Earlier studies have also found beliefs to correlate with gender, age, culture, depression severity, functioning and perceived side effects.

I have devoted the present section to a small presentation of belief measures that have been found to correlate with either ADM adherence or other variables. More precisely, I have identified four measures with a track record of being applied to researching beliefs about depression or its treatment in relation to other variables. Two of these measures, the Beliefs about Medicine Questionnaire (BMQ) and the Antidepressant Compliance Questionnaire (ADCQ) are applied in my own research. I also came across other measures, which had only been tested for internal consistency, as in the case of the questionnaires produced by Gabriel & Violato ^{74,75}. These have been left out of this review.

A very brief history of the four instruments can be summed up as follows:

RDF: The Reasons For Depression (RFD) questionnaire was developed and validated in 1995 ⁷⁶. It measures causal perceptions of depression.

ADCQ: The Antidepressant Compliance Questionnaire (ADCQ) was developed in 2004 ³. It was tested in relation to a dependent variable (adherence) in 2009 by Chakraborty et al. ⁷⁷.

BMQ: The Beliefs about Medicines Questionnaire (BMQ) was developed in 1999 by Horne and Weinman ¹. It is a generic scale designed for use across illnesses and therapeutic regimens with the general aim of predicting adherence. It was applied in relation to beliefs about antidepressants by Aikens et al. in 2005 followed closely by a similar study published later the same year ^{18,32}.

IPQ: In the latter paper, Brown quotes Leventhal's Self-Regulatory Model (SRM), which in another variation is termed the Common Sense Model (CSM) ^{2,78}. Leventhal's ideas have been further operationalized in a fourth instrument, namely the Illness Perception Questionnaire (IPQ) ⁷⁹. Several studies have applied this instrument to the case of depression, beginning in 2001 with a paper by Brown ⁸⁰.

Depression beliefs vs. Treatment beliefs

Two of the instruments, the Illness Perception Questionnaire (IPQ) and the Beliefs about Medicines Questionnaire (BMQ), have a generic design, and are intended to be applied to a variety of illnesses. The other two instruments, the Reasons For Depression questionnaire (RFD) and the Antidepressant Compliance Questionnaire (ADCQ), are designed exclusively for the depression domain.

Two of the instruments are illness focused (IPQ and RFD) and the other two are treatment focused (BMQ and ADCQ). Treatment focus, in this case, is primarily concerned with beliefs about medicine.

This two by two division is illustrated in table 1.

Table 1: Generic vs Specific & Illness vs Treatment

	Generic	Specific
Illness	IPQ	RFD
Treatment (Medicine)	BMQ	ADCQ

Variables related to beliefs about depression

Gender

By means of RFD, Schweizer et al. has found that men were more likely to see achievement-related issues as causing their depression. Both Schweizer et al. and Cornwall et al. have found women to be more likely to endorse interpersonal causes^{81,82}. Gaudiano et al. found women more likely to endorse physical and biological causes⁸³. However, most other papers reporting RFD related studies do not mention anything about gender differences and the ones who do, state that they have had no significant findings in this regard^{69,84}.

Applying the IPQ in a vignette study, Edwards et al. found women to score significantly higher on consequences and timeline⁸⁵.

In a Danish study applying the ADCQ, Kessing et al. found that female patients had a more negative view of their doctor-patient relationship, that is, compared to men and after adjusting for age⁸⁶. An Indian study, not adjusting for age, found that male gender was associated with lower overall score on ADCQ (Spearman's rho: -0.323, $P < 0.05$)⁷⁷.

No BMQ studies report any gender differences. Actually, Aikens et al. report a remarkably low significance between gender as independent variable related to BMQ necessity ($-.06$; $p=.34$) and harmfulness ($.00$; $p=.99$) as dependent variables ⁸⁷.

The closest to a significant relation between gender and the BMQ components, is a moderated effect. The previously mentioned study by Gaudiano et al. found that men endorsing physical causes of depression scored higher on the BMQ subscale for concerns about antidepressants ⁸³.

Age

There have been even fewer clear findings in relation to age. Aikens et al. found a significant association between age and BMQ necessity (zero-order Pearson and Spearman correlations: $r = .27$, $P < .001$) ⁸⁷. Kessing et al. found that patients over 40 years of age scored lower on the ADCQ doctor-patient relationship, positive beliefs and partner agreement, suggesting an inclination towards more negative treatment attitudes. If these two findings are in any way generalizable, they point in contradictory directions.

Culture

RFD was validated for the UK population with no differences in factor structure compared to its US origins ⁸⁴. Khalsa et al. found self-reported ethnic minorities (African American, Asian and Latino in a US study) less apt to endorse biological and characterological causes of depression ⁶⁹. The same study found no significant cultural differences in preferences for psychotherapy over medication (62% for ethnic minorities and 55% for Caucasian).

A B-IPQ study compared how black African ($n = 73$) and white British women ($n=72$) perceived depression and found African women to score lower on consequences, identity (symptoms), chronic timeline and treatment control. Furthermore the African women were more socially and less bio-medically oriented in their causal perceptions ⁸⁸.

ADCQ turned out to yield a quite similar results for descriptive statistics when comparing the Danish and the Indian studies according to Chakraborty et al. ⁷⁷. In a study, treating BMQ as an dependent variable, no significant results were found for ethnicity ⁸⁷.

Depression severity

It is well known that depressed mood is associated with altered attribution styles ⁸⁹. By extrapolation, it would seem plausible that causal perceptions were susceptible

to depressed mood as well. A number of applications of the RFD instrument do indeed point in this direction, but not in as clear-cut a fashion as one might suspect.

Addis et al.⁷⁶ found that higher scores on the Beck Depression Inventory⁹⁰ were associated with higher scores on the RFD achievement (.19, $p < .05$), conflict (.20, $p < .05$) and intimacy (.26, $p < .01$), which as the authors point out, is congruent with the certain cognitive characterizations of depressed people as strongly focused on interpersonal or achievement related factors^{91,92}.

The UK validation of RFD could only replicate such a correlation for achievement⁸⁴ and a recent study, which found none of the above found instead that perceived biological reasons were correlated with BDI⁸³.

These inconsistencies suggest that we should be careful about making specific conclusions about singular factors in reason giving and depression severity. A potentially more generalizable and less speculative interpretation of Addis et al.'s data takes into account that there was a fairly high degree of correlation between factors within RFD, which suggest that people tend to give multi-dimensional explanations for depression. In this perspective, it seems plausible to view RFD as a general measure of reason-giving reflecting the rumination tendency that is associated with longer episodes of depression⁹³. This latter idea is purported by the UK validation of RFD in which the depressed population had stronger correlations between BDI score and RFD subscales than the non-depressed population⁸⁴.

In a study based on a female population, Fortune et al. found that a higher score on BDI was positively correlated with IPQ identity, timeline, consequences and less perceived control⁹⁴.

For BMQ, Aikens et al. (2008) found perceived necessity to be significantly correlated with depressive symptom severity as measured on the HAM-D17^{87,95}. Perceived harmfulness was not associated with HAM-D17, but it was however significantly correlated with not having ever taken an antidepressant.

There have been found no significant correlations between depression severity and ADCQ^{3,77}.

Functioning and Side Effects

In the first application of RFD, Addis et al.⁷⁶ found evidence of criterion validity in relation to various functional areas using the Social Adjustment Scale⁹⁶ and the Dyadic Adjustment Scale⁹⁷. People who scored highly on interpersonal conflict

reasons tended to score low on work and social/leisure. Intimacy and relationship-oriented reasons for depression were associated with decreased marital functioning.

Aikens et al. found correlations between the BMQ harmfulness component and side effects. Changes were measured over time and the results suggest a bidirectional relationship between perceived harmfulness and side effects ⁹⁸.

Partner agreement

Cornwall et al. found that concordance in reason giving between patients and partners was significantly associated with a better clinical outcome ⁸². Interestingly, they also found that perceived interpersonal reasons for depression were associated with increased caregiver distress.

ADCQ has a component devoted to *perceived* partner agreement. However, as mentioned above, this is a 3-item component, where only two of the items fit logically (*my partner agrees that depression is the correct diagnosis of my condition & my partner agrees that antidepressants are a suitable treatment for my condition*), whereas the third one (*antidepressants correct the changes that occurred in my brain due to stress or problems*) seems somewhat unrelated. Whether or not perceived partner agreement correlates with either treatment adherence or clinical outcome or something else remains to be studied.

BMQ and IPQ do not contain any items or components referring to perceived partner agreement, nor have they been scored on actual partner agreement, as in the case of RFD. On a note, IPQ has in its conceiving studies been used to demonstrate variance in partner agreement, but this did not take place within the depression domain, nor was the variance correlated to any other measures ⁷⁹.

Beliefs about depression 2: The link to adherence and attitudes

Depression and especially antidepressants are disputed subjects. This is reflected in frequent heated media debates ⁹⁹.

As mentioned above, many factors can be considered in relation to ADM non-adherence, but a recent cohort study has confirmed that beliefs and attitudes play a relatively great role compared to for instance objective socio-demographic variables ¹⁰⁰. Similar findings have been reported in earlier studies ^{101,102}.

According to some sources, people will tend to have a preference for psychological treatment over medication. However, some studies find that the perceived need for medication tends to increase with depression.^{103,104} Furthermore, findings on general aversion towards ADM are inconsistent ⁷¹.

Much research on beliefs in relation to validated measures of ADM adherence (such as the Morisky scale) has applied at least one of four belief measures presented above.

In addition, there is large body on ADM *adherence related aspects*, such as treatment preferences and coping strategies in general. These studies have researched beliefs with a larger variety of methods, e.g. semi-structured interviews and vignettes, and correlated their findings with different operationalisations of illness beliefs and preferences.

Naturally, if people are unsure about whether their symptoms are caused by depression and, conversely, whether improvements are caused by medication, then they will have a hard time deciding whether committing to ADM treatment is the right thing to do. Much evidence suggest that this is indeed often the case.^{42,105,106}

Likewise, concern about possible adverse events or attribution of existing adverse events (e.g. sexual dysfunction and weight gain) to ADM will tend to decrease incitement to remain adherent to treatment. These effects have been demonstrated both qualitatively¹⁰⁷ and quantitatively and they are not unique to ADM treatment¹⁸.

Another type of beliefs affecting ADM use and perception are related to moral issues and legitimacy. Many patients will have to engage in legitimizing and defending their own potential use of ADM. Moral issues involves senses of 'failure' by not being able to cope without medicine and loss of authenticity by having the 'self' chemically altered.³³ This is presumably partly related to the widespread public disagreement about the depression diagnosis and about effects of ADM (SSRIs in particular). However, both public and private moral dilemmas might have a root cause in that perceptions of depression and ADM seem intricately related to common notions of self-identity. This hypothesis is pursued in study 2.

Adherence in relation to the four belief measures

Presently, ADM adherence is probably one of the most prominent and discussed aspects of depression treatment behaviour. Related hereto are treatment preferences and coping strategies in general. All three will be covered in this section in relation to the four measures.

RFD

Studies applying RFD are generally more concerned with patient preferences and coping styles than with adherence to any singular treatment regimen. They are also

generally more oriented towards non-medical therapies, such as cognitive behaviour therapy and interpersonal psychotherapy. The underlying rationale is that clinical outcomes will improve if treatment types resonate with patient beliefs and attitudes. The hypotheses about how a patient-treatment interaction would influence clinical outcome do indeed include the likelihood of patient adherence, but other mechanisms such as perceived and actual treatment helpfulness figure just as prominently ¹⁰⁸.

The first study relating RFD to different treatment types found that existential reason giving was related to better outcomes in cognitive therapy and worse outcomes in behavioural activation ¹⁰⁸, which makes sense as cognitive therapy targets the existential domain. Relationship-oriented reasons were related to negative outcome in cognitive therapy, which also makes sense as cognitive therapy shifts the blame to intrapersonal dynamics (thought patterns) in a situation where the patient perceive interpersonal issues as the real problem.

Reason giving, measured as the tendency to offer multiple explanations for depression, was associated with increased adherence (homework compliance) in behavioural activation, but with worse clinical outcome. This is a seemingly paradoxical finding which the authors hypothesize might be caused by excessive examination of problems to a degree that ultimately prevent meaningful behavioural change. Nevertheless, it serves to illustrate the importance of measuring adherence and clinical outcome together.

Building on the ideas of Addis et al., Meyer and Garcia-Roberts applied RFD along with a motivations for interventions questionnaire (MFI) ¹⁰⁹. This resulted in some positive correlations between perceived causes and endorsement of interventions that would target such causes. The most significant finding was that people who scored high on childhood related causes would also score high on motivation for therapy addressed at discussing childhood related traumas. As a mild critique of the study, it should be mentioned that the motivations for interventions questionnaire was constructed for the study at hand and the items seem almost designed to fit those of the RFD. However, Khalsa et al. who compared RFD scores with a preference for either psychotherapy or medication report a somewhat similar finding. In this case, perceptions of childhood related causes of depression were significantly related to a preference for psychotherapy, but no other significant correlations were found for RFD vs. treatment preference ⁶⁹.

IPQ

Hunot et al. found no significant associations between IPQ and adherence. The latter was operationalized as continued vs. non-continued use of antidepressant medication over a period of 6 months⁷².

Based on a very small number (n = 12) Brown et al. found indications that people who were less adherent to antidepressant medication scored higher on interpersonal causes of depression (r = 0.59, P = 0.05)⁸⁰. The less adherent patients were defined as people who endorsed at least one of the items on the Morisky scale. The interpersonal cause item, however, is not a part of the original IPQ, but was devised specifically for the study at hand. The authors of IPQ do indeed encourage flexibility in its application to specific illnesses and as such there is absolutely nothing wrong with such a praxis, but lack of standardization do inhibit our ability to assess the generalizability of that finding. Nevertheless, the results resonate with those of Addis et al. in the sense that patients who perceive interpersonal issues as causes of their depression seem to be less apt to endorse interventions that do not target these causes directly.

Brown et al. also found associations between perceptions and coping strategies as measured on an adapted version of the brief 28-item COPE. People who scored higher on negative consequences for depression also scored higher on active coping, religious coping and self-blame, while lower scores on perceived controllability was associated with more religious coping. Higher scores on chronic timeline were associated with less planning and finally, reporting of higher numbers and frequency of symptoms was associated with self-blame, self-distraction and emotional venting.

In a cross-sectional survey Edwards et al. compared people who had sought help for their emotional problems (TS) with people who had not sought help (NTS) on their perceptions of vignette depression characters as rated on the B-IPQ⁸⁵. The TS group scored significantly higher on consequences, identity, comprehension and upset. Commendably, Edwards et al. had carried forwards the list of causes developed by Brown et al.⁸⁰, but no significant differences were found for these causes.

Houle et al. compared IPQ-scores for people who preferred psychotherapy vs. people who preferred medication but found very few significant results in this regard. People who preferred psychotherapy scored higher on social attribution and seriousness of consequences. No significant results were found for timeline: acute/chronic, timeline: cyclical, personal control, treatment control, illness coherence, emotional representations, cause: physical or cause: psychological.

ADCQ

Only one paper reports measures relative to ADCQ⁷⁷. Adherence was assessed by a self-developed questionnaire specifically designed for the study. Items are not specified, but structure includes type of antidepressant, dosing, whether medicines were supervised, follow-up status and most importantly, percentage of the total number of days medicine was missed. The latter was split into subcategories of 0-25%, 25-75% and 75-100% of days medicines were missed. Results are reported as a significant negative correlation between total ADCQ score and percentage of days medicines were missed (Spearman's rho: -0.33, $P < .05$).

BMQ

All studies that apply BMQ to beliefs about antidepressant treatment target medicine specifically and most of them also figure a measure of adherence. This is natural since, unlike RFD and IPQ, BMQ, along with ADCQ, is specifically designed to measure beliefs related to medical adherence.

Using the 4-item Morisky scale presented in the beginning of this section, Brown et al. reported significant correlations between various components of BMQ and singular items on the Morisky scale³².

Thus, in univariate analyses, the specific concerns component was associated with "forgetting to take medication", "stopping when feeling better" and "sometimes careless about taking medication". General overuse was associated with "stopping when feeling better" and some of the items of general overuse were also associated with "stopping when feeling worse". The items in question are not specified in the paper. In multivariate analyses, only specific concerns together with depression were associated with adherence.

Aikens et al. also conducted multivariate analyses in a BMQ study on antidepressant medication treatment behaviour. In this case, two different measures of adherence were used, Morisky and 3-items from the Brief Medication Questionnaire¹⁸. Aikens et al. report no univariate results and the multivariate analysis failed to reach significance between any of the four standard components of the BMQ and any of the two adherence measures. However, a composite components score consisting of necessity minus concerns had a very significant multivariate association with adherence ($P < .001$). Dropping the depression variable from the model did not change the significance. The same was the case for social desirability.

In a later study, also applying the Brief Medication Questionnaire, Aikens et al. found that adherence was significantly predicted by the specific necessity component⁹⁸.

General harmfulness did not predict adherence, but very interestingly it predicted side effects. A bi-directional effect was demonstrated in the latter case.

In a cohort study, Hunot et al. had three types of adherence measures ⁷². The Medication Adherence Report Scale (MARS) which can be said to constitute a refinement of the Morisky scale, but in this case with 6-items (later versions have 5), with frequency sensitive Likert rating scale and a more complex scoring system. This scale was combined with a prescription refill check-up and a yes/no-response item at four time points to measure continued/non-continued use of antidepressants. Significant results in relation to BMQ are only reported for the latter measure, which was associated with two of the items in specific concerns, namely concerns about side-effects and worry about antidepressants. Multivariate analyses confirmed independent predictive validity.

5: Progression from state of the art

When I first started researching the relation between depression beliefs and antidepressant adherence, it quickly became clear that most research that had been able to demonstrate some kind of statistically significant relation in this regard had done so using the Beliefs about Medicines Questionnaire (BMQ). This provoked my curiosity. BMQ is a solid measure of beliefs about medicines that tend to correlate with adherence across illnesses. That is, BMQ demonstrates that for most medical treatment regimens, people's adherence will tend to depend on their concerns and perceived need for the medicine. If people have little concern and see the medicine in question as being very necessary for their wellbeing, they will tend to be more adherent and vice versa. Applied to patients taking antidepressants, BMQ can be used to assert whether these patients are concerned about their medicines and whether they see a need for it in general. What BMQ cannot assert, because it is not designed to do so, is which specific aspects people see in depression and antidepressants that will make them more or less adherent to this particular type of medication. My own intuition was that people's concerns about, perceived need of and adherence to antidepressant medication would be related to people's ideas about 'what depression is' as well as their implicit or explicit ideas about how antidepressants 'work in the mind'.

In the search for a scale that might be able to complement BMQ with beliefs that are both particular to depression and antidepressants while also being related to antidepressant adherence, I found the ADCQ. The ADCQ had not yet been validated in relation to a validated measure of adherence, and I therefore decided to do so. This resulted in research question 1:

RQ1: Are the particular beliefs about depression and depression treatment, which are measured with the Antidepressant Compliance Questionnaire (ADCQ), related to antidepressant adherence?

As part of the search for beliefs particular to depression and antidepressants while also being related to antidepressant adherence, I wished to make a preliminary quantitative assessment of the role of identity concerns. Identity concerns are frequently mentioned and investigated in qualitative studies. However, identity concerns do not seem to have been validated as a relevant construct by quantitative studies on beliefs about depression and antidepressants. I was especially interested in the possible relation between identity concerns and attitudes towards antidepressants. While attitudes are not the same as adherence, they are likely

related to adherence as well as clinical outcome and, not least, quality of life for people taking antidepressants. These reflections resulted in research question 2:

RQ2: Is it possible to establish a preliminary quantitative measure of antidepressant related identity concerns with sound internal consistency and significant relation to attitudes towards antidepressants?

Lastly, I wished to investigate the relations between beliefs particular to depression and depression treatment. To the best of my knowledge none of the existing papers about depression beliefs report studies of beliefs as discrete models with coherent structures. It is far more common to study depression related beliefs as variation in factors relating to perceived reasons for depression (e.g. existential, physical, cognitive)^{69,76,109,110}, treatment of depression (e.g. necessity, concerns, preserved autonomy)^{1,18,32,83} or depression itself and its consequences (e.g. timeline, coherence, emotional representation)^{72,79,80,111,112}.

In contrast hereto, the primary aim of study 3 is to investigate whether it is possible to identify discrete mental models (beliefs clusters), which are individually meaningful and mutually distinct.

This aim is largely motivated by the assumption that mental representations are formed as flexible but stable meaningful and coherent wholes, whose composition is governed by structural properties that operate relatively independently of the subject to which the mental representations refer.

Furthermore, study 3 constitutes an attempt to revive and re-operationalize prototype theory in the study of mental models of depression. Since no well-defined method existed for this end, I sought to develop a new approach. These reflections led to the following research questions:

RQ3: How can we elicit belief clusters of particular relevance to depression and antidepressants?

RQ4: Within variations in perceptions of depression, can we identify discrete mental models?

RQ5: If so, are these models related to patient status or attitudes towards antidepressants?

Methods

Study 3 was conceived before the other studies. In its first iteration, the idea was to conduct elicitation interviews with depression patients as well as never-depressed people. The aim was to recruit depression patients from general practice. Depression patients diagnosed in general practice constitutes a far larger group than those who are diagnosed and treated in specialized clinics and hospitals⁴⁷, but the latter group seems overrepresented in depression belief studies.

For various reasons, recruitment through general practice in Denmark is tricky. It quickly turned out that it would be impossible to recruit a satisfactory amount of respondents through this channel within a reasonable timeframe.

I therefore decided to attempt to recruit interview respondents based on a survey, which could also serve as direct data collection for two other studies that I was curious to conduct.

I thus constructed a survey, which was aimed at the general public as well as at depression patients and relatives. The survey was advertised through several channels which included a wide variety of the largest national newspaper websites. In order to increase the likelihood of reaching depression patients, the survey was also advertised on patient information and discussion sites. In order to reach out to non-frequent IT users, information about the survey was posted in analogue versions of newspapers and patient magazines.

Within a week, 688 respondents completed the survey. The full sample was included in study 2, which aimed to investigate the relation between identity concerns and ADM attitudes. A third of the full sample, who indicated that they were current users of antidepressants were included in study 1 ($n = 228$), which aimed to compare BMQ and ADCQ on their relation to ADM adherence.

52% (355) of the participants in the survey had allowed the researchers to contact them regarding a potential interview about perceptions of depression (Study 3). Among these, selection was based on two criteria, namely whether participants had any experience as current or former depression patients (self-reported) and whether they had positive or negative attitudes towards antidepressants.

The interview respondent selection process followed three steps. First, the 355 respondents were divided into two groups, i.e. patients and non-patients. Subsequently, respondents in each of these two groups were ranked according to their score on an attitude measure. Lastly, for each group, the 9 participants with the

highest and lowest attitude scores respectively were selected. Thus, among the 355 interview willing participants, 36 were asked whether they would still like to participate in interviews and all agreed.

References

1. Horne, R., Weinman, J. & Hankins, M. The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. *Psychol. Health* **14**, 1–24 (1999).
2. Leventhal, H., Meyer, D. & Nerenz, D. in *Contributions to Medical Psychology* (ed. Rachman, S.) 7–30 (Pergamon Press, 1980).
3. Demyttenaere, K. *et al.* Development of an antidepressant compliance questionnaire. *Acta Psychiatr. Scand.* **110**, 201–207 (2004).
4. Morisky, D. E., Green, L. W. & Levine, D. M. Concurrent and predictive validity of a self-reported measure of medication adherence. *Med. Care* **24**, 67–74 (1986).
5. Riis, J., Simmons, J. P. & Goodwin, G. P. Preferences for Enhancement Pharmaceuticals: The Reluctance to Enhance Fundamental Traits. *J. Consum. Res.* **35**, 495–508 (2008).
6. Rosch, E. H. & Mervis, C. B. Family resemblances: Studies in the internal structure of categories. *Cogn. Psychol.* **7**, 573–605 (1975).
7. Ajzen, I. & Fishbein, M. *Understanding Attitudes and Predicting Social Behavior*. (PRENTICE-HALL, 1980).
8. Wittgenstein, L. *Philosophical Investigations*. (John Wiley & Sons, 2010).
9. Rosch, E. H. Natural categories. *Cogn. Psychol.* **4**, 328–350 (1973).
10. Lalljee, M., Lamb, R. & Carnibella, G. Lay prototypes of illness: Their content and use. *Psychol. Heal.* **8**, 33–49 (1993).
11. von Lengerke, T. Distinctiveness of disease prototypes in lay illness diagnosis: An exploratory observational study. *Psychol. Health Med.* **10**, 108–121 (2005).
12. Bishop, G. D. & Converse, S. A. Illness representations: A prototype approach. *Heal. Psychol.* **5**, 95–114 (1986).
13. Bishop, G. D., Briede, C. & Cavazos, L. Processing illness information: The role of disease prototypes. *Basic Appl. Soc. Psych.* (1987). doi:10.1080/01973533.1987.9645875
14. Nickerson, R. S. Confirmation bias: A ubiquitous phenomenon in many guises. *Rev. Gen. Psychol.* **2**, 175–220 (1998).
15. Harmon-Jones, E. & Mills, J. *Cognitive dissonance: progress on a pivotal theory in social psychology*. (American Psychological Association, 1999).

16. Taber, C. S. & Lodge, M. MOTIVATED SKEPTICISM IN THE EVALUATION OF POLITICAL BELIEFS (2006). *Crit. Rev.* **24**, 157–184 (2012).
17. Lord, C. G., Ross, L. & Lepper, M. R. Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *J. Pers. Soc. Psychol.* **37**, 2098–2109 (1979).
18. Aikens, J. E., Nease, D. E., Nau, D. P., Klinkman, M. S. & Schwenk, T. L. Adherence to maintenance-phase antidepressant medication as a function of patient beliefs about medication. *Ann. Fam. Med.* **3**, 23–30 (2005).
19. Read, J., Cartwright, C., Gibson, K., Shiels, C. & Magliano, L. Beliefs of people taking antidepressants about the causes of their own depression. *J. Affect. Disord.* **174**, 150–156 (2015).
20. Reid, I. C. Are antidepressants overprescribed? No. *BMJ* **346**, f190–f190 (2013).
21. Fountoulakis, K. N., Hoschl, C., Kasper, S., Lopez-Ibor, J. & Möller, H.-J. The media and intellectuals' response to medical publications: the anti-depressants' case. *Ann. Gen. Psychiatry* **12**, 11 (2013).
22. Misri, S. *et al.* Factors impacting decisions to decline or adhere to antidepressant medication in perinatal women with mood and anxiety disorders. *Depress. Anxiety* **30**, 1129–1136 (2013).
23. Jacob, S. A., Hassali, M. A. A. & Ab Rahman, A. F. Attitudes and beliefs of patients with chronic depression toward antidepressants and depression. *Neuropsychiatr. Dis. Treat.* **Volume 11**, 1339 (2015).
24. Melartin, T. K. *et al.* Continuity is the main challenge in treating major depressive disorder in psychiatric care. *J. Clin. Psychiatry* **66**, 220–227 (2005).
25. Partridge, B., Lucke, J. & Hall, W. Over-diagnosed and over-treated: a survey of Australian public attitudes towards the acceptability of drug treatment for depression and ADHD. *BMC Psychiatry* **14**, 74 (2014).
26. Eagly, A. H. & Chaiken, S. *The psychology of attitudes*. (Harcourt Brace Jovanovich College Publishers, 1993).
27. Heise, D. R. in *Attitude Measurement* (ed. Summers, G. F.) 235–253 (Rand McNally, 1970).
28. Demyttenaere, K., Reines, E. H., Lönn, S. L. & Lader, M. Satisfaction With Medication Is Correlated With Outcome but Not Persistence in Patients Treated With Placebo, Escitalopram, or Serotonin-Norepinephrine Reuptake Inhibitors. *The Primary Care Companion For CNS Disorders* (2011).

doi:10.4088/PCC.10m01080

29. Horne, R. *et al.* Concordance, adherence and compliance in medicine taking. *London: NCCSDO* (2005).
30. Cramer, J. A., Mattson, R. H. & Prevey, M. L. How often is medication taken as prescribed? A novel assessment technique. **261**, 3273–3277 (1989).
31. Andrade, S. E., Kahler, K. H., Frech, F. & Chan, K. A. Methods for evaluation of medication adherence and persistence using automated databases. *Pharmacoepidemiol. Drug Saf.* **15**, 565–74; discussion 575–7 (2006).
32. Brown, C. *et al.* Beliefs about antidepressant medications in primary care patients: relationship to self-reported adherence. *Med. Care* **43**, 1203–1207 (2005).
33. Ridge, D. *et al.* ‘My dirty little habit’: Patient constructions of antidepressant use and the ‘crisis’ of legitimacy. *Soc. Sci. Med.* **146**, 53–61 (2015).
34. Molden, D. C. & Dweck, C. S. Finding ‘meaning’ in psychology: a lay theories approach to self-regulation, social perception, and social development. *Am. Psychol.* **61**, 192–203 (2006).
35. Ferrari, A. J. *et al.* Burden of depressive disorders by country, sex, age, and year: findings from the global burden of disease study 2010. *PLoS Med.* **10**, e1001547 (2013).
36. Bortolato, B., Carvalho, A. F., Soczynska, J. K., Perini, G. I. & McIntyre, R. S. The Involvement of TNF- α in Cognitive Dysfunction Associated with Major Depressive Disorder: An Opportunity for Domain Specific Treatments. *Curr. Neuropharmacol.* **13**, 558–76 (2015).
37. Hames, J. L., Hagan, C. R. & Joiner, T. E. Interpersonal processes in depression. *Annu. Rev. Clin. Psychol.* **9**, 355–77 (2013).
38. Barge-Schaapveld, D. Q. C. ., Nicolson, N. A., Berkhof, J. & deVries, M. W. Quality of life in depression: daily life determinants and variability. *Psychiatry Res.* **88**, 173–189 (1999).
39. Hjarsbech, P. U., Nielsen, M. B. D., Andersen, M. F., Rugulies, R. & Christensen, U. Struggling at work – a qualitative study of working Danes with depressive symptoms. *Disabil. Rehabil.* **37**, 1674–1682 (2015).
40. The Global Crisis of Depression. Available at: <http://kofiannanfoundation.org/newsroom/speeches/2014/11/global-crisis-depression>. (Accessed: 1st December 2015)
41. Paykel, E. S. Partial remission, residual symptoms, and relapse in depression.

- Dialogues Clin. Neurosci.* **10**, 431–7 (2008).
42. Buus, N. Adherence to anti-depressant medication: A medicine-taking career. *Soc. Sci. Med.* **123**, 105–113 (2014).
 43. WHO & Lo, T. O. *Adherence to long-term therapies. World Health Organisation* (2003).
 44. Sansone, R. A. & Sansone, L. A. Antidepressant adherence: Are patients taking their medications? *Innov. Clin. Neurosci.* **9**, 41–46 (2012).
 45. Lingam, R. & Scott, J. Treatment non-adherence in affective disorders. *Acta Psychiatr. Scand.* **105**, 164–172 (2002).
 46. van Geffen, E. C. G. *et al.* Initiation of antidepressant therapy: do patients follow the GP's prescription? *Br. J. Gen. Pract.* **59**, 81–87 (2009).
 47. Hansen, D. G. *et al.* Early discontinuation of antidepressants in general practice: association with patient and prescriber characteristics. *Fam. Pract.* **21**, 623–9 (2004).
 48. Videbech, P., Bonde, A., Damsbo, N. & Deleuran, A. *Referenceprogram for unipolar depression hos voksne.* (Sekretariatet for referenceprogrammer, 2007).
 49. Melfi, C. A. *et al.* The effects of adherence to antidepressant treatment guidelines on relapse and recurrence of depression. *Arch. Gen. Psychiatry* **55**, 1128 (1998).
 50. Kessing, L. V., Hansen, M. G., Andersen, P. K. & Angst, J. The predictive effect of episodes on the risk of recurrence in depressive and bipolar disorders - a life-long perspective. *Acta Psychiatr. Scand.* **109**, 339–44 (2004).
 51. Skelton, J. A. & Croyle, R. T. in *link.springer.com* 1–9 (Springer US, 1991). doi:10.1007/978-1-4613-9074-9_1
 52. Foucault, M. *Naissance de la clinique.* (Presses universitaires de France, 1963).
 53. KLEINMAN, A. Concepts and a model for the comparison of medical systems as cultural systems. *Soc. Sci. & Med. Part B Med. Anthropol.* **12**, 85–93 (1978).
 54. Mechanic, D. *Medical sociology.* (Free Pr, 1978).
 55. Leventhal, H., Leventhal, E. A. & Breland, J. Y. Cognitive Science Speaks to the 'Common-Sense' of Chronic Illness Management. *Ann. Behav. Med.* **41**, 152–163 (2011).

56. Conner, M. T. Initiation and Maintenance of Health Behaviors. *Appl. Psychol.* **57**, 42–50 (2008).
57. Diefenbach, M. A. & Leventhal, H. The common-sense model of illness representation: Theoretical and practical considerations. **5**, 11–38 (1996).
58. Shafir, E. & LeBoeuf, R. A. Rationality. *Annu. Rev. Psychol.* **53**, 491–517 (2002).
59. Kahneman, D. A perspective on judgment and choice: Mapping bounded rationality. *Am. Psychol.* **58**, 697–720 (2003).
60. Jorm, A. F. Mental health literacy Public knowledge and beliefs about mental disorders. *Br. J. Psychiatry* **177**, 396–401 (2000).
61. Gabriel, A. & Violato, C. Depression Literacy among Patients and the Public: A Literature Review. *Prim. psychiatry* **17**, 55–64 (2010).
62. Bostrom, A., Fischhoff, B. & Morgan, M. G. Characterizing Mental Models of Hazardous Processes: A Methodology and an Application to Radon. *J. Soc. Issues* **48**, 85–100 (1992).
63. Bostrom, A., Morgan, M. G., Fischhoff, B. & Read, D. What Do People Know About Global Climate Change? 1. Mental Models. *Risk Anal.* **14**, 959–970 (1994).
64. Haslam, N. Dimensions of folk psychiatry. *Rev. Gen. Psychol.* **9**, 35–47 (2005).
65. Conrad, P. The meaning of medications: Another look at compliance. *Soc. Sci. Med.* **20**, 29–37 (1985).
66. Weiner, B., Perry, R. P. & Magnusson, J. An attributional analysis of reactions to stigmas. *J. Pers. Soc. Psychol.* **55**, 738–748 (1988).
67. HASLAM, N., BAN, L. & KAUFMANN, L. Lay conceptions of mental disorder: The folk psychiatry model. *Aust. Psychol.* **42**, 129–137 (2007).
68. Schomerus, G. G. *et al.* Evolution of public attitudes about mental illness: a systematic review and meta-analysis. *Acta Psychiatr. Scand.* **125**, 440–452 (2012).
69. Khalsa, S.-R., McCarthy, K. S., Sharpless, B. A., Barrett, M. S. & Barber, J. P. Beliefs about the causes of depression and treatment preferences. *J. Clin. Psychol.* **67**, 539–549 (2011).
70. Schreiber, R. & Hartrick, G. KEEPING IT TOGETHER: HOW WOMEN USE THE BIOMEDICAL EXPLANATORY MODEL TO MANAGE THE STIGMA OF DEPRESSION. *Issues Ment. Health Nurs.* **23**, 91–105 (2002).

71. Buus, N., Johannessen, H. & Stage, K. B. Explanatory models of depression and treatment adherence to antidepressant medication: A qualitative interview study. *Int. J. Nurs. Stud.* **49**, 1220–1229 (2012).
72. Hunot, V. M., Horne, R., Leese, M. N. & Churchill, R. C. A cohort study of adherence to antidepressants in primary care: the influence of antidepressant concerns and treatment preferences. *Prim. Care Companion J. Clin. Psychiatry* **9**, 91–9 (2007).
73. Read, J., Haslam, N., Sayce, L. & Davies, E. Prejudice and schizophrenia: a review of the 'mental illness is an illness like any other' approach. *Acta Psychiatr. Scand.* **114**, 303–18 (2006).
74. Gabriel, A. & Violato, C. The development of a knowledge test of depression and its treatment for patients suffering from non-psychotic depression: a psychometric assessment. *BMC Psychiatry* **9**, 56 (2009).
75. Gabriel, A. A. & Violato, C. C. The development and psychometric assessment of an instrument to measure attitudes towards depression and its treatments in patients suffering from non-psychotic depression. *J. Affect. Disord.* **124**, 9 (2010).
76. Addis, M. E., Truax, P. & Jacobson, N. S. Why do people think they are depressed?: The Reasons For Depression Questionnaire. *Psychother. Theory, Res. Pract. Train.* **32**, 476–483 (1995).
77. Chakraborty, K., Avasthi, A., Kumar, S. & Grover, S. Attitudes and beliefs of patients of first episode depression towards antidepressants and their adherence to treatment. *Soc. Psychiatry Psychiatr. Epidemiol.* **44**, 482–8 (2009).
78. Hagger, M. S. & Orbell, S. A Meta-Analytic Review of the Common-Sense Model of Illness Representations. *Psychol. Heal.* **18**, 141–184 (2003).
79. Weinman, J., Petrie, K. J., Moss-morris, R. & Horne, R. The illness perception questionnaire: A new method for assessing the cognitive representation of illness. *Psychol. Health* **11**, 431–445 (1996).
80. Brown, C. *et al.* Primary care patients' personal illness models for depression: a preliminary investigation. *Fam. Pract.* **18**, 314–320 (2001).
81. Schweizer, S. *et al.* Does illness attribution affect treatment assignment in depression? *Clin. Psychol. & Psychother.* **17**, 418–426 (2010).
82. Cornwall, P. L., Scott, J., Garland, A. & Pollinger, B. R. Beliefs about Depression in Patients and Their Partners. *Behav. Cogn. Psychother.* **33**, 131–138 (2005).

83. Gaudiano, B. A., Nowlan, K., Hughes, J. A. & Miller, I. W. Gender differences in hospitalised patients' perceived reasons for their depression. *J. Psychiatr. Intensive Care* 1–10 (2013). doi:10.1017/S1742646413000186
84. Thwaites, R., Dagnan, D., Huey, D. & Addis, M. E. The Reasons for Depression Questionnaire (RFD): UK Standardization for clinical and non-clinical populations. *Psychol. Psychother. Theory, Res. Pract.* **77**, 363–374 (2004).
85. Edwards, S., Tinning, L., Brown, J. S. L., Boardman, J. & Weinman, J. Reluctance to Seek Help and the Perception of Anxiety and Depression in the United Kingdom. *J. Nerv. Ment. Dis.* **195**, 258–261 (2007).
86. Kessing, L. V., Hansen, H. V., Demyttenaere, K. & Bech, P. Depressive and bipolar disorders: patients' attitudes and beliefs towards depression and antidepressants. *Psychol. Med.* **35**, 1205–1213 (2005).
87. Aikens, J. E., Nease, D. E. & Klinkman, M. S. Explaining patients' beliefs about the necessity and harmfulness of antidepressants. *Ann. Fam. Med.* **6**, 23–29 (2008).
88. Brown, J. S. L. *et al.* How black African and white British women perceive depression and help-seeking: a pilot vignette study. *Int. J. Soc. Psychiatry* **57**, 362–74 (2011).
89. Peterson, C. & Villanova, P. An Expanded Attributional Style Questionnaire. *J. Abnorm. Psychol.* **97**, 87–89 (1988).
90. Beck, A. T., WARD, C. H., MENDELSON, M., MOCK, J. & ERBAUGH, J. An inventory for measuring depression. *Arch. Gen. Psychiatry* **4**, 561–571 (1961).
91. Wright, J. H. & Beck, A. T. Cognitive therapy of depression: theory and practice. *Hosp. & community psychiatry* **34**, 1119–1127 (1983).
92. Blatt, S. J. & Maroudas, C. Convergences among psychoanalytic and cognitive-behavioral theories of depression. *Psychoanal. Psychol.* (1992).
93. Nolen-hoeksema, S. & Morrow, J. Effects of rumination and distraction on naturally occurring depressed mood. *Cogn. Emot.* **7**, 561–570 (1993).
94. Fortune, G., Barrowclough, C. & Lobban, F. Illness representations in depression. *Br. J. Clin. Psychol.* **43**, 347–364 (2004).
95. Hamilton, M. A rating scale for depression. *J. Neurol.* (1960).
96. Weissman, M. M. Assessment of Social Adjustment by Patient Self-Report. *Arch. Gen. Psychiatry* **33**, 1111 (1976).
97. Spanier, G. B. Measuring dyadic adjustment: New scales for assessing the

- quality of marriage and similar dyads. *J. Marriage Fam.* (1976).
98. Aikens, J. E. & Klinkman, M. S. Changes in patients' beliefs about their antidepressant during the acute phase of depression treatment. *Gen. Hosp. Psychiatry* **34**, 221–226 (2012).
 99. Coyne, J. The Antidepressant Wars, a Sequel: How the Media Distort Findings and Do Harm to Patients. *blogs.plos.org/mindthebrain* (2012). Available at: <http://blogs.plos.org/mindthebrain/2012/12/26/the-antidepressant-wars-a-sequel-how-the-media-distort-findings-and-do-harm-to-patients/>. (Accessed: 20th November 2015)
 100. De las Cuevas, C., Peñate, W. & Sanz, E. J. Risk factors for non-adherence to antidepressant treatment in patients with mood disorders. *Eur. J. Clin. Pharmacol.* **70**, 89–98 (2014).
 101. Lin, E. H. *et al.* The role of the primary care physician in patients' adherence to antidepressant therapy. *Med. Care* **33**, 67–74 (1995).
 102. Hansen, H. V. & Kessing, L. V. Adherence to antidepressant treatment. *Expert Rev. Neurother.* **7**, 57–62 (2007).
 103. Prins, M. A., Verhaak, P. F. M., Bensing, J. M. & van der Meer, K. Health beliefs and perceived need for mental health care of anxiety and depression--the patients' perspective explored. *Clin. Psychol. Rev.* **28**, 1038–58 (2008).
 104. Karp, D. A. Taking Anti-Depressant Medications: Resistance, Trial Commitment, Conversion, Disenchantment.
 105. Leydon, G. M., Rodgers, L. & Kendrick, T. A qualitative study of patient views on discontinuing long-term selective serotonin reuptake inhibitors. *Fam. Pract.* **24**, 570–5 (2007).
 106. van Geffen, E. C. G. *et al.* The decision to continue or discontinue treatment: experiences and beliefs of users of selective serotonin-reuptake inhibitors in the initial months--a qualitative study. *Res. Social Adm. Pharm.* **7**, 134–50 (2011).
 107. Anderson, C. & Roy, T. Patient experiences of taking antidepressants for depression: a secondary qualitative analysis. *Res. Social Adm. Pharm.* **9**, 884–902 (2013).
 108. Addis, M. E. & Jacobson, N. S. Reasons for depression and the process and outcome of cognitive-behavioral psychotherapies. *J. Consult. Clin. Psychol.* **64**, 1417–1424 (1996).
 109. Meyer, B. & Garcia-Roberts, L. Congruence between reasons for depression

- and motivations for specific interventions. *Psychol. Psychother.* **80**, 525–42 (2007).
110. Fitzgerald, J. M. J. M. & Richardson, H. H. Use of the reasons for depression questionnaire with adolescents. *J. Clin. Psychol.* **58**, 1045–1056 (2002).
 111. Vollmann, M., Scharloo, M., Langguth, B., Kalkouskaya, N. & Salewski, C. Illness representations as mediators of the relationship between dispositional optimism and depression in patients with chronic tinnitus: A cross-sectional study. *Psychol. Heal.* (2013). doi:10.1080/08870446.2013.828294
 112. Lynch, J., Moore, M., Moss-Morris, R. & Kendrick, T. Are patient beliefs important in determining adherence to treatment and outcome for depression? Development of the beliefs about depression questionnaire. *J. Affect. Disord.* **133**, 29–41 (2011).

Paper 1

Beliefs behind antidepressant adherence - A parallel test of two measures (BMQ & ADCQ)

Jon Johansen & Bjarne Taalo Sørensen

[Target journal: Acta Psychiatrica Scandinavica]

Abstract

Objective

A parallel test of two measures of beliefs related to antidepressant adherence. One measure reflects generic and general medication beliefs (BMQ) and is applicable across illnesses, the other reflects specific depression-related illness and medication beliefs (ADCQ).

Method

228 respondents completed both the Beliefs about Medicines Questionnaire (BMQ) and the Antidepressant Compliance Questionnaire (ADCQ). Scores were analysed in relation to a measure of adherence (the Morisky scale).

Results

We could not establish any meaningful significant linear relations between any of the scales and adherence. However, the Beliefs about Medicines Questionnaire (BMQ), contrary to the Antidepressant Compliance Questionnaire (ADCQ), exhibited fairly solid discriminative powers, especially when two of its factors were calculated as a composite score. The BMQ was able to discriminate significantly ($P \leq 0.01$) between high and low adherence on three out of four items on the Morisky scale as well as on the Morisky total score.

Conclusion

Beliefs measured by the BMQ did indeed relate to self-reported antidepressant adherence whereas this was not the case for beliefs measured by the ADCQ. However, it remains an open question whether general and generic medication beliefs are more predicative of antidepressant adherence than specific depression-related illness and medication beliefs, since the ADCQ appears to be a questionable measure of the latter. Further research should pursue a stronger measure of depression-related illness and medication beliefs related to antidepressant adherence.

Significant outcomes

- Based on the current study, the Antidepressant Compliance Questionnaire (ADCQ) does not seem to relate to antidepressant adherence and we recommend that it is used with caution.
- There seems to be a lack of a measure of depression-related illness and medication beliefs related to antidepressant adherence. Such a measure

could help explain the concerns and medication necessity beliefs that influence antidepressant adherence, thereby aiding the clinic in addressing such beliefs.

Limitations

- Our population sample relied on self-selection based on an online survey.
- The sample had a high degree of adherence, which does not seem entirely representative of general antidepressant medication adherence.
- This was a cross-sectional study. A stronger study design could follow medication persistence at several time points in relation to beliefs about medication and depression.

Introduction

A review based on a sample of studies published between 2001 and 2012 reports average non-adherence rates to be 52 percent for psychiatric populations and 46.2 percent for primary care populations ¹. This is in line with an earlier review which found a median prevalence of antidepressant non-adherence to be 53 percent ².

Keeping in mind that these are simplifications based on studies covering a wide range of definitions, methodologies and results, it would be safe to postulate that antidepressant adherence is often low ³.

Many factors can be considered in relation to antidepressant non-adherence, but a recent cohort study confirmed that beliefs and attitudes play a relatively great role compared to, for instance, objective socio-demographic variables ⁴. Similar findings have been reported in earlier studies ^{5,6}.

Based on these results, the present paper is driven by the search for relatively stable sets or types of beliefs that consistently influence antidepressant adherence.

To a certain degree, stable sets of adherence-related beliefs have been found for medicines prescribed for long-term conditions in general. Thus, a recent review concludes that beliefs measured by the Necessity and/or Concerns subscales of the Beliefs about Medicines Questionnaire (BMQ) ⁷ were consistently associated with adherence across an array of illness and medication types, including antidepressants ⁸.

The BMQ consists strictly of questions about medications. It does not contain any questions about illnesses as such, for instance their nature, causes, consequences, etc. Furthermore, all questions in the BMQ are either about medicines in *general* (the Harm and Overuse subscales) or about generic aspects of the *specific* medications that respondents might be taking at the time of answering the questionnaire. This means that even the BMQ's specific subscales are generic, which, of course, is a prerequisite for administration and comparison across illnesses and medication regimens. As a consequence, while the BMQ is likely sensitive to adherence-related beliefs about aspects which are potentially unique to a particular type of medication, it is limited in its ability to identify these beliefs. It is, for instance, able to measure concerns about antidepressants, but unable to assess whether people are concerned that antidepressants might alter their personality, because such a question would make little sense when asked in the context of a hypertension medication regimen.

This leads to the question of whether we might be able to obtain more in depth knowledge about the nature of antidepressant adherence-related beliefs by means of a questionnaire that not only addresses general and generic medication beliefs but also particular depression-related illness and medication beliefs.

We find it likely that the consistent ability of the combined Necessity-Concerns scales to account for variance in adherence across illnesses will have different underlying antecedents depending on treatment domain. E.g., the reasons why people are concerned about antihypertensives are likely to differ from the reasons why people are concerned about antidepressants.

In order to increase our in depth understanding of antidepressant adherence-related beliefs we therefore wished to co-apply the BMQ with a measure of depression-related illness and treatment beliefs. Such a measure does indeed exist, namely the Antidepressant Compliance Questionnaire (ADCQ) ⁹. This measure has never been co-applied with the BMQ nor does it seem to have been tested in relation to a validated measure of adherence even though it has been used in a number of antidepressant adherence related studies ¹⁰⁻¹⁶. A parallel test of the ADCQ and the BMQ would thus address two important and so far unresolved research questions.

Aims of the study

We aim to compare general and generic medication beliefs with specific depression beliefs on their ability to discriminate between high and low adherence by applying the *illness specific* Antidepressant Compliance Questionnaire (ADCQ) and the *illness generic* Beliefs about Medicines Questionnaire (BMQ) in a parallel test thereby avoiding obscuring cross study factors such as differences in sample and measures of adherence.

Materials and Methods

Sample

A Danish internet survey was designed with the aim of generating data for two separate studies. Study 1 is the present study on beliefs associated with antidepressant medication adherence. Study 2 (forthcoming) concerned the attitudes of the general public towards treating depression with antidepressant medication.

The survey, which was aimed at the general public as well as at people exposed to depression as either patients or relatives, was advertised through several channels including a wide variety of the largest national newspaper websites. In order to

increase the likelihood of reaching depression patients, the survey was also advertised on patient information and discussion sites. In order to reach out to non-frequent IT users, information about the survey was posted in analogue versions of newspapers and patient magazines. Within a week, 688 respondents completed the survey. The full sample was included in study 1. One third of the full sample, who indicated that they were current users of antidepressants, was included in the present study.

Respondents who indicated that they were current users of antidepressants were administered the Beliefs about Medicines Questionnaire (BMQ), the Antidepressant Compliance Questionnaire (ADCQ) and the Morisky adherence scale. They were also presented with a series of follow-up questions about the details of their current use of medication, i.e. whether it was prescribed for depression, where and when they had received a diagnosis and which kind of medication they were taking. Respondents were able to go back in the survey. Those who answered all questions consistently were accepted as current users of antidepressants ($n = 228$).

Around 35 percent of the current users of antidepressants were 50 or older and about 21 percent were younger than 30 years. Approximately 70 percent of the respondents were female, roughly one third of the respondents were singles and almost 50 percent were married or had a cohabiting partner.

Beliefs about Medicines Questionnaire

The BMQ was developed in 1999 as a psychometrically sound method for scoring commonly held medication beliefs⁷. The rationale behind the BMQ is to facilitate research on beliefs which are relevant across illnesses and cultural groups, and in particular to answer questions about how medication beliefs, as measured by the BMQ, relate to illness beliefs and adherence behaviours in general.

The BMQ consists of four subscales. Two of these, the Necessity and Concerns subscales, measure generic beliefs about specific medicines used by respondents at a given time of answering the questionnaire, e.g. *'My health, at present, depends on medicines'* (Necessity) and *'Having to take this medicine worries me'* (Concern). The other two subscales (Harm and Overuse) measure general beliefs about medicines and their use, e.g. *'Medicines do more harm than good'* (Harm) and *'Doctors use too many medicines'* (Overuse).

The BMQ is theoretically rooted in Leventhal's self-regulatory model (SRM), which posits that people's health behaviour is generally a result of what makes 'common-sense' to them¹⁷. This is especially reflected in the Necessity and Concerns

subscales, which in combination can be said to measure implicit cost-benefit analyses related to medication.

A Danish translation of the BMQ was made in 2009 by means of both forward and backward translations adjusted by consensus and final acceptance from one of the original scale authors¹⁸.

Antidepressant Compliance Questionnaire

The ADCQ was developed in 2004 and found to have good psychometric properties⁹. The idea was for the ADCQ to be predictive of antidepressant adherence, but this property was not tested in the original paper. Although the ADCQ has been applied in a number of subsequent studies in order to draw conclusions about beliefs and attitudes, none of them contain any validated measure of adherence¹⁰⁻¹⁶.

The ADCQ is not reported to have any specific theoretical grounding. Its authors state that the original 51 items were devised based on literature and personal experience. By means of PCA and Promax rotation applied to the answers of 85 psychiatric out-patients, the 51 initial items were reduced to 33 falling into four components: Perceived doctor-patient relationship, e.g. *'My doctor fully understands my condition'*, Preserved autonomy, e.g. *'Antidepressants can alter your personality'*, Positive beliefs on antidepressants, e.g. *'People's emotional problems are solved by antidepressants'*, and Partner agreement, e.g. *'My partner agrees that depression is the correct diagnosis of my condition'*.

The ADCQ was translated into Danish for a study published in 2005 with the instrument author among the co-authors¹⁰. For the present study we introduced one adaptive alteration in the wording of most of the items in the first component. 13 out of 15 items in this component begins with *'My doctor...'*, but we programmed the questionnaire to match the respondent's primary caretaker, e.g. for people consulting their GP the original wording was retained, but for people who consulted psychiatrists the wording was changed to *'My psychiatrist ...'*, etc.

Furthermore, in 6 of the 33 items, wordings such as *'my emotional problems'* and *'my depression'* were changed in order to reflect depression and antidepressants in general rather than personal patient experience, e.g. *'people's emotional problems'* and *'people's depression'*. This was the case for the following original items: *'My emotional problems are solved by the antidepressants'*, *'I think my depression is only due to factors associated with my personality'*, *'With antidepressants the causes of my depression disappear'*, *'Antidepressants make me stronger so I will be able to deal more efficiently with my problems'*, *'Antidepressants help me to worry less'*

about my problems' and *'Antidepressants correct the changes that occurred in my brain due or stress or problems'*. This was done in order for these items to be answered by a larger population including non-patients in a study investigating beliefs as predictors of attitudes towards antidepressants (forthcoming).

Morisky

The four-item Morisky Medication Adherence Scale (MMAS-4) is an often used self-reported measure of medication adherence, which was originally developed and tested for concurrent and predictive validity in 1986 ¹⁹.

Its four items are based on a previous five-item scale ²⁰. Its underlying theory is that drug errors of omission can occur in any or all of several ways: forgetting, carelessness, stopping drug use when feeling better or starting (increasing) the drug when feeling worse. We chose MMAS-4 as adherence measure in this study, because it has exhibited significant univariate association with the BMQ on earlier accounts ²¹.

Our own translation for the four items were compared to an earlier Danish translation ²². No discordance was found.

Scales and scoring

In the online survey the items from the BMQ and the ADCQ were presented in a mixed random order and rated on the same scale in order facilitate comparison and in order to avoid confusing the respondents. A five point scale was used consisting of 1: Complete disagree, 2: No text, 3: Uncertain, 4: No text, 5: Completely agree. This entails an alteration of the ADCQ which in its initial design is rated on a four point scale. The four Morisky items are normally answered with either 'yes' or 'no', but in order to allow for a more sophisticated analysis, respondents also rated the Morisky items on a four point scale (1: Never, 2: No text, 3: Sometimes, 4: No text, 5: Very often). For the discriminative powers comparison, the Morisky responses were coded back into *no* (1: Never) and *yes* (2: No text, 3: Sometimes, 4: No text and 5: Very often) resulting in two adherence profiles where 'yes' indicates low adherence and 'no' indicates high adherence.

Statistical methods

In an initial step, two maximum likelihood factor analyses with Promax rotation were performed, one for the BMQ scale and one for the ADCQ scale, with the criterion that the eigenvalues should be larger than one and that the cumulative amount of total variance extracted should be greater than 60 percent. In the final models, the correlation matrices exhibited no serious partial correlation, individual and overall

measures of sampling adequacy were higher than 0.50 and all communalities were higher than 0.40. Cronbach's alphas, item-to-item correlations and item-to-total correlations were measured in order to ensure sufficiently high reliability. In a second step, a series of t-tests were performed. Factors of the BMQ and ADCQ scales were compared based on high and low adherence values using standard t-tests – i.e. either based on pooled variances in the case of equal variances or based on weighted variances in the case of unequal variances in the two subsamples. Levene's tests were performed.

Results

Psychometric properties

Three out of the four BMQ components had good internal consistency ranging from .75 to .83. Only the Harm component was problematic and a Cronbach's alpha of .5 could only be achieved by omitting one item (*'People who take medicines should stop their treatment for a while every now and again'*). This was not surprising, since the original study which reported the development of BMQ also found that the Harm component had a low internal consistency in some datasets, which led the authors to recommend that this subscale be used with caution ⁷.

Based on our data, the psychometric properties of the ADCQ were more problematic. ADCQ 1 (Perceived doctor-patient relationship) had a suspiciously high Cronbach's alpha of .96, suggesting item redundancy. ADCQ 2 (Preserved autonomy) had a fine alpha of .76. This was far from the case with ADCQ 3 (Positive beliefs on antidepressants) which our factor analysis suggested was actually best understood as two separate components with only two items in each. Thus the items *'You may take more tablets than prescribed on days when you feel more depressed'* and *'You may take fewer tablets than prescribed on days when you feel better'* had a Cronbach's alpha of .60 and the items *'People's emotional problems are solved by the antidepressants'* and *'With antidepressants the causes of people's depression disappear'* had a Cronbach's alpha of .50. With the criteria of keeping as many items as possible in ADCQ 3 and achieving the highest possible Cronbach's alpha (.44), a three item solution was chosen based on the four items just mentioned excluding the last. ADCQ 4 (Partner agreement) was clearly problematic based on semantic analysis alone since one of the three items, *'Antidepressants correct the changes that occurred in people's brain due to stress or problems'* does not seem to have anything to do with partner agreement. This was confirmed by factor analysis and excluding the item resulted in a Cronbach's alpha of .76.

Linear relationship

No significant correlations between neither the ADCQ nor the BMQ and the Morisky scale were found. We thus proceeded to the comparative test of discriminative powers.

Discriminative powers

In table 1, the ADCQ and BMQ components are listed in relation to their ability to discriminate between high and low adherence groups as rated on the Morisky scale. The BMQ Necessity-Concerns differential is included along with the independent components (please refer to table 1 on the next page).

Table 1: Parallel test of the discriminative powers of ADCQ and BMQ against the Morisky adherence scale

Components:	Adherence levels:	MMAS-4 → Do you ever forget to take your medicine?			Are you careless at times about taking your medicine?			When you feel better do you sometimes stop taking your medicine?			Sometimes if you feel worse when you take the medicine, do you stop taking it?			MMAS TOTAL SCORE		
		n	Mean (SD)	p	n	Mean (SD)	p	n	Mean (SD)	p	n	Mean (SD)	p	n	Mean (SD)	p
ADCQ 1: Perceived doctor-patient relationship	High	87	3.55 (1.05)	0.29	149	3.55 (1.05)	0.08	183	3.47 (1.08)	0.79	208	3.45 (1.07)	0.53	74	3.55 (1.06)	0.36
	Low	141	3.40 (1.06)		79	3.29 (1.04)		45	3.42 (0.97)		20	3.60 (0.85)		154	3.42 (1.05)	
ADCQ 2: Preserved autonomy	High	87	2.53 (0.72)	0.70	149	2.50 (0.66)	0.85	183	2.46 (0.66)	0.05	208	2.50 (0.65)	0.44	74	2.52 (0.71)	0.88
	Low	141	2.49 (0.6)		79	2.52 (0.61)		45	2.68 (0.56)		20	2.61 (0.59)		154	2.50 (0.62)	
ADCQ 3: Positive beliefs on antidepressants	High	87	1.20 (0.66)	0.46	149	1.24 (0.70)	0.88	183	1.17 ^a (0.53)	0.03	208	1.22 (0.63)	0.26	74	1.14 (0.56)	0.08
	Low	141	1.26 (0.66)		79	1.23 (0.58)		45	1.51 ^a (0.99)		20	1.45 (0.89)		154	1.29 (0.70)	
ADCQ 4: Partner agreement	High	87	3.92 (0.96)	0.35	149	3.87 (1.05)	0.53	183	3.87 (1.01)	0.32	208	3.83 (1.05)	0.69	74	3.92 (0.93)	0.41
	Low	141	3.79 (1.09)		79	3.78 (1.02)		45	3.70 (1.15)		20	3.93 (0.99)		154	3.80 (1.09)	
BMQ 1: Necessity	High	87	3.88 [*] (0.90)	0.03	149	3.81 [*] (0.89)	0.02	183	3.77 [*] (0.87)	0.04	208	3.73 (0.87)	0.37	74	3.92 [*] (0.91)	0.01
	Low	141	3.62 [*] (0.83)		79	3.54 [*] (0.77)		45	3.48 [*] (0.81)		20	3.55 (0.76)		154	3.62 [*] (0.82)	
BMQ 2: Concerns	High	87	2.84 (0.88)	0.47	149	2.75 (0.87)	0.32	183	2.75 (0.83)	0.12	208	2.75 [*] (0.83)	0.03	74	2.75 (0.86)	0.60
	Low	141	2.76 (0.79)		79	2.86 (0.73)		45	2.96 (0.78)		20	3.16 [*] (0.74)		154	2.81 (0.81)	
BMQ 3: Overuse	High	87	2.49 (0.95)	0.63	149	2.39 [*] (0.93)	0.00	183	2.44 [*] (0.93)	0.00	208	2.49 [*] (0.95)	0.03	74	2.44 (0.97)	0.28
	Low	141	2.56 (0.95)		79	2.80 [*] (0.94)		45	2.92 [*] (0.92)		20	2.97 [*] (0.87)		154	2.58 (0.94)	
BMQ 4: Harm	High	87	2.09 (0.77)	0.30	149	2.03 (0.75)	0.95	183	1.96 (0.71)	0.00	208	2.01 (0.72)	0.23	74	2.08 (0.78)	0.48
	Low	141	1.99 (0.67)		79	2.03 (0.64)		45	2.30 [*] (0.62)		20	2.21 (0.59)		154	2.01 (0.67)	
BMQ1.2: Necessity – Concerns (Differential)	High	87	1.38 (1.27)	0.07	149	1.42 [*] (1.26)	0.00	183	1.34 [*] (1.30)	0.00	208	1.24 ^a (1.33)	0.00	74	1.49 [*] (1.29)	0.01
	Low	141	1.06 (1.32)		79	0.73 [*] (1.28)		45	0.56 (1.14)		20	0.58 ^a (0.84)		154	1.04 [*] (1.29)	

The four ADCQ items, the four BMQ items and the BMQ Necessity-Concerns differential score are all listed in relation to each of the four Morisky items as well as the Morisky total score. The greyed out cells signify instances where a component did not discriminate between high and low adherers. ^{*}Significant difference between means at the 5% level. ^{a)}Unequal variance according to Levene's test.

For each of the four Morisky items, which are listed unabridged in the table, the high adherence group consists of those who answered 1: Never. The low adherence group consists of those who answered 2-5 (Sometimes/Very often). For the MMAS total score in the table, the high adherence group consists of those who answered 1: Never to all four items.

In the 20 mean score comparisons (4 ADCQ components vs. 4 MMAS + total), high and low adherers only scored significantly different on the ADCQ in two instances. On the third Morisky item (*When you feel better do you sometimes stop taking your medicine?*), the high adherence group (n = 183) scored a mean of 2.46 on the ADCQ 2 (Preserved autonomy), whereas the low adherence group (n = 45) scored 2.68. The difference between these two scores was found to be significant ($p = .05$). For the same Morisky item vs. ADCQ 3 (Positive beliefs on antidepressants), the numbers are 1.17 for high adherers and 1.51 for low adherers ($p = .03$). All standard deviations are listed in table 1. It should be noted that these differences, although significant, are low. Even more problematic is the fact that, in theory, high adherers should have a higher score on the components whereas low adherers should have a lower score. This is opposite to what we found. Consequently, based on the current study, no meaningful significant results can be reported on the ADCQ's ability to discriminate between high and low adherence.

Better results were achieved with the BMQ. All significant mean differences between the high and low adherence groups are in the expected directions. Thus, 13 out of the 25 mean score comparisons (4 BMQ components + the differential score vs. 4 MMAS + total) were significant and meaningful. Only three insignificant differences were in unexpected directions. For instance, high adherers as defined by the first Morisky item (*Do you ever forget to take your medicine?*) scored higher on the second BMQ component (Concerns), which is obviously contrary to expected as high adherers logically should harbour less concerns. Two other comparisons also yielded this type of insignificant reversed differences, namely the first Morisky item vs. BMQ 4 and the total Morisky score vs. BMQ 4.

The largest and most significant differences were found for the Necessity-Concerns differential score which only turned out insignificant in one out of four possible instances, namely in relation to the first Morisky item. Even here, however, it approximated significance with $p = .07$. All other p-values were equal or under .01 and the differences between mean scores in relation to the individual Morisky items ranged between 49 and 58 percent, when measured as size of the difference in means in proportion to the largest mean. These numbers are very high when

compared to all the rest of the significant BMQ mean differences, which range from 7 to 16 percent with p-values from .04 to below .00.

Discussion

The idea behind this study was to compare general and generic medication beliefs (BMQ) with particular depression-related illness and medication beliefs (ADCQ) in a parallel test with antidepressant adherence as the dependent variable. However, since we found no meaningful significant correlations between our measure of particular depression-related illness and medication beliefs, ADCQ, and the self-reported measure of adherence, we are faced with one of two possible conclusions. General and generic medication beliefs are either a superior predictor of antidepressant adherence compared with particular depression-related illness and medication beliefs or our measure of the latter, i.e. the ADCQ, is not sufficiently valid to make the comparison meaningful.

Our hypothesis is that the comparison is obscured by the properties of the ADCQ. We base this on three arguments. Firstly, it seems unlikely that particular depression-related illness and medication beliefs should be totally unrelated to antidepressant adherence. Secondly, both the sample and the measure of adherence used in the present study seem sound, as suggested by the positive BMQ results. Thirdly, the ADCQ suffers from several apparent issues with, which we will briefly cover below.

Contrary to the BMQ, the ADCQ does not have any reported theoretical grounding. Furthermore, its components seem somewhat arbitrarily constituted.

The ADCQ 1 (Perceived doctor-patient relationship) component contains almost half the items (15) of the 33-item questionnaire. Its original Cronbach's alpha was found to be .93, whereas we found it to be .96. This is a very high degree of internal consistency suggesting that the component might contain too many items which are somewhat overlapping²³. Redundancy can be confirmed when comparing the wording of the questions, e.g. *'My doctor takes sufficient time to listen to my problems'* vs. *'My doctor is really interested in my problems'*. Furthermore, many of the items in this component seem more related to whether the patient has received information about antidepressants and adherence than about the doctor-patient relationship as such, e.g. *'My doctor strongly emphasizes that it is important to take antidepressants regularly'*.

ADCQ 2 (The preserved autonomy component) seems more logical and it is actually a bit surprising that its only significant relation to the Morisky scale was a low and logically reversed one.

The ADCQ 3 (Positive beliefs on antidepressants) component is more problematic containing several items that do not semantically reflect its title, e.g. *'You may take more tablets than prescribed on days when you feel more depressed'*. This lack of internal logic was reflected in our factor analysis which suggested that ADCQ 3 is better understood as two separate components, however with only two items in each, as mentioned in the results section.

The last component, ADCQ 4 (Partner agreement), originally contained three items of which only two can be said to reflect its title. The third item, which had to be omitted based on our factor analysis, is itself problematic (*'Antidepressants correct the changes that occurred in people's brain due to stress or problems'*) since it actually contains two different questions where agreement with one does not entail agreement with the other.

Three study limitations might have affected the results obtained with ADCQ, namely translation issues, scale alteration and the changed wording of six items. However, our internal consistency calculations of two of the four components closely match the original ones, i.e. .93 vs .96 for ADCQ 1 and .76 vs .81 for ADCQ 2 suggesting that translation and scale alterations were sound. Furthermore, the consistency issues of ADCQ 3 and 4 persist independently of slight alterations such as changing *'my depression'* to *'people's depression'*. Lastly, even the internally consistent combinations of items from ADCQ 3 and 4 failed to correlate significantly with our measure of adherence.

Some more general limitations of our study should be mentioned. This was a cross-sectional study which is a limitation in itself compared to longitudinal studies. Additionally, our recruitment method was somewhat unorthodox and as a consequence our sample is based on self-selection which is less reliable than studies where patient status is proven by medical records. Nevertheless, the demographic composition of the sample seems quite representative of depression patients in terms of age, sex and prescription source (i.e. psychiatric in/out-patients vs. primary care patients). Furthermore, to the extent that we can rely on self-reported measures of adherence, it would seem fair to also rely on self-reported patient status, as long as respondents are able to account for details such as medication type, prescription source and illness indication (i.e. depression vs. anxiety, etc.).

Moreover, our results as regards the BMQ in relation to MMAS-4 closely resemble earlier studies in which these two instruments have been co-applied^{8,21,24,25}. This suggests that our sample is representative and that our alternative scoring of Morisky resulted in as little harm to validity as it did in any new information.

Further research could create a stronger measure of particular depression-related illness and medication beliefs related to antidepressant adherence as well as to the implicit cost-benefit analyses that seem to influence adherence in general as illustrated by the Necessity-Concerns framework.

Acknowledgements

This study was sponsored by Innovation Fund Denmark. The authors would like to thank the following people who commented on manuscript drafts: Klaus G. Grunert (Professor at Aarhus University), Bjarke Ebert (Lead Medical Advisor at Lundbeck) and Christina Kurre Olsen (Lead Specialist at Lundbeck).

Declaration of interest

The primary author was an employee at Lundbeck at the time of the study, but the study does not involve or address any specific pharmaceutical compounds and the study was primarily sponsored by Innovation Fund Denmark under the Industrial PhD programme in collaboration with Aarhus University.

References

1. Sansone, R. A. & Sansone, L. A. Antidepressant adherence: Are patients taking their medications? *Innov. Clin. Neurosci.* **9**, 41–46 (2012).
2. Lingam, R. & Scott, J. Treatment non-adherence in affective disorders. *Acta Psychiatr. Scand.* **105**, 164–172 (2002).
3. Davé, S. Discontinuation of antidepressant therapy among patients with major depressive disorder. *Open J. Psychiatry* **02**, 272–280 (2012).
4. De las Cuevas, C., Peñate, W. & Sanz, E. J. Risk factors for non-adherence to antidepressant treatment in patients with mood disorders. *Eur. J. Clin. Pharmacol.* **70**, 89–98 (2014).
5. Lin, E. H. *et al.* The role of the primary care physician in patients' adherence to antidepressant therapy. *Med. Care* **33**, 67–74 (1995).
6. Hansen, H. V. & Kessing, L. V. Adherence to antidepressant treatment. *Expert Rev. Neurother.* **7**, 57–62 (2007).

7. Horne, R., Weinman, J. & Hankins, M. The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. *Psychol. Health* **14**, 1–24 (1999).
8. Horne, R. *et al.* Understanding patients' adherence-related Beliefs about Medicines prescribed for long-term conditions: A meta-analytic review of the Necessity-Concerns Framework. *PLoS ONE* **8**, e80633 (2013).
9. Demyttenaere, K. *et al.* Development of an antidepressant compliance questionnaire. *Acta Psychiatr. Scand.* **110**, 201–207 (2004).
10. Kessing, L. V., Hansen, H. V., Demyttenaere, K. & Bech, P. Depressive and bipolar disorders: patients' attitudes and beliefs towards depression and antidepressants. *Psychol. Med.* **35**, 1205–1213 (2005).
11. Chakraborty, K., Avasthi, A., Kumar, S. & Grover, S. Attitudes and beliefs of patients of first episode depression towards antidepressants and their adherence to treatment. *Soc. Psychiatry Psychiatr. Epidemiol.* **44**, 482–8 (2009).
12. Sawamura, K., Ito, H., Koyama, A., Tajima, M. & Higuchi, T. The effect of an educational leaflet on depressive patients' attitudes toward treatment. *Psychiatry Res.* **177**, 4 (2010).
13. Misri, S. *et al.* Factors impacting decisions to decline or adhere to antidepressant medication in perinatal women with mood and anxiety disorders. *Depress. Anxiety* **30**, 1129–1136 (2013).
14. Kumpakha, A., Bhattarai, S., Sharma, S. & Hc, P. Improving Patient Compliance in Antidepressant Therapy through Counselling. *Indian J. Pharm. Pract.* **6**, 34–39 (2013).
15. Hung, Y., Wang, Y.-C. & Chou, J.-P. The Components of Adherence for Depression Patients. *中華心理衛生學刊* **27**, 201–221 (2014).
16. Jacob, S. A., Hassali, M. A. A. & Ab Rahman, A. F. Attitudes and beliefs of patients with chronic depression toward antidepressants and depression. *Neuropsychiatr. Dis. Treat.* **Volume 11**, 1339 (2015).
17. Leventhal, H., Meyer, D. & Nerenz, D. in *Contributions to Medical Psychology* (ed. Rachman, S.) 7–30 (Pergamon Press, 1980). at <<http://books.google.dk/books?id=mNYnAQAAIAAJ>>

18. Andersen, M., Eldberg, K., Foged, A. & Søndergaard, J. *Generisk substitution. Indflydelse på medicinbrugernes tryghed og komplians*. (2009).
19. Morisky, D. E., Green, L. W. & Levine, D. M. Concurrent and predictive validity of a self-reported measure of medication adherence. *Med. Care* **24**, 67–74 (1986).
20. Green, L. W., Levine, D. M. & Deeds, S. Clinical trials of health education for hypertensive outpatients: Design and baseline data. *Prev. Med. (Baltim)*. **4**, 417–425 (1975).
21. Aikens, J. E., Nease, D. E., Nau, D. P., Klinkman, M. S. & Schwenk, T. L. Adherence to maintenance-phase antidepressant medication as a function of patient beliefs about medication. *Ann. Fam. Med.* **3**, 23–30 (2005).
22. Herborg, H. & Thomsen, D. *Evidensrapport 9, v. 1.2*. (2005). at <https://bibliotek.dk/da/moreinfo/netarchive/870970-basis%253A26213525>
23. Tavakol, M. & Dennick, R. Making sense of Cronbach's alpha. *Int. J. Med. Educ.* **2**, 53–55 (2011).
24. Brown, C. *et al.* Beliefs about antidepressant medications in primary care patients: relationship to self-reported adherence. *Med. Care* **43**, 1203–1207 (2005).
25. De Las Cuevas, C., Peñate, W. & Sanz, E. J. Psychiatric outpatients' self-reported adherence versus psychiatrists' impressions on adherence in affective disorders. *Hum. Psychopharmacol.* **28**, 142–150 (2013).

Paper 2

Identity concerns predict attitudes towards antidepressants

Jon Johansen & Bjarne Taulo Sørensen

[Target journal: Depression & Anxiety]

Abstract

Background

Negative attitudes towards antidepressants might lead to decreased adherence, increased stigma and lower quality of life for patients and relatives. The present study was aimed at identifying beliefs that predict negative attitudes towards antidepressants. We hypothesized that seeing antidepressants as a potential threat to identity would correlate strongly with negative attitudes.

Methods

31 items constituted the original item pool in an online survey (N = 688) about beliefs and attitudes in relation to depression. 24 items were based on two existing questionnaires, i.e. the Beliefs about Medicines Questionnaire (BMQ) and the Antidepressant Compliance Questionnaire (ADCQ). Seven additional belief items as well as a three-item antidepressant attitude measure were developed specifically for the study. We hypothesized that five out of the 31 items would reflect aspects of identity concerns.

Results

Based on 11 of the original 31 items, we identified three factors, all of which correlated negatively with attitude towards antidepressants. These factors were interpreted as belief constructs reflecting 1: *Identity concerns*, 2: *Drug dependency* and 3: *Antidepressant over-prescription*. Taken as a whole, the three factors correlated positively with negative attitudes towards antidepressants (R square = .511).

Conclusions

Identity concerns seem to be an important, overlooked factor in depression treatment. Our results indicate that seeing medication as a potential threat to identity leads to negative medication attitudes which is likely to influence adherence, clinical outcome and quality of life in a negative way. We suggest that identity concerns should be addressed in the clinic on the same priority level as more traditional subjects, such as side effects and adherence.

Introduction

Intuitively, it would seem likely that negative attitudes towards antidepressants may lead to decreased adherence, increased stigma and lower quality of life for patients and relatives, but due to the lack of studies applying standardized measures of attitudes towards antidepressants these assertions are still somewhat unfounded. However, one study have found that people with negative attitudes at 18 months reported to be less adherent than people with neutral or positive attitudes ¹.

Even if we assume the unlikely idea that negative treatment attitudes only rarely entail poorer adherence, then attitudes must still be considered an important factor in pharmaceutical treatment, because feeling bad about taking medicine is a negative experience regardless of levels of adherence. Furthermore, attitudes can be measured for patients and non-patients alike and can be seen as a behavioural indicator of the different agents involved in depression treatment, that is, patients themselves, health care professionals, close relatives, colleagues, society and the media. In this regard, attitudes towards antidepressants can be seen as a complementary measure to adherence and stigma measures. Note should be made of the fact that patients are non-patients before they become patients. Their initial pre-depressed attitudes towards antidepressants can influence whether they seek help, accept diagnosis and initiate treatment.

In the literature relating to patient's perspectives on antidepressants, the term *attitude* is used somewhat inconsistently. Often it seems to be used more or less synonymously with beliefs or subjective reasons for preferences ^{2,3}. At other times it approximates a tendency to respond with some degree of favourableness or unfavourableness to antidepressant treatment ^{1,4}, which is in line with the commonly accepted definition of attitudes ⁵. It is in this latter sense of the term attitudes that the present paper is written.

Our aim with the present study is to identify beliefs that influence attitudes towards antidepressants. Moreover, we wish to test the hypothesis that identity-related beliefs play a prominent part in this relation. This hypothesis is partially based on a study about preferences for enhancement pharmaceuticals, in which the participants were more reluctant to enhance traits considered fundamental to self-identity (e.g. mood, motivation and self-confidence) compared to traits considered less fundamental to self-identity (e.g. wakefulness, concentration and absentmindedness)⁶.

Naturally, there is a big difference between fictive enhancement pharmaceuticals and existing treatment pharmaceuticals and it is not known whether reluctance to *enhance* fundamental traits translates into reluctance to *treat* fundamental traits. The opposite logic could be that people it is ok to treat fundamental traits if these are perceived as being compromised by depression.

Nevertheless, to the degree that depression is conceptualized as a mood disorder and correspondingly, that mood is considered an antidepressant treatment target, it would seem likely that antidepressant treatment may in some way conflict with people's notions of fundamental traits, i.e. traits that are considered central to self-identity. This study can be seen as a preliminary test of this hypothesis.

Although identity concerns and other existential issues are fairly common in qualitative research on beliefs and attitudes related to depression and antidepressants ⁷, they seem less prominent in quantitative scales commonly used to measure beliefs about depression and its treatment such as the Antidepressant Compliance Questionnaire (ADCQ) ⁸, the Beliefs about Medicines Questionnaire (BMQ) ⁹ and the Illness Perception Questionnaire (IPQ) ¹⁰. A small number of the scale items (most of which are included in the present study) can indeed be said to reflect identity related issues, but none of these are grouped in factors or theoretically articulated as coherent beliefs constructs.

In summary, this study aims to identify beliefs related to attitudes towards antidepressants with the sub-goal of investigating the potential role of identity-related beliefs.

Materials and Methods

Data collection

The present paper reports one of two studies based on data generated in a Danish internet survey. The survey was aimed at the general public and advertised through several channels including a wide variety of the largest national newspaper websites as well as more specialized patient information and discussion sites. Additionally, information about the survey was posted in analogue versions of newspapers and patient magazines.

Attitude measure

A three-item antidepressant attitude measure was developed for the study. This measure was inspired by Theory of Reasoned Action ¹¹ and devised using a basic semantic differential ¹²:

Treating depression with antidepressant medication is:
Extremely bad: 3, 2, 1, 0, 1, 2, 3 :Extremely good

Treating depression with antidepressant medication is:
Extremely foolish: 3, 2, 1, 0, 1, 2, 3 :Extremely wise

I am:
Strongly against: 3, 2, 1, 0, 1, 2, 3 :Strongly for (treating depression with antidepressant medication)

Belief measure – item pool

Three sources were used, the Antidepressant Compliance Questionnaire (ADCQ), the Beliefs about Medicines Questionnaire (BMQ) and a set of new items developed for the present study. The complete item pool is listed in table 1.

Table 1: Item pool

Source	Modified wording	Hypothesized reflection of self-identity	Item
ADCQ	None		Skipping a day now and again prevents your body from becoming immune to the antidepressants
ADCQ	None		When you have taken antidepressants over a long period of time it is difficult to stop taking them
ADCQ	None		Your body can become addicted to antidepressants
ADCQ	None		As long as you are taking antidepressants you do not really know if they are actually necessary
ADCQ	None		Your body can become immune to antidepressants
ADCQ	None	Yes	Antidepressants can alter your personality
ADCQ	None	Yes	When you take antidepressants you have less control over your thoughts and feelings
ADCQ	Type 1		Antidepressants make depressed people stronger so they can deal more efficiently with their problems
ADCQ	None		You may take more tablets than prescribed on days when you feel more depressed
ADCQ	Type 1		With antidepressants the causes of depression disappear
ADCQ	None		If you forget to take the antidepressants on a certain day, it is better to take an additional dose the following day
ADCQ	Type 1		Antidepressants help people worry less about their problems
ADCQ	Type 1		Depressed people's emotional problems are solved by antidepressants
ADCQ	None		You may take fewer tablets than prescribed on days when you feel better
ADCQ	Type 1	Yes	I think depression is only due to factors associated with personality
ADCQ	None		Antidepressants correct the changes that occurred in my brain due to stress or problems
BMQ	Type 2		Doctors prescribe too many antidepressants
BMQ	Type 2		Natural remedies are safer than antidepressants
BMQ	Type 2		If doctors had more time with patients they would prescribe fewer antidepressants
BMQ	Type 2		Doctors place too much trust on antidepressants
BMQ	Type 2		All antidepressant medication is poison
BMQ	Type 2		Antidepressants do more harm than good
BMQ	Type 2		People who take antidepressants should stop their treatment for while every now and again
BMQ	Type 2		Most types of antidepressants are addictive
Interviews	None		Psychotherapy and other talk therapy is generally not very effective against depression

Interviews	None		Depressed people will typically have suffered deprivation or misfortune early on in their lives
Interviews	None		Most people who are diagnosed with depression can get well without medicine
Interviews	None		When a person is diagnosed with depression, it is normally due to preceding unfortunate circumstances
Interviews	None	Yes	Antidepressant medication inhibits personal development
Interviews	None	Yes	In the medical perspective, mind and soul are reduced to chemistry and biology
Interviews	None		Depressions caused by external causes (for instance, events and circumstances) and depression caused by internal circumstances (for instance, biological changes) should not be treated similarly

ADCQ was originally designed to measure beliefs related to antidepressant medication adherence⁸ whereas BMQ was designed to measure beliefs related to medication adherence in general⁹. Both questionnaires have previously been translated into Danish and these translations were re-used in the present study^{13,14}.

We hypothesized that adherence-related beliefs might very well also be related to medication attitude as well, and therefore we sought to include as many items from the BMQ and the ADCQ as possible. Items were included if they could be answered by patients and non-patients alike. Thus, in order for the final questionnaire to make sense to non-patients, we had to exclude a number of items; others could be included with slightly altered wordings.

These alterations, which are listed in table 1, include two types. In type 1 alterations, items which originally were aimed at individual patient experience were modified in order for them to refer to depression and antidepressants in general: E.g. in the item '*I think depression is only due to factors associated with my personality* (ADCQ)' the word 'my' was omitted. In type 2 alterations, wordings were changed so that items related to antidepressants specifically rather than medicine in general. For instance, in the item: '*Natural remedies are safer than medicine*' (BMQ) the word 'medicine' was replaced with 'antidepressants'.

16 out of 31 items from the ADCQ and eight out of 18 items from the BMQ were included. Seven newly developed items were also included. These were based on 16 qualitative pilot interviews. The items were designed to reflect themes that came up when participants were asked about concerns towards antidepressant medication.

Based on semantic analysis of the 31 items included in the survey, we speculated that five of them were good candidates to reflect identity-related concerns about antidepressants, e.g. '*Antidepressants can alter your personality*' (ADCQ). Thus, we expected that at least some of them would group together in an exploratory factor analysis.

All items were presented in a mixed random order and rated on the same scale in order facilitate comparison and avoid confusing the respondents. A five-point scale was used consisting of 1: Complete disagree, 2: No text, 3: Uncertain, 4: No text, 5: Completely agree. This is an alteration of the ADCQ which in its initial design is rated on a four-point scale.

Statistical measures

A maximum likelihood factor analysis with Promax rotation was conducted with the criterion that the eigenvalues should be larger than one and that the cumulative amount of total variance extracted should be greater than 60 percent. The correlation matrix revealed no serious partial correlation, individual and overall measures of sampling adequacy were greater than 0.50 and all communalities were higher than 0.40.

Results

Population characteristics

Of 688 participants, roughly one third (29%) were males, 25.3 percent were younger than thirty, 30.1 percent were in their thirties, 16.9 percent were in their forties, 16.3 percent were in their fifties, and 11.5 percent were sixty or older. 32.3 percent were single, 16.4 percent were in a relationship, and 48.4 percent were married or in a cohabiting relationship.

Internal validity

The three-item attitude measure had a Cronbach's alpha of 0.945.

Factor analysis of the item pool resulted in three coherent factors based on 11 of the 31 original items (table 2).

Table 2: Three factors

Factor	Loading	Item wording	Cronbach's alpha	Original source	ID*	Mean	Std. Deviation
1. Identity concerns			.818				
1	.763	All antidepressant medication is poison		BMQ		2.07	1.212
1	.729	Antidepressant medication inhibits personal development		Interviews	Yes	2.29	1.160
1	.710	Antidepressants do more harm than good		BMQ		2.11	1.089
1	.658	When you take antidepressants you have less control over your thoughts and feelings		ADCQ	Yes	2.39	1.197
1	.650	In the medical perspective, mind and soul are reduced to chemistry and biology		Interviews	Yes	2.76	1.268
2. Drug dependency			.813				

2	.863	Your body can become addicted to antidepressants		ADCQ		3.42	1.199
2	.818	When you have taken antidepressants over a long period of time it is difficult to stop taking them		ADCQ		3.21	1.218
2	.780	Most types of antidepressants are addictive		BMQ		3.02	1.139
3. Antidepressant over-prescription			.763				
3	.814	If doctors had more time with patients they would prescribe fewer antidepressants		BMQ		3.59	1.089
3	.767	Doctors prescribe too many antidepressants		BMQ		3.45	1.119
3	.745	Doctors place too much trust on antidepressants		BMQ		3.44	1.094

Of the five items that we anticipated would reflect antidepressants as a perceived threat to identity, three formed parts of a five-item component (Cronbach's alpha: .818) subsequently termed *Identity concerns* (e.g. 'Antidepressant medication inhibits personal development'). This component contained items from all three sources, namely two from the pilot interview, two from the BMQ and one from the ADCQ.

Two other components were found. A three-item component (Cronbach's alpha: .813), based on two components from the ADCQ and one from the BMQ, seems to reflect *Drug dependency* (e.g. 'Your body can become addicted to antidepressants'). Lastly, a three-item component (Cronbach's alpha: .763) was based exclusively on one original BMQ-component termed General-Overuse. However, since the wordings of the items were changed to reflect antidepressants specifically and since items only reflect behaviour of doctors and not patients, we interpret the component to reflect *Antidepressant over-prescription* (e.g. 'Doctors prescribe too many antidepressants').

Correlations and regression

All three factors were significantly correlated with attitude towards antidepressants at the 0.01 level (2-tailed). This was most pronounced for *Identity concerns* ($r = -.685$, $p < .001$) and Antidepressant overuse ($r = -.559$, $p < .001$), but also to a fair degree for *Drug dependency* ($r = -.331$, $p < .001$).

However, a regression analysis revealed *Drug dependency* to be accounted for by the other two sum scores. That is, with attitude as dependent variable, the three sum scores as a whole had an R square of .511 ($F = 238.12$, $p < .001$), but *Drug dependency* turned out to be minuscule and insignificant ($B = .010$, $p = .811$).

Table 3: Coefficients (Dependent Variable: Attitude)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	8.303	.168		49.371	.000
Identity concerns	-.849	.054	-.546	-15.571	.000
Drug dependency	.010	.042	.007	.239	.811
Antidepressant over-prescription	-.384	.051	-.248	-7.599	.000

Discussion

Seeing antidepressants as a medical threat to authentic self-identity might be one of the strongest causes of negative attitudes towards antidepressants.

This conclusion is based on the *Identity concerns* factor presented above. This factor consists of five items relating to negative attitudes towards antidepressants. In our interpretation, three of these items have identity as an underlying rationale (Antidepressant medication inhibits personal development; When you take antidepressants, you have less control over your thoughts and feelings; In the medical perspective, mind and soul are reduced to chemistry and biology).

Of the two remaining items, one seems to relate to negative attitudes without any underlying rationale, i.e. antidepressants are construed as harmful from a cost-benefit perspective, but the harmfulness is unspecified (Antidepressants do more harm than good) and could therefore refer to anything. The fact that this item is grouped with items relating to *Identity concerns* suggests that the perceived harmfulness could relate to the latter. The same can be argued for the last item (All antidepressant medication is poison) which seems to be a metaphoric expression for antidepressants being generally harmful (“poison”).

Together with *Identity concerns*, two other factors formed part of a model with an R square of .511 in relation to antidepressant attitudes. These factors were *Drug dependency* and *Antidepressant over-prescription*. *Identity concerns*, however, was by far the strongest loading factor both independently ($r = -.685, p < .001$) and as part of the regression model ($B = -.849, p < .001$). Curiously, it was also the factor with the lowest average mean score. Taken together these results indicate that attitude towards antidepressants seem very sensitive to identity concerns although the latter might not be as heavily endorsed as other belief factors.

The supporting factors, *Drug dependency* and *Antidepressant over-prescription*, can be expected to be at least partially connected to the same underlying rationales as *Identity concerns*. This is most obvious for *Drug dependency*, which is accounted for by the other two factors although it relates significantly to antidepressant treatment attitude on its own. *Drug dependency* can be understood as both a physical and psychological phenomenon and based on its three items it is likely to be understood as both. This also reminds us that *Identity concerns* can be seen as related to physical dependency to some degree.

Antidepressant over-prescription can both be understood in a treatment context and in a diagnostic context. In a treatment context it could mean that caretakers are putting depression patients on too high a dosage for too long a period of time. It could also mean that caretakers by relying too singularly on antidepressants fail to address other treatment aspects such as therapy, counselling or coaching. In a diagnostic context it could mean that caretakers prescribe antidepressants to people who would be better off with alternative courses of action. All these interpretations resonate with *Identity concerns* in the sense that they can all be seen as counterproductive to the goal of steering clear of unnecessary identity centric trait modification.

As mentioned in the introduction, our hypothesis is that the strong relation between identity concerns and antidepressant attitude is due to the perception that antidepressants target certain personal traits, e.g. mood, motivation and self-confidence, which people are reluctant to modify because they are seen as central to identity. This hypothesis is inspired by a study by Riis et al. who found that people were reluctant to enhance so-called fundamental traits ⁶.

This leads to the question of whether people with positive attitudes towards antidepressants tend to see depression treatment target traits as less central to identity or whether they simply see these traits as being enabled rather than enhanced or modified. This would resonate with the classical medical view that certain traits, e.g. mood, which have been compromised by illness, should be restored to their natural states. In this view, traits are enabled rather than enhanced or modified.

It could also be the case that people with positive attitudes towards antidepressants tend to see depression as a more functional and less existential condition. If this is the case, people with positive vs. negative attitudes towards antidepressants might not differ in their view on whether certain traits are more central to identity than

others. Rather, their views might differ as to whether certain traits are more central to depression treatment than others.

Whichever the underlying mechanisms that govern the relation between identity concerns and antidepressant treatment attitude might be, the clinical implications are significant.

Identity concerns are existential in nature and views on identity are culturally rooted. Furthermore, they are not easily refuted by scientific evidence. Information about neurobiological underpinnings of depression can always be met with the view that they are a second order phenomenon caused by existential events evolving around identity and life events. Also, the notion that antidepressants inhibit personal development can be somewhat immune to real life examples of the contrary. This is the case because it is always to imagine an alternative timeline in which someone overcame depression without antidepressants in a way that was more 'true' to identity and the perceived narrative logic of life. This line of thinking cannot simply be cured by mental health literacy just as a political standpoint cannot simply be cured by information reflecting the opposite standpoint.

Therefore, addressing these things in the clinic is a radically different undertaking than simply informing patients about depression, antidepressants, side effects and adherence. Further research should pursue a greater understanding of the existential dimension of antidepressant treatment and, more importantly, translational research should use this information to help clinicians address existential and cultural beliefs.

Due to the nature of our study design, our data does not support any conclusions about the underlying rationale governing the perceived relation between *Identity concerns* and negative attitudes towards antidepressants. However, based on our study and its background theory, we have generated the following hypotheses that should be tested by further research:

1. People with positive attitudes towards antidepressants see depression and its treatment as primarily concerning traits which are not considered fundamental to self-identity, e.g. certain cognitive functions such as concentration and working memory. In contrast, people with negative attitudes towards antidepressants see depression and its treatment as primarily concerning traits which are indeed considered fundamental to self-identity, e.g. mood and motivation.

2. People with positive attitudes towards antidepressants conceive of the treatment targets (e.g. mood or concentration) as natural traits in unnatural states, whereas people with negative attitudes towards antidepressants conceive of the treatment targets as traits in states which are natural in respect to the perceived causes of a given depression.
3. People with positive attitudes towards antidepressants conceive of treatment as enabling rather than enhancing, whereas people with negative attitudes towards antidepressants conceive of the treatment as enhancing and modifying.

Despite these results and subsequent hypotheses our study has several limitations.

The study was cross-sectional and we cannot know for certain whether the observed relation between beliefs and attitude are unidirectional. It is not unlikely that beliefs and attitudes influence each other in a bidirectional way, where beliefs are sometimes formed as a post hoc rationalisation of attitude.

The study is based on a convenience sample and results might not be entirely generalizable to the full population, which in this case is society in general. Respondents are primarily people who read news online and secondarily people who form part of existing interest groups relating to the subject (e.g. depression websites and patient web fora). Furthermore, people who actively chose to participate in the study can be assumed to have an above average antidepressant involvement degree. However, since antidepressants must be considered a high-involvement product in general, this bias is likely to be of little consequence.

Conclusion

Our research indicates that identity concerns strongly influence attitudes towards antidepressant medication. This finding has very important implications for clinical practice. It is often advocated that clinicians should discuss possible side effects and the importance of adherence when administering antidepressants, but such advice neglects the less technical and more existential aspects of taking antidepressant medication. We suggest that clinicians should be ready to discuss identity-related concerns with patients on the same level of priority as more technical aspects of medicine taking.

Acknowledgements

This study was sponsored by Innovation Fund Denmark. The authors would like to thank the following people who commented on manuscript drafts: Klaus G. Grunert (Professor at Aarhus University), Bjarke Ebert (Lead Medical Advisor at Lundbeck) and Christina Kurre Olsen (Lead Specialist at Lundbeck).

Declaration of interest

The primary author was an employee at Lundbeck at the time of the study, but the study does not involve or address any specific pharmaceutical compounds and the study was primarily sponsored by Innovation Fund Denmark under the Industrial PhD programme in collaboration with Aarhus University.

References

1. Melartin, T. K. *et al.* Continuity is the main challenge in treating major depressive disorder in psychiatric care. *J. Clin. Psychiatry* **66**, 220–227 (2005).
2. Misri, S. *et al.* Factors impacting decisions to decline or adhere to antidepressant medication in perinatal women with mood and anxiety disorders. *Depress. Anxiety* **30**, 1129–1136 (2013).
3. Jacob, S. A., Hassali, M. A. A. & Ab Rahman, A. F. Attitudes and beliefs of patients with chronic depression toward antidepressants and depression. *Neuropsychiatr. Dis. Treat.* **Volume 11**, 1339 (2015).
4. Partridge, B., Lucke, J. & Hall, W. Over-diagnosed and over-treated: a survey of Australian public attitudes towards the acceptability of drug treatment for depression and ADHD. *BMC Psychiatry* **14**, 74 (2014).
5. Eagly, A. H. & Chaiken, S. *The psychology of attitudes*. (Harcourt Brace Jovanovich College Publishers, 1993).
6. Riis, J., Simmons, J. P. & Goodwin, G. P. Preferences for Enhancement Pharmaceuticals: The Reluctance to Enhance Fundamental Traits. *J. Consum. Res.* **35**, 495–508 (2008).
7. Malpass, A. *et al.* 'Medication career' or 'moral career'? The two sides of managing antidepressants: a meta-ethnography of patients' experience of antidepressants. *Soc. Sci. Med.* **68**, 154–68 (2009).
8. Demyttenaere, K. *et al.* Development of an antidepressant compliance questionnaire. *Acta Psychiatr. Scand.* **110**, 201–207 (2004).
9. Horne, R., Weinman, J. & Hankins, M. The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. *Psychol. Health* **14**, 1–24 (1999).
10. Weinman, J., Petrie, K. J., Moss-morris, R. & Horne, R. The illness perception questionnaire: A new method for assessing the cognitive representation of illness. *Psychol. Health* **11**, 431–445 (1996).

11. Ajzen, I. & Fishbein, M. *Understanding Attitudes and Predicting Social Behavior*. (PRENTICE-HALL, 1980). at <http://www.pearsonhighered.com/educator/academic/product/0,,0139364358,00%2ben-USS_01DBC.html>
12. Heise, D. R. in *Attitude Measurement* (ed. Summers, G. F.) 235–253 (Rand McNally, 1970). at <<http://www.indiana.edu/~socpsy/papers/AttMeasure/attitude..htm>>
13. Andersen, M., Eldberg, K., Foged, A. & Søndergaard, J. *Generisk substitution. Indflydelse på medicinbrugernes tryghed og komplians*. (2009).
14. Kessing, L. V., Hansen, H. V., Demyttenaere, K. & Bech, P. Depressive and bipolar disorders: patients' attitudes and beliefs towards depression and antidepressants. *Psychol. Med.* **35**, 1205–1213 (2005).

Paper 3

Mental models of depression and their relation to attitude

- A detailed comparative view of two discrete belief models associated with positive and negative attitudes towards antidepressants

Jon Johansen & Joachim Scholderer

[Target journal: Social Science & Medicine]

Abstract

Objective

Information about depression and its treatment is likely to be processed in a way that is influenced by pre-existing beliefs and attitudes. The present study aims to map mental models of depression (depression prototypes) in order to better understand the 'cognitive filters' that can sometimes influence how information about depression and its treatment is processed.

Method

Elicitation interviews were conducted with 36 participants. These were selected from a sample of 688 respondents whose attitudes towards antidepressants had been measured prior to the interviews. The 36 participants consisted of equal amounts of endorsers of positive and negative attitudes respectively. Half had at some point in their life been prescribed antidepressants for depression (patients) whereas this was not the case for the other half (non-patients). The elicited depression attributes were analysed by content coding. Subsequently, the coded attributes were subjected to cluster analysis.

Results

Two clusters were identified. The clusters differed significantly in terms of attitudes towards antidepressants ($p < .001$) but not in terms of patient status ($p = .75$). The conceptual structures revealed by the clusters seemed to be differentiated along three dimensions. Differences in conceptual structures relating to causes of depression seem structured along a biomedical vs psychosocial dimension. Differences in conceptual structures relating to depression itself as well as its consequences seem structured along a causality vs intentionality dimension. Differences in conceptual structures relating to treatment of depression seem structured along an identity dimension, where people with negative attitudes towards antidepressant medication see the latter as a threat to authentic self-identity, whereas people with positive attitudes are likely to see antidepressant medication as an enabler of identity when it has been repressed by depression.

Introduction

Background

The present study aims to investigate differences in mental models of depression (in terms of their content and in terms of the attitudes towards antidepressant medication resulting from these (ADM attitudes)).

Beliefs about depression have already been studied extensively, but to the best of our knowledge no papers report studies of beliefs as discrete models with coherent structures. It is far more common to study depression related beliefs as variation in factors relating to perceived reasons for depression (e.g. existential, physical, cognitive)¹⁻⁴, treatment of depression (e.g. necessity, concerns, preserved autonomy)⁵⁻⁸ or depression itself and its consequences (e.g. timeline, coherence, emotional representation)⁹⁻¹³.

In contrast hereto, the primary aim of the present study is to identify mental models of depression which are coherent, but distinct between different individuals. This aim is largely motivated by the assumption that mental representations are formed as flexible but stable meaningful and coherent wholes, whose composition is governed by structural properties that operate relatively independently of the subject to which the mental representations refer.

Theoretical approach and terminology

We assume that lay mental models of depression will often be structured around narratives and associations, which are largely influenced by cultural scripts, conventions and attitudes. This idea is inspired by studies of cultural conventions or religious beliefs, which can sometimes seem hard to understand until they are seen in the light of a larger coherent belief system^{14,15}.

Technically speaking, our approach is informed by prototype theory.

Prototype theory rests on the shoulders of Wittgenstein's notion of family resemblance¹⁶, and was popularized in cognitive psychology by Rosch et al. in the seventies^{17,18}. Prototype theory maintains that categorization is often a graded phenomenon structured around central members of a category. This is a departure from classical set-theoretic Aristotelian logic, where category membership is determined by discrete rules. In graded categorization, category membership is determined by resemblance to a prototype regardless of whether the category itself is defined by discrete rules¹⁸. Correspondingly, prototypes themselves are organized in hierarchical category membership, where central members of the category have

more attributes in common than non-central members and non-members. This is in line with the earlier cue validity processing model, which is mathematically defined as a conditional probability that can be operationalized as the frequency of cue association to category X divided by frequency of cue association to all other relevant categories¹⁹. The prototype model of categorization, however, is not as much a processing model as a description of structural principles.

Prototype theory was influential within the literature on illness representations in the eighties. However, as a research guiding perspective, it seems to have been lying relatively dormant in recent times, except for a few papers^{20,21}, most of which refer to the early work of George D. Bishop et al.^{22,23}.

The present study is an attempt to revive and re-operationalize prototype theory in the study of mental models of depression. The following terms are central to the study, and we will therefore briefly define how we use them in the paper:

- Prototypes
- Attributes (types and tokens)
 - Causal attributes
 - Illness attributes
 - Treatment attributes

We use the term *depression prototypes* as a term for prototypical conceptions of depression. Following prototype theory we assume that lay people think of depression in idealised schematic structures and that singular instances of potential depression cases will be judged on how well they match the preconceived depression prototype. Furthermore, we assume that people differ in their prototypical conceptions of depression.

In line with prototype theory we assume that prototypes can be described by their attributes or by exemplars. Attributes are understood as properties people use to describe a category. For the case of depression, examples of such attributes could be 'sadness', 'caused by stress', 'irritability', etc. Exemplars are understood as best case examples of depression which take the shape of character types in relation to a sequence of events (narratives).

In the present study, we aim to elicit depression prototypes by their attributes rather than by exemplars. We distinguish between attribute types and tokens. Attribute tokens are the particular words different individuals use to describe depression as a category. These tokens can be coded into attribute *types* by means of traditional content analysis.

As a consequence of the elicitation method we use, we further distinguish between causal attributes, illness attributes and treatment attributes. Causal attributes denote anything which could potentially cause depression. Illness attributes are descriptions of depression itself (symptoms) as well as what it can entail (consequences). Treatment attributes denote anything perceived as a potential amelioration of cure of depression.

Assuming that there is variation in prototypical conceptions of depression, we expected to find more than one of such depression prototypes. We also expected that there would be both differences (unique attributes) and commonalities (shared attributes) between them.

We also speculated that different prototypes might be associated with differences in attitudes towards antidepressant medication (ADM attitudes).

Materials and Methods

Recruitment of participants

36 participants were recruited among 688 respondents from an earlier study, which was based on an online survey (forthcoming). The online survey was originally devised to study the relation between health beliefs, medication adherence and attitudes. It was aimed at both depression patients and people without previous personal experience with depression or antidepressants. Recruitment channels included a large variety of the largest Danish newspaper websites but also more specialized patient information and discussion sites. In order to reach out to non-frequent internet users, the survey was also advertised in analogue versions of newspapers and patient magazines.

52% (355) of the participants in the survey had allowed the researchers to contact them regarding a potential interview about perceptions of depression. Among these, selection was based on two criteria, namely whether participants had any experience as current or former depression patients (self-reported) and whether they had positive or negative attitudes towards antidepressants.

The selection process followed three steps. First, the 355 respondents were divided into two groups, i.e. patients and non-patients. Subsequently, respondents in each of these two groups were ranked according to their score on an attitude measure (presented below). Lastly, for each group, the 9 participants with the highest and lowest attitude scores were selected.

The following item was used to distinguish between people who had never in their life received a prescription for antidepressants and those who had:

Have you ever been prescribed antidepressant medication?

A series of follow-up questions were asked in order to ensure that people who answered yes had indeed received the prescription for depression and to assess which kind of medicine, under which circumstances, whether they took it or not, etc. For people who answered no, another series of follow-up questions were asked to assess whether they had at some time in their life suspected that they might be depressed, despite the fact that they had not been prescribed any medication for it. These questions were also meant to enable respondents to notice if they had clicked yes or no by mistake in which case they were able to go back in the survey and make corrections.

Attitude measure

A 3-item antidepressant attitude measure, using discrete scoring, was developed for the study, using a basic semantic differential ²⁴:

Treating depression with antidepressant medication is:
Extremely bad: 3, 2, 1, 0, 1, 2, 3 :Extremely good

Treating depression with antidepressant medication is:
Extremely foolish: 3, 2, 1, 0, 1, 2, 3 :Extremely wise

I am:
Strongly against: 3, 2, 1, 0, 1, 2, 3 :Strongly for (treating depression with antidepressant medication)

Diagrammatic Concept Elicitation Interviews (DiCE)

The interview objective was to let respondents provide words or brief statements describing depression as a general phenomenon (in contrast to describing singular instances of depression). These words and statements were considered *attribute tokens* in accordance with the terminology described above.

Various elicitation techniques were considered and tested in pilot interviews. The main challenge was that elicitation techniques are normally applied in the investigation of more tangible concepts such as physical products. In contrast hereto, depression is an abstract, complex, fuzzy²⁵ and value-loaded concept.

For this reason the principal investigator developed an elicitation protocol which we will refer to as Diagrammatic Concept Elicitation (DiCE).

All 36 DiCE interviews were conducted as 1:1 interviews by the principal investigator. A diagram of the type depicted in figure 1a was placed in front of the participant

with the interviewer sitting at the other side, facing the participant, and overlooking the diagram from an upside-down perspective.

The interviewer would then place the label 'depression' in the middle field (figure 1b) and tell the participant that although there are many different views and opinions about what depression is, most people agree that there is something, which is at least referred to as depression.

Subsequently the interviewer would state that most people also have ideas about what could cause depression, what the consequences of depression could be and, finally, ideas about what would work against depression in a broad sense. During this further introduction, the labels 'causes', 'consequences' and 'treatment' were placed in the diagram (figure 1b).

Figure 1a. Empty diagram used for elicitation of depression attributes.

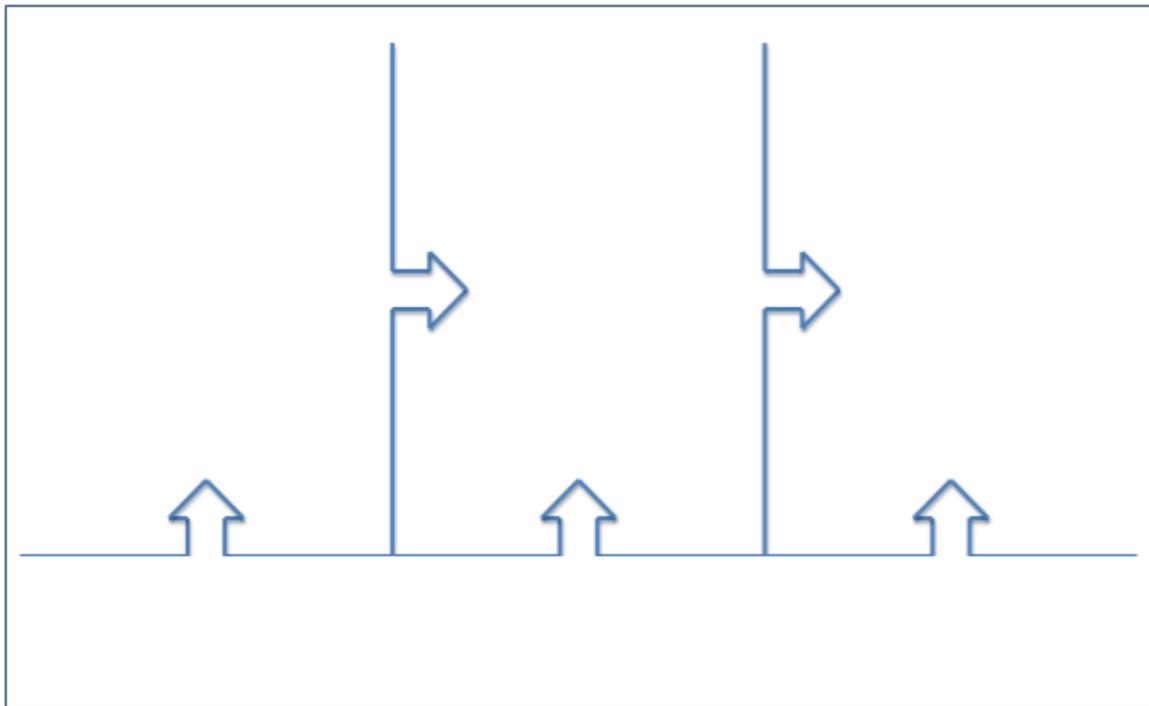
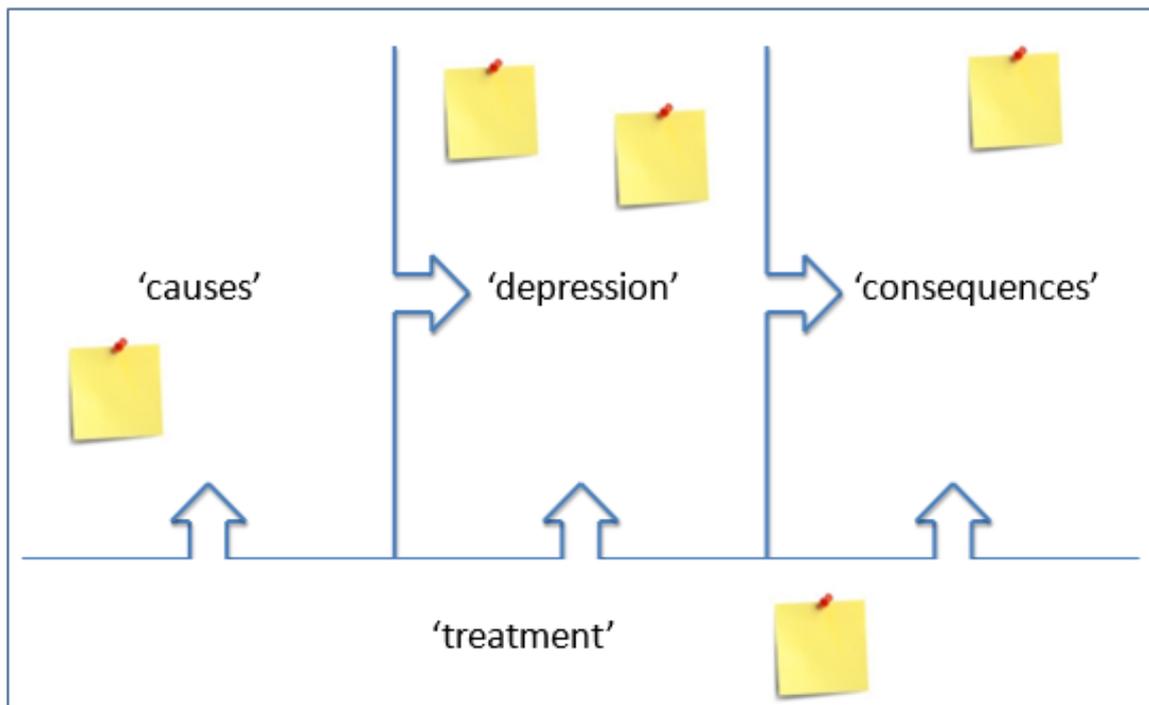


Figure 1b. Diagrammatic concept elicitation in progress



Participants were then asked to come up with as many words or brief sentences they could think of as appropriate examples for each aspect of depression. It was explicitly stated that there were no right or wrong answers and that, on the contrary, the only thing that mattered was the opinions and associations of the participant. Furthermore, it was stressed that the sequence of categories and examples had no importance.

Each word or sentence was written on a post-it note and placed in one of the four depression aspect fields as directed by the participants (figure 1b). All post-it notes were validated by the participant both in terms of how they were worded on the post-it notes and in terms of how they were categorized in the four depression aspect fields.

2466 attributes were elicited during the interviews.

After the interviews, all attributes were transcribed into a spreadsheet, which was used for the analysis.

Coding

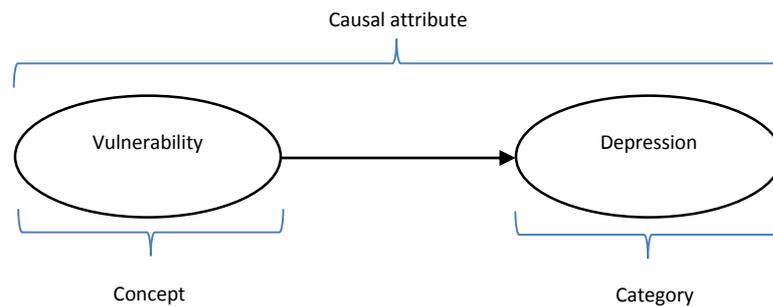
We retained the four depression aspect categories meaning that all attribute tokens were automatically considered either causal attributes (the 'cause' field), illness attributes (the 'depression' and 'consequences' fields) or treatment attributes (the 'treatment' field).

New additional attribute types were created through an iterative content analysis process following the guidelines of Krippendorff ²⁶.

Coding was relational in the sense that all attributes were coded as a relation between two concepts or between a concept and a category. Categories were defined by the four original depression aspect fields whereas concepts emerged in the coding process.

For instance, several causal attribute tokens could be conceptualized as 'being vulnerable to depression', e.g. "Depression can be latent", "Some people are less robust" and "An internal force that rips you apart". This spawned the concept 'vulnerability'. The mentioned attributes were then coded as a directed relation between 'vulnerability' and depression, leading to the causal attribute type VULNERABILITY > DEPRESSION. In the diagrammatic depiction of a prototype featuring this relation, the causal attribute would be visualized as an arrow between the concept 'vulnerability' and the category 'depression' as shown in figure x.

Figure 2: Example of relational coding



Attribute types were created bottom-up by the principal investigator. A singular attribute token or the similarity between two attribute tokens would spawn a potential concept. This concept would then be tested on all 2466 attributes regardless of initial category. This gave room to a flexibility allowing for a concept such as 'vulnerability' to form part more than one major attribute type, e.g. as both leading to depression (causal attribute) or as an aspect or consequence of depression (illness attribute).

Sometimes no other attribute tokens seemed to reflect the emergent attribute type while at other times a great number of attribute tokens seemed to match. In the latter case, attribute tokens were then re-checked for comparability, while the attribute type was checked against other emerging attribute types in order to look for overlaps and redundancy. Saturation was found to be reached when no new attribute types could be developed that were not already reflected by other attribute types. This iterative process resulted in attribute types that often were rejected or merged. An attribute type could be rejected if it only made sense in relation to a very small number of attribute tokens, e.g. one or two. No specific lower limit was set, but at the end of the coding process the 'smallest' accepted attribute types were reflected by seven attribute tokens. In comparison, the 'largest' attribute types were reflected by 130. Attributes types were used like tags, in the sense that attribute tokens were allowed to form part of more than one attribute type.

Coding was performed in a spreadsheet with the 2466 attribute tokens forming one axis and the emerging number of attribute types forming another.

When the coding process was done, this collective spreadsheet containing all attributes types from all participants was converted into several singular spreadsheets reflecting the attribute types mentioned by each unique participant.

These spreadsheets were then subjected to network and cluster analysis in the statistical software program R.

Inter-coder reliability test

An inter-coder reliability test was conducted on a random subset of 198 attribute tokens, with three independent coders. At least two out of three coders agreed on the coding of 98% of the attribute tokens. All three coders agreed on the coding of 70% of the attribute tokens. The average pairwise agreement between coders was 80%, Krippendorff's $\alpha = .79$, Conger's exact $\kappa = .79$, Fleiss' $\kappa = .79$ ($Z = 132, p < .001$). These values can be regarded as acceptable (according to the guidelines suggested by Krippendorff, 1970²⁷) or even excellent (according to the guidelines by Fleiss, 1971²⁸).

Frequency scores

Frequency of mentioning is sometimes proposed as a way to assess the relative importance of a code. However, some participants might be better at finding words for associations than others. Likewise, some participants might simply be more talkative and likely to come up with many examples, some of which are redundant²⁹.

An important decision was therefore to decide whether frequency of mentioning should be calculated as part of the cluster analysis. This could potentially have resulted in a higher number of clusters. Nonetheless, we took a conservative stance and went with a binary system in which an attribute type was either mentioned or not.

However, we have included relative frequency of mentioning in the results section. These were calculated as in the following example. The causal attribute type GRADUAL BREAKDOWN > DEPRESSION covers 53 original attribute tokens (e.g. "Long term stress", "Thoughts and emotions pile up", "The last straw", etc.). Eighteen of these 53 tokens, i.e. 34%, were originally uttered by participants from the positive attitude group whereas the remaining 35, i.e. 66%, were uttered by participants from the negative attitude group. Hence, 34% and 66% are listed as the relative frequency scores for this attribute type.

Statistical methods

Mathematically, complex conceptual structures can best be represented by graphs. In the following, we will represent the coded data from each participant ($i = 1 \dots N$) by a binary directed graph $G_i = (V, E_i)$. In the coding process, the individual data were mapped onto a common set of categories. If categories that were not used as codes for a given participant are treated as isolated vertices in the respective graph, the vertex set V will be invariant over participants, ensuring that the graphs G_i can be meaningfully compared. The edge sets E_i , on the other hand, will be participant-specific. Each of these can algebraically be represented by a binary adjacency matrix \mathbf{A}_i , that is, a square matrix with number of rows and number of columns equal to the number of vertices in V and elements taking the value $a_{ijk} = 1$ if an edge leads from the j th to the k th vertex ($j, k = 1 \dots P$) and $a_{ijk} = 0$ otherwise.

An often-used measure of the dissimilarity of two graphs G_1 and G_2 is the Hamming distance³⁰. If the adjacency matrices \mathbf{A}_1 and \mathbf{A}_2 representing the edge sets of the two graphs are binary and the above coding $a_{ijk} \in \{0, 1\}$ is used, the to the well-known Manhattan distance,

$$d(G_1, G_2) = \sum_{j=1}^P \sum_{k=1}^P |a_{1,jk} - a_{2,jk}| \quad (1)$$

Once a distance measure is defined, cluster analysis techniques can be used to group the graphs representing the participant-specific data into homogenous subsets. However, not all clustering methods can meaningfully be used on Manhattan distances. Furthermore, it is typically not possible to show a priori that any particular clustering method will lead to the best possible separation of a given data set. Hence, a “cluster ensemble” methodology is used. We will construct a collection of partitions and hierarchies, using several clustering methods that can meaningfully be used on Manhattan distances, evaluate the solutions in terms of several clustering validity measures, and identify the overall best solution using rank aggregation³¹.

Five different clustering methods were used: agglomerative nesting (AGNES), clustering for large applications (CLARA), divisive analysis clustering (DIANA), partitioning around medoids (PAM³²) and the self-organising tree algorithm (SOTA³³), all with $k = 2$ to $k = 5$ clusters. The solutions were compared in terms of three internal clustering validity measures: connectivity³⁴, the Dunn index³⁵ and silhouette width³⁶. Connectivity was interpreted as the degree to which observations are assigned to the same clusters as their nearest neighbours. The

Dunn index and silhouette width are measures that trade off compactness (low within-cluster distances) against separation (high between-cluster distances).

In addition, clustering stability was examined by deleting each cell, one at a time, from all adjacency matrices \mathbf{A}_i , then recalculating the Hamming distances between participants based on the reduced input data set, then recalculating all 20 candidate clusterings and finally comparing the solutions based on the reduced input data set to the solutions based on the full input data set. The criteria for stability evaluation were the average proportion of non-overlap between clusters based on the reduced and full input data sets (APN), the average distance between persons assigned to the same cluster based on the reduced and full input data sets (AD), the average distance between cluster means based on the reduced and full input data sets (ADM) and the figure of merit (FOM), that is, the average within-cluster variance of the values in the removed cell when the clustering is based on Hamming distances calculated from the remaining cells. The averages of these comparisons were calculated over all $P^2 = 5929$ possible data sets that could be constructed by removing one cell at a time from the adjacency matrices \mathbf{A}_i (for details about these clustering stability measures, see Datta & Datta, 2003; Yeung, Haynor & Ruzzo, 2001^{37,38}).

The seven validation criteria have different ranges of variation. Connectivity, AD, ADM and FOM have the range $[0, \infty]$ and should be minimized. The Dunn index also has the range $[0, \infty]$ but should be maximized. Silhouette width has the range $[-1, 1]$ and should be maximized. APN has the range $[0, 1]$ and should be minimized. To find a compromise solution, the ranks of the 20 candidate clusterings on the seven criteria were aggregated using the Monte Carlo cross-entropy approach suggested by Pihur, Datta and Datta³¹, with Spearman's foot rule distance as the list comparison measure. Since the seven criteria vary on different scales and discriminate between candidate clusterings to different degrees, they were weighted by their coefficients of variation during the rank aggregation. All calculations were performed under Revolution R Enterprise 7.0.0 (Revolution Analytics, Mountain View, CA) using the algorithms by Brock, Pihur, Datta and Datta (2011³⁹) and Pihur, Datta and Datta (2012⁴⁰).

Results

Clustering results

Rank aggregation across the seven validity criteria suggested that the DIANA solution with $k = 2$ clusters was the overall best compromise between connectivity, compactness, separation and stability. The four next-best solutions assumed $k = 2$ as

well, corroborating the conclusion that a two-cluster solution represented the data best.

We interpret these clusters to reflect two distinct depression prototypes.

The participants reflected in the two prototypes did not differ significantly in terms of age (cluster 1: $M = 42.43$, $SD = 14.73$; cluster 2: $M = 38.60$, $SD = 11.61$; $t = .87$, df (unequal variances) = 33.60, p (two-tailed) = .39, gender (cluster 1: 57% women, cluster 2: 67% women; $\chi^2 = .33$, $df = 1$, p (two-tailed) = .56 or patient status (cluster 1: 52% patients, cluster 2: 47% patients; $\chi^2 = .11$, $df = 1$, p (two-tailed) = .75).

The three-item attitude measure had a Cronbach's alpha of 0.945. Participants differed significantly in terms of attitude towards antidepressant medication, abbreviated ADM attitude (cluster 1: $M = 17.86$ (sum scores), $SD = 4.82$; cluster 2: $M = 8.20$ (sum scores), $SD = 2.68$; $t = -7.66$, df (unequal variances) = 32.36, p (two-tailed) < .001, Cohen's $d = 2.37$).

For this reason, we will refer to cluster 1 ($n = 21$) as the *positive ADM attitude depression prototype* and to cluster 2 ($n = 15$) as the *negative ADM attitude depression prototype*.

Central graphs, interpretable as means and medians of sets of graphs⁴¹, were calculated for both DIANA clusters. Fruchterman-Reingold plots of the central graphs were not as intuitively meaningful to the uninitiated beholder as we had hoped for. We have therefore reworked this output into clear and comparable diagrammatic depictions. In this process, we have of course retained the structural relations in a one-to-one relationship reflecting the original output, which has been included as supporting data.

The two depression prototypes consist of both unique and shared attribute types. In order to reflect this and for the sake of clarity and comparability, the reworked depictions have been split into three depression prototypes. The first represents all attribute types which are unique to the positive ADM attitude prototype while the second represents all attribute types which are unique to the negative ADM attitude prototype. The third is a shared prototype representing all attribute types that the positive and the negative ADM attitude prototypes have in common. It is therefore not a real prototype as such, but a construction devised for analytical purposes. Despite this fact, we will retain the term prototype for the shared model as well.

The following is an exemplification of how the prototypes have been structured. The positive ADM attitude prototype contains 'genes' as causes of depression, whereas

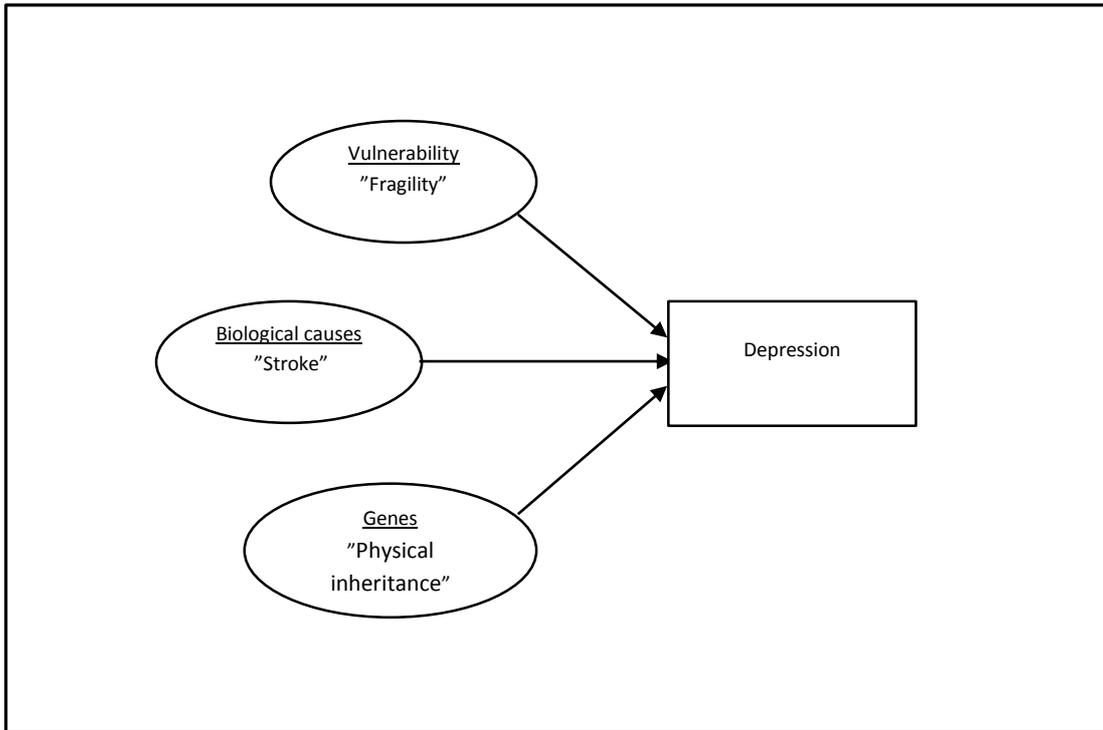
this is not the case for the negative ADM attitude prototype. However, it also features 'gradual breakdown', but as this is something it has in common with the negative ADM attitude prototype, this relation is omitted from the depiction of the unique relations in both the negative and the positive prototypes and contained instead in the shared (synthesized) prototype, which contains all relations that the two original prototypes have in common.

Below, these three prototypes are presented and compared in three sections. Section one compares the three prototypes on causal attributes. Section two compares the three prototypes on illness attributes. Section three compares the three prototypes treatment attributes.

For each prototype below we have created a table containing examples of the original attribute tokens behind the attribute types (i.e., the verbatim quotes that were collected on post-it notes). Also inserted, are the relative frequency scores.

Causal attributes: Positive ADM attitude depression prototype

Figure 3. Positive ADM attitude depression prototype for Causal attributes (simplified)



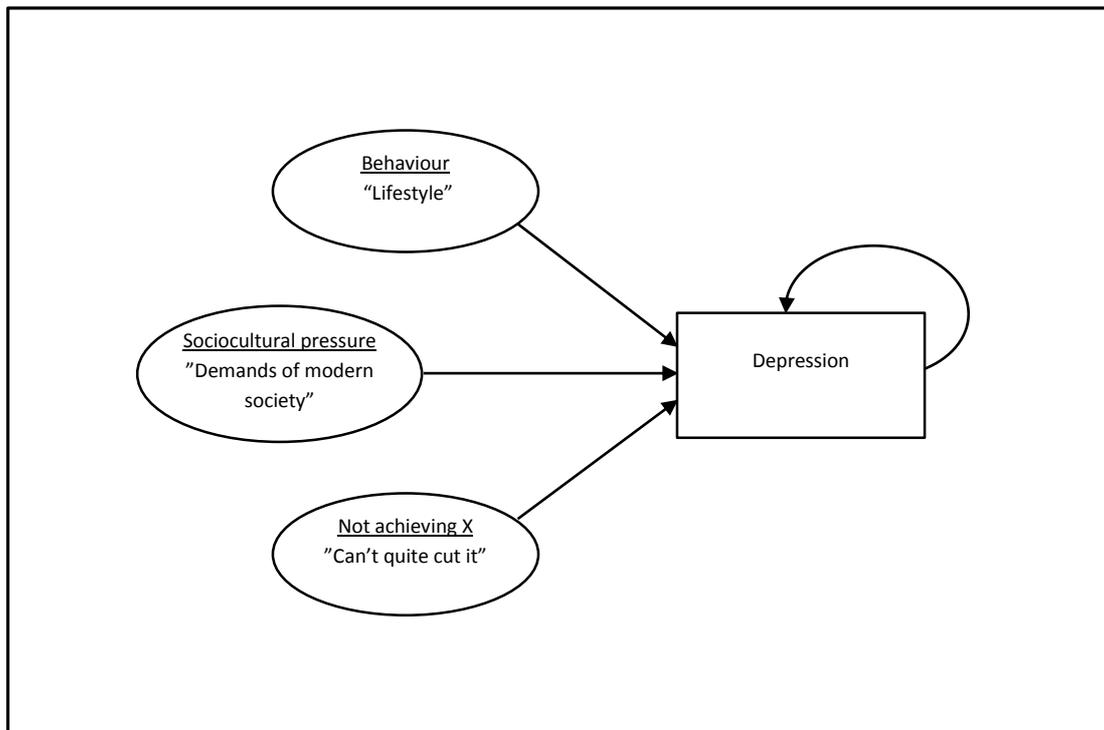
Squares represent original categories, while circles represent emergent concepts. Arrows between entities represent relational codes.

Table 4. Sample causal attribute tokens and frequencies for the simplified positive ADM attitude depression prototype

Attribute types	Frequencies		Attribute tokens (sample)
	Positive	Negative	
VULNERABILITY > DEPRESSION	67%	33%	“Individual disposition”. “An internal force that rips you apart”. “Vulnerability”. “Fragility”. “Depression can be latent”. “Some people are less robust”.
BIOLOGICAL CAUSES > DEPRESSION	59%	41%	“Other illnesses”. “Physical brain damages”. “Stroke”. “Biological changes”. “Chemical influences”. “Weak immune system”.
GENES > DEPRESSION	61%	39%	“Genetic inheritance”. “Physical inheritance”. “Biologically determined breaking point”.

Causal attributes: Negative ADM attitude depression prototype

Figure 4. Negative ADM attitude depression prototype for causal attributes



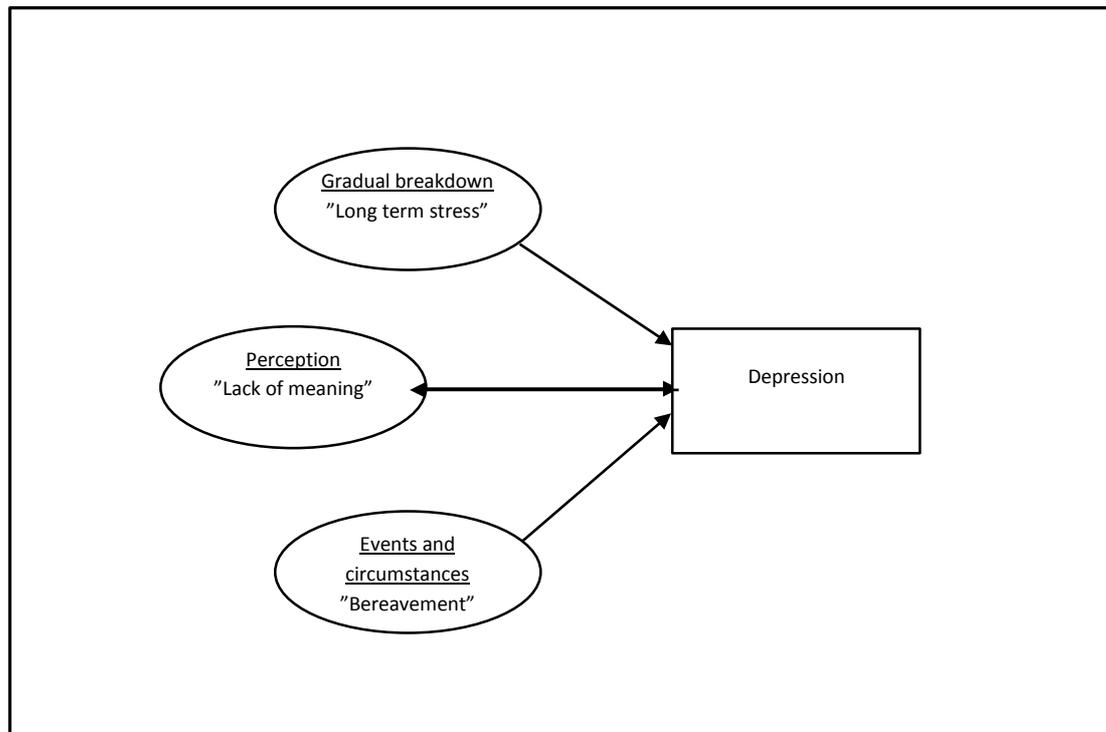
Squares represent original categories, while circles represent emergent concepts. Arrows between entities represent relational codes.

Table 5. Sample causal attribute tokens and frequencies for the simplified negative ADM attitude depression prototype

Attribute types	Frequencies		Attribute tokens (sample)
	Positive	Negative	
BEHAVIOUR > DEPRESSION	29%	71%	"Lack of self-discipline". "Drinking too much". "Physical inactivity". "Thinking too much". "If depression is not inherited, then it is people's own fault". "Lifestyle".
SOCIOCULTURAL PRESSURE > DEPRESSION	8%	92%	"Extreme demands of modern society". "At odds with cultural norms". "Being the perfect parent while super fit and top performer at job".
NOT ACHIEVING X > DEPRESSION	4%	96%	"Can't quite cut it". "Not being able to solve problems". "Not being acknowledged". "Not being welcome".
DEPRESSION > DEPRESSION	38%	62%	(Also represented in the consequence model, fig. X) "Depression can return". "Risk of relapse". "Depression increases risk of more depression".

Causal attributes: Shared depression prototype

Figure 5. Shared depression prototype for causal attributes (synthesized)



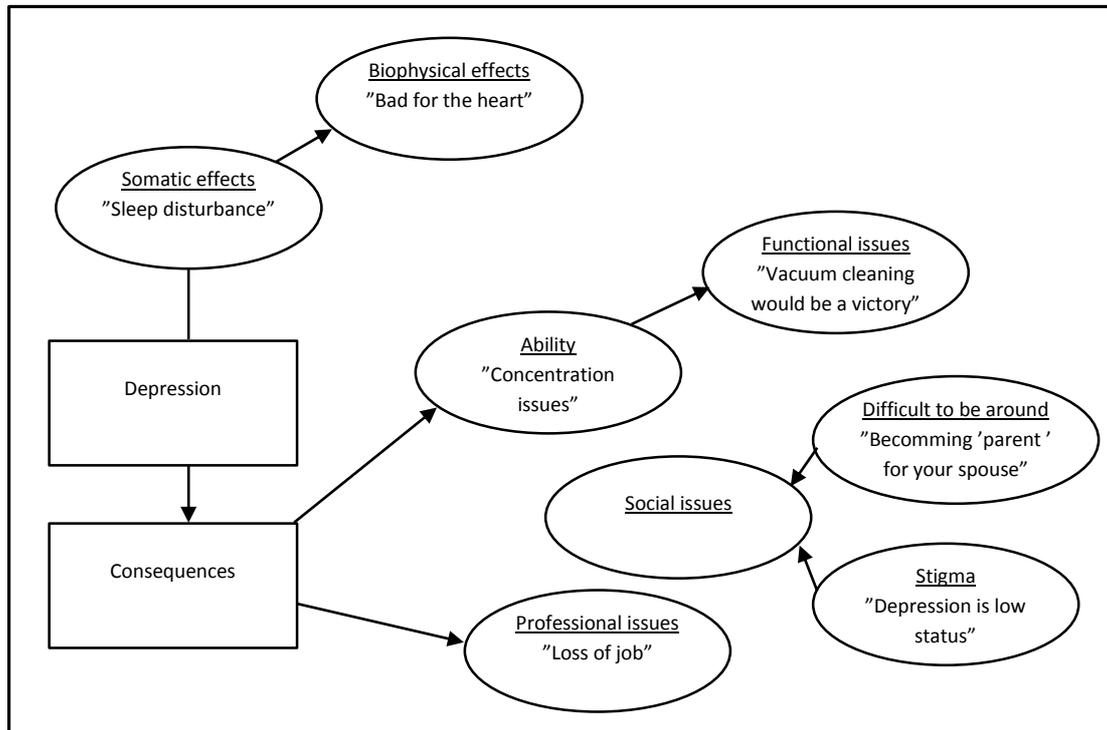
Squares represent original categories, while circles represent emergent concepts. Arrows between entities represent relational codes.

Table 6. Sample causal attribute tokens and frequencies for the synthesized shared depression prototype

Attribute types	Frequencies		Attribute tokens (sample)
	Positive	Negative	
GRADUAL BREAKDOWN > DEPRESSION	34%	66%	“Long term stress”. “Thoughts and emotions pile up”. “The last straw”. “Like a frog in boiling water – notice it too late”. “Symptoms that gradually increase over the years”.
PERCEPTIONS AND EXISTENTIAL ISSUES > DEPRESSION	37%	63%	“Lack of meaning”. “Existential issues”. “Focus on negative things”. “Lack of purpose”. “Life values crumble away”. “Issues with getting older”. “Images of the perfect life”.
NEGATIVE EVENTS AND CIRCUMSTANCES > DEPRESSION	38%	63%	“Being sacked from the job”. “Your spouse leaves you”. “Bereavement”. “Decease”. “Disease”. “Financial problems”.

Illness attributes: Positive ADM attitude depression prototype

Figure 6. Positive ADM attitude depression prototype for illness attributes (simplified)



Squares represent original categories, while circles represent emergent concepts. Lines denote relationships that are more predicative and less causal than arrows, but both represent relational codes.

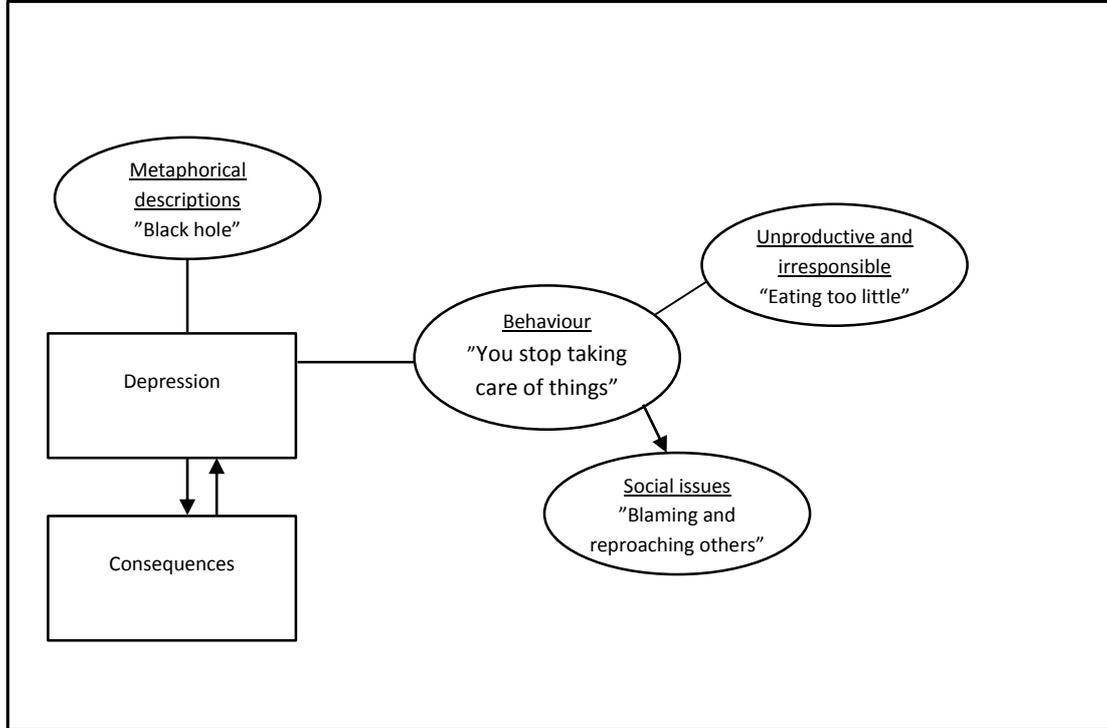
Table 7. Sample illness attribute tokens and frequencies for the simplified positive ADM attitude depression prototype

Attribute types	Frequencies		Attribute tokens (sample)
	Positive	Negative	
DEPRESSION : SOMATIC EFFECTS	55%	45%	"You are hungry, but you can't eat". "You are tired, but you can't sleep". "Sleep disturbance". "Appetite changes".
SOMATIC EFFECTS > BIOPHYSICAL EFFECTS	59%	41%	"Brain chemistry becomes unbalanced". "Altered connections in brain". "Physical effects". "Bad for the heart". "Bodily decay". "Freezing, neck pain and head ache".
CONSEQUENCES > ABILITY DECREASE	58%	42%	"Difficulties remembering stuff". "Concentration issues". "Decreased mental resilience". "Disablement".
ABILITY DECREASE > FUNCTIONAL	54%	46%	"Difficulties performing normal everyday chores". "Vacuum cleaning would be a victory". "Can't cope with the supermarket". "Not functional".
CONSEQUENCES > PROFESSIONAL ISSUES	50%	50%	"Can't perform at job". "Can't get started at thesis writing". "Working is difficult". "Difficult to deliver anything of professional value". "Loss of job". "Long term sick leaves". "Possible early retirement".
DIFFICULT TO BE AROUND > SOCIAL ISSUES	52%	48%	"Depressed people are terrible to be around, so people back off". "Kids can have a hard time understanding it". "Becoming 'parent' for your spouse".

STIGMA > SOCIAL ISSUES	50%	50%	“Less sympathy for depressed (compared to other illnesses)”. “People think it’s your own fault”. “There is this idea that you should be able to control your own thoughts and emotions”. “Depression is low status”.
------------------------	-----	-----	--

Illness attributes: Negative ADM attitude depression prototype

Figure 7. Negative ADM attitude model for illness attributes (simplified)



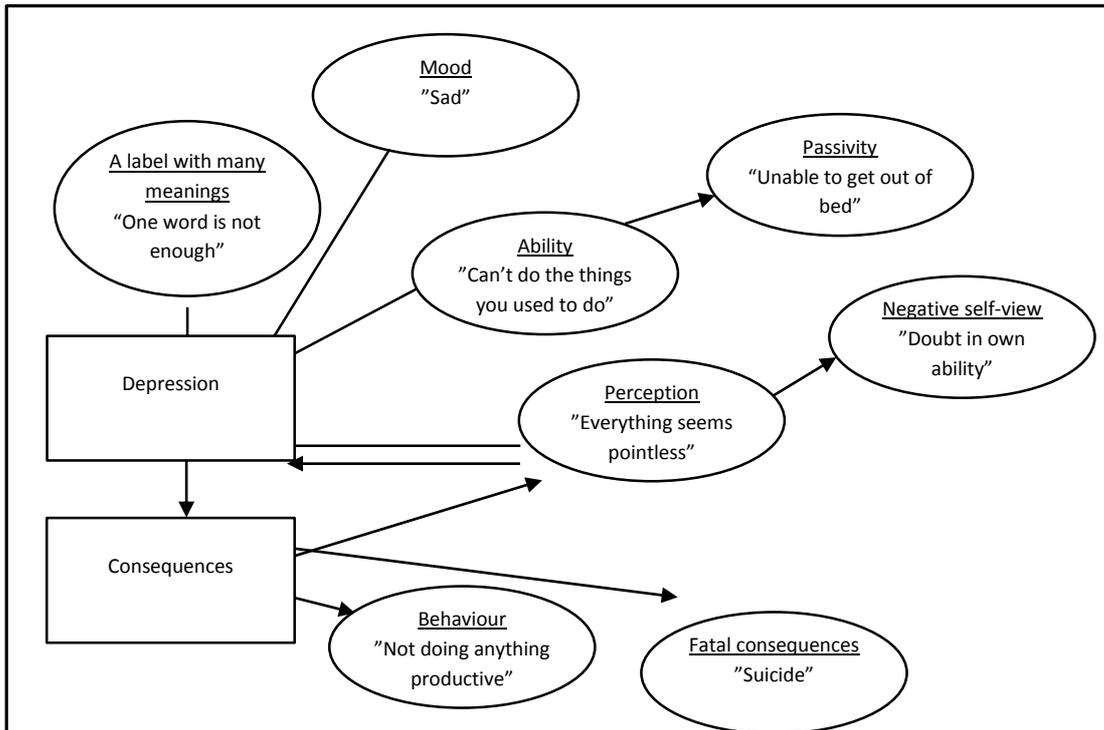
Squares represent original categories, while circles represent emergent concepts. Lines denote relationships that are more predicative and less causal than arrows, but both represent relational codes.

Table 8. Sample illness attribute tokens and frequencies for the simplified negative ADM attitude depression prototype

Attribute types	Frequencies		Attribute tokens (sample)
	Positive	Negative	
DEPRESSION : METAPHORICAL DESCRIPTIONS	34%	66%	“Black hole”. “As walking in deep water with heavy boots on”. “The world is there, but you aren’t part of it”. “Vicious circle”. “Negative spiral”. “Dark labyrinth – no way out”. “Everything is grey”.
DEPRESSION > DEPRESSION	38%	62%	(Also represented in the consequence model, fig. X) “Depression can return”. “Risk of relapse”. “Depression increases risk of more depression”.
DEPRESSION : BEHAVIOUR	45%	55%	“You stop doing spontaneous things”. “You stop taking care of things”. “Depression is a reaction opposite to aggression”.
BEHAVIOUR > UNPRODUCTIVE AND IRRESPONSIBLE	17%	83%	“They engage in being sad”. “Not taking care of oneself”. “Eating too little or just wrong”. “Not taking care of the home”. “Abusing stuff such as alcohol or antidepressants”. “Mental self-punishment”.
BEHAVIOUR > SOCIAL ISSUES	56%	44%	“Speaking about oneself all the time”. “Avoiding conflict”. “Reacting aggressively”. “Some people just withdraw”. “Negative comments”. “Blaming and reproaching relatives”.

Illness attributes: Shared depression prototype

Figure 8. Shared depression prototype for illness attributes (synthesized)



Squares represent original categories, while circles represent emergent concepts. Lines denote relationships that are more predicative and less causal than arrows, but both represent relational codes.

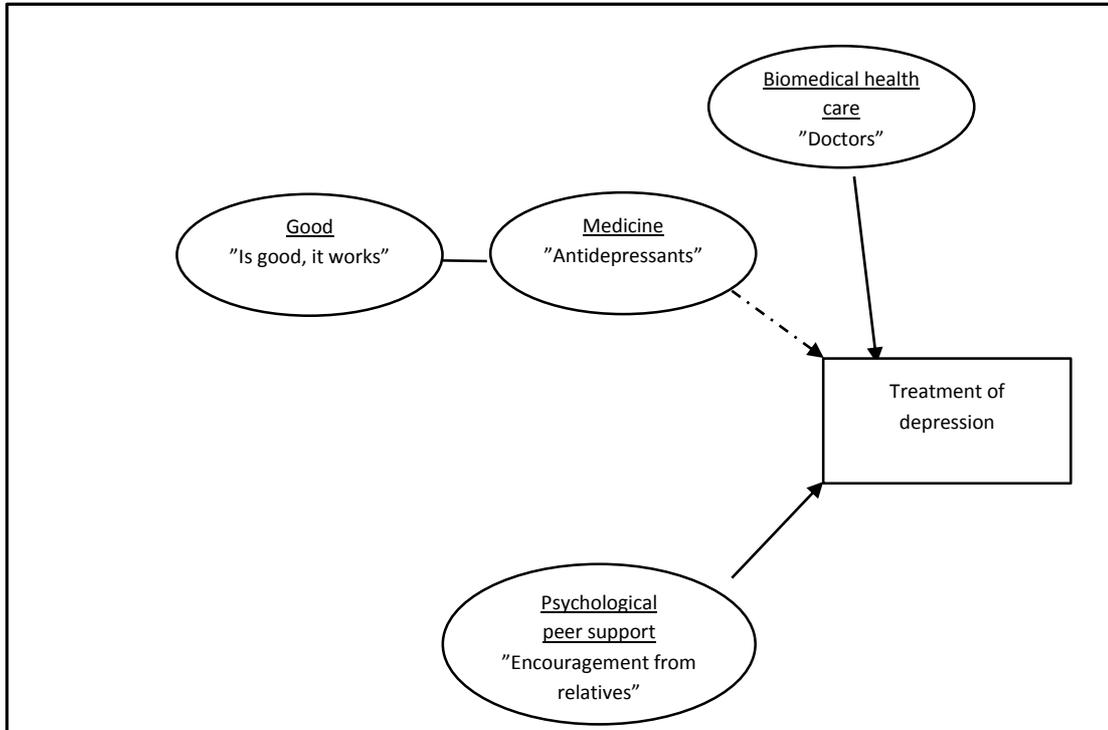
Table 9. Sample illness attribute tokens and frequencies for the synthesized shared depression prototype

Attribute types	Frequencies		Attribute tokens (sample)
	Positive	Negative	
DEPRESSION : A LABEL	64%	36%	"One word is not enough". "Proposed alternative: Failure to 'master' life". "In earlier times, this label did not exist". "A cultural definition".
DEPRESSION : MOOD	57%	43%	"Sad". "Nervous". "Transposed mood curve". "No joy in daily life". "Absence of emotions". "Blues". "Tears". "Emotional chaos".
DEPRESSION : ABILITY	68%	32%	"Can't do the things you used to do". "Lack of ability to navigate". "Bodily powerlessness". "Thought it was Alzheimer". "Some people can't even drive".
ABILITY > PASSIVITY	62%	38%	"Difficult to be physically active". "Unable to get out of bed". "It paralyzes your ability to pull yourself together".
DEPRESSION : PERCEPTION	40%	60%	"Everything seems pointless". "Self-focused". "Pessimism and gloom". "In the dark about one's own illness". "Automatic irrational worry".
DEPRESSION > PERCEPTION	41%	59%	"You'll easily believe that you are the only one who feels this bad". "Can't see the point of doing stuff". "Losing faith in the future".
PERCEPTION > NEGATIVE SELF-VIEW	33%	67%	"Doubt in own ability". "Less self-esteem". "Less self-confidence". "Feeling useless". "Feeling uselessly". "You walk on the street and you feel judged".
DEPRESSION > BEHAVIOUR	45%	55%	"Not doing anything productive". "Unjustified behaviour".

DEPRESSION > FATAL CONSEQUENCES	62%	38%	“Suicide”. “Perish”. “It can destroy your life”. “Death”. “Attracted to trucks..”.
---------------------------------	-----	-----	--

Treatment attributes: Positive ADM attitude depression prototype

Figure 9. Positive ADM attitude model for treatment attributes (simplified)



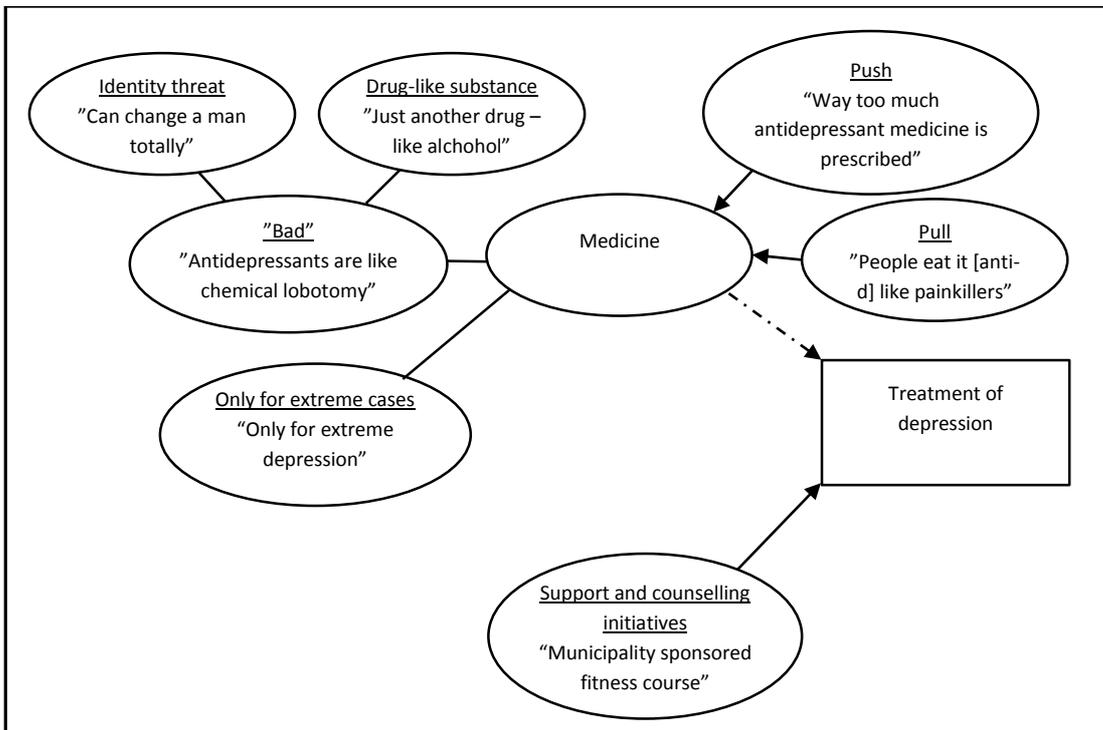
Squares represent original categories, while circles represent emergent concepts. Lines denote relationships that are more predicative and less causal than arrows, but both represent relational codes. Dotted lines or arrows denote a relation that is not unique to the represented model, but which is necessary to include in order to show one or more relations that are unique.

Table 10. Sample treatment attribute tokens and frequencies for the simplified positive ADM attitude depression prototype

Attribute types	Frequencies		Attribute tokens (sample)
	Positive	Negative	
MEDICINE > TREATMENT	79%	21%	“Medicine”. “Antidepressants”. “Different types of medicine”.
MEDICINE : GOOD	97%	3%	”Is good, it works”. “Necessary”. “Not dangerous”. “Means everything”. “Not harmful”. “Not addictive”. “Wouldn’t have been here without it”.
BIOMEDICAL HEALTH CARE > TREATMENT	71%	29%	“Doctors”. “Hospitalization”. “Psychiatrist”. “Admission to psychiatric emergency ward”. “Frequent medical follow up”.
PSYCHOLOGICAL PEER SUPPORT > TREATMENT	66%	34%	“Understanding surroundings and colleagues”. “Encouragement from relatives”. “Friends: ‘private therapy’”. “Talking with someone who understands”.

Treatment attributes: Negative ADM attitude depression prototype

Figure 10. Negative ADM attitude model for treatment attributes (simplified)



Squares represent original categories, while circles represent emergent concepts. Lines denote relationships that are more predicative and less causal than arrows, but both represent relational codes. Dotted lines or arrows denote a relation that is not unique to the represented model, but which is necessary to include in order to show one or more relations that are unique.

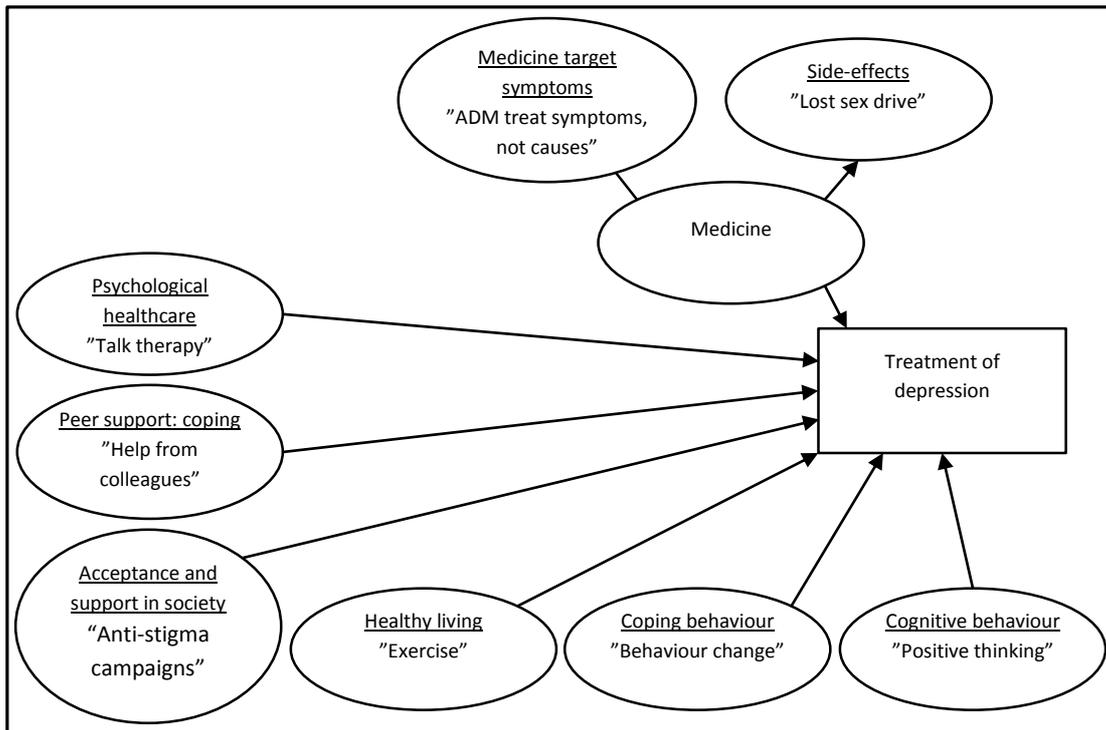
Table 11. Sample treatment attribute tokens and frequencies for the simplified negative ADM attitude depression

Attribute types	Frequencies		Attribute tokens (sample)
	Positive	Negative	
MEDICINE > TREATMENT	79%	21%	"Medicine". "Antidepressants". "Different types of medicine".
MEDICINE: BAD	14%	86%	"Antidepressants are like chemical lobotomy". "It [medicine] handicaps you".
MEDICINE: BAD: IDENTITY THREAT	5%	95%	"Antidepressants can change a man totally". "Can inhibit working with oneself". "Antidepressants can inhibit personal development". "Medicine turns people off".
MEDICINE: BAD: DRUG SUBSTANCE	14%	86%	"Just another drug - like alcohol". "Doping". "Blunting". "Dependency".
MEDICINE: ONLY FOR EXTREME CASES	17%	83%	"Only for extreme depression". "For when something is completely wrong in the head". "If you are very far out in depression". "Only for when cause is purely chemical". "Only if cause is physical".

PUSH > MEDICINE	26%	74%	“Way too much antidepressant medicine is prescribed”. “Easier to prescribe than to talk with people”. “Pharmaceutical industry is comprised of bandits who have to sell”. “Prescriptions are random”.
PULL > MEDICINE	22%	78%	“People eat it [antidepressant medication] like painkillers”. “The easy way out”. “Spoiled attitude: life mustn’t hurt”. “Society does not accept pain”.
SUPPORT AND COUNSELLING INITIATIVES > TREATMENT	24%	76%	“Municipality sponsored fitness course”. “Initiatives against workplace stress”. “The health care system should not put all responsibility on the shoulders of relatives”. “Depression prevention by teaching people proactive personal development”.

Treatment attributes: Shared depression prototype

Figure 11. Shared depression prototype for treatment attributes (synthesized)



Squares represent original categories, while circles represent emergent concepts. Lines denote relationships that are more predicative and less causal than arrows, but both represent relational codes.

Table 12. Sample treatment attribute tokens and frequencies for the synthesized shared depression prototype

Attribute types	Frequencies		Attribute tokens (sample)
	Positive	Negative	
MEDICINE > TREATMENT	79%	21%	“Medicine”. “Antidepressants”. “Different types of medicine”.
MEDICINE > SIDE-EFFECTS	50%	50%	“Lost sex drive”. “Weight gain”. “Drowsiness”. “Sleep disturbance”. “Bodily restlessness”. “More depression”. “Nausea”. “Dry mouth”.
MEDICINE: SYMPTOM TREATMENT	37%	63%	“ADM treat symptoms, not causes”. “It’s a crutch, not a new leg”. “ADM is support, not healing”. “It does not remove the cause”. “ADM should never stand alone”.

PSYCHOLOGICAL HEALTHCARE > DEPRESSION	35%	65%	“Talk therapy”. “Tools for thinking”. “Psychologists”. “Others with conversation therapy educations”. “Cognitive therapy”.
PEER SUPPORT FOR COPING > DEPRESSION	37%	63%	“Help from colleagues”. “Self-help groups”. “Support from girlfriend”. “It helps when relatives support the chosen treatment initiatives”.
ACCEPTANCE AND SUPPORT IN SOCIETY > DEPRESSION	39%	61%	“Anti-stigma campaigns”. “Celebrities advocate openness about depression”. “Mental health campaigns”. “Reduce health care waiting time”.
HEALTHY LIFESTYLE > DEPRESSION	39%	61%	“Exercise”. “Healthy food”. “Sex”. “D-vitamin”. “Meditation”. “Walk the dog in a forest”. “Using the body”. “Dancing”. “Massage”. “St. John’s wort”. “Fresh air”. “Sunlight”. “Yoga”.
COPING BEHAVIOUR > TREATMENT	34%	66%	“Behaviour change”. “After depression, avoid going back to same situation”. “Maybe change career”. “Get hobbies”. “Daily structure”. “Travel somewhere”. “Grocery shopping at off peak times”.
COGNITIVE BEHAVIOUR > TREATMENT	28%	72%	“Positive thinking”. “For some, religion can work”. “Talking while listening to oneself”. “Writing – putting things into words”. “Practice feeling that you’ve earned it”. “Realistic life expectations”.

Discussion

Summary of findings

In order to identify and compare depression illness prototypes, we elicited 2466 depression related attribute tokens from 36 participants, half of which had positive ADM attitudes and half of which had negative attitudes. Furthermore, half of the participants had at some point in their life been prescribed ADM by a health care professional, while this was not the case for the other half.

The 2466 depression attribute tokens were subjected to content analysis and coded into a number of relational attribute types (relations between concepts). Inter-coder reliability tests were performed with satisfactory results.

Finally, the coded data material was analysed statistically in order to identify one or more coherent and distinct attribute clusters. The cluster analysis resulted in two clusters, which we take to reflect two distinct depression prototypes.

While the clusters differed significantly in terms of attitude (17,86 vs 8,20), they were both comprised of almost equal amount of patients and non-patients (52% vs 47%) with almost the same mean age (42 vs 39) and gender composition (women: 57% vs 67%).

Since the clusters only differed significantly on attitude score, we have chosen to refer to them as positive and negative *ADM attitude depression prototypes* (abbreviated positive and negative prototypes below).

Interpretation of findings

Causal attributes: Biomedical vs Psychosocial

Beliefs about causes of depression seem to be polarized between biological (positive prototype) and psychosocial (negative prototype) causes.

The positive prototype for causes contains BIOLOGICAL CAUSES > DEPRESSION (e.g. “stroke”) and GENES > DEPRESSION (e.g. “physical inheritance”) which are clearly biomedical. It also contains VULNERABILITY > DEPRESSION (e.g. “fragility”) which is less clear cut, since vulnerability can both be biological and psychological, but it does seem very much in line with contemporary biomedical theories on depression which maintain that depression can be triggered in people who are disposed for depression⁴².

The negative prototype for causes contains BEHAVIOUR > DEPRESSION (e.g. “lifestyle”), SOCIOCULTURAL PRESSURE > DEPRESSION (e.g. “demands of modern society”) and ‘NOT ACHIEVING X’ > DEPRESSION (e.g. “can’t quite cut it”), which is clearly in line with a psychosocial perspective.

Oddly, it is the negative prototype which contains depression as potential cause of more depression (DEPRESSION > DEPRESSION). In itself, this notion can both refer to biomedical and psychosocial loops, but it is very prominently represented in the biomedical literature, where relapse prevention is an often mentioned argument for the importance of antidepressant adherence⁴³.

Both depression prototypes contain PERCEPTION > DEPRESSION (e.g. “lack of meaning”), GRADUAL BREAKDOWN > DEPRESSION (e.g. “long term stress”) and EVENTS AND CIRCUMSTANCES > DEPRESSION (e.g. “bereavement”). This resonates with the fact that ‘stress’ continues to be the most endorsed cause of depression by lay people^{44,45}.

Illness attributes: Causality vs Intentionality

In our interpretation, the main difference between the two prototypes for illness attributes lies in emphasis on causality (positive prototype) vs intentionality (negative prototype). This distinction can be illustrated by the following example: The two sentences “*not* performing everyday chores” and “*difficulties* performing everyday chores” seem to reflect a similar subject, namely that depressed people can have a tendency to perform poorly in relation to everyday chores. There is a big difference, though, between construing this lack of performance as *deliberate behaviour* versus as a result of some degree of *limited capability*.

The negative prototype predominantly construes depression in terms of intentional behaviour. It should be noted that an attribute token was only coded as behaviour if it did not contain any hint of a cause to the behaviour, such as a decrease in energy or ability.

Three types of behaviours are represented in the negative prototype: 1) DEPRESSION > BEHAVIOUR, e.g. “you stop doing spontaneous things”, and as subgroups hereto, 2) DEPRESSION > BEHAVIOUR > UNPRODUCTIVE OR IRRESPONSIBLE, e.g. “abusing stuff such as alcohol or antidepressants” and DEPRESSION > BEHAVIOUR > SOCIAL ISSUES, e.g. “blaming and reproaching others”.

In contrast hereto, the positive prototype does not contain any purely behavioural attributes. In fact it only contains causally construed attribute types.

DEPRESSION : SOMATIC EFFECTS (e.g. “sleep disturbances” AND DEPRESSION : SOMATIC EFFECTS > BIOPHYSICAL EFFECTS (e.g. “bad for the heart”) are clearly of a causal nature.

The same goes for DEPRESSION > CONSEQUENCES > ABILITY which involves everything from “concentration issues” to “disablement” and can lead to functional issues (... ABILITY > FUNCTIONAL ISSUES), such as the aforementioned “difficulties performing normal everyday chores”.

DEPRESSION > CONSEQUENCES > PROFESSIONAL ISSUES attribute type seem to contain issues related to both ability (e.g. “can’t perform at job” and “can’t get started at thesis writing”) as well as longer term consequences (e.g. “loss of job”, “long term sick leaves” and “possible early retirement”).

Just like the positive prototype, the negative prototype contains the concept of social issues. However, in the negative prototype the social issues are mediated by behaviour, which is construed as a property of depression: DEPRESSION > BEHAVIOUR > SOCIAL ISSUES. Contrastingly, in the positive prototype social issues has to do with the perspective of others. Thus, in the positive prototype the two ‘causes’ of social issues are STIGMA > SOCIAL ISSUES, e.g. “depression is low status” and the subtler notion that it is not always easy relating and interacting with depressed people (DIFFICULT TO BE AROUND > SOCIAL ISSUES), which is reflected in attribute tokens such as “depressed people are terrible to be around, so people back off” and “becoming a ‘parent’ for your spouse”.

The seemingly pronounced differences between the negative and positive depression prototypes can be brought to question by the fact that the shared depression prototype contains attributes of both ability and behaviour, meaning that

the negative depression prototype does indeed acknowledge some degree of causality (ability decrease) and that the positive depression prototype does indeed acknowledge some degree of intentionality (behaviour). However, these acknowledgements seem to be exceptions confirming the rule.

The shared notion of behaviour is construed as a consequence rather than as an intrinsic part of depression and it is represented by fairly neutral behavioural attribute tokens such as “unjustified behaviour” compared to the more judgemental behavioural attribute tokens found in the negative prototype, e.g. “abusing stuff such as alcohol or antidepressants” and “blaming and reproaching others”.

The shared admission to decreased ability is construed as a property of depression itself and largely seen as leading to passivity, e.g. “unable to get out of bed”.

While these exceptions should be acknowledged they are, at least to some degree, likely artefacts of the elicitation procedure, which encouraged participants to mention anything they could think of regardless of whether they found it important or significant. This also means that even the most medication sceptic participants did indeed mention medication among the potential remedies of depression, as we will see in the section on treatment. These effects will be discussed in further detail in the section on limitations of the study.

As for the rest of the shared depression prototype for illness attributes, some interesting patterns emerge. The association between depression and mood (DEPRESSION : MOOD), e.g. “sadness” form part of both depression prototypes, and does thus not seem to be a differentiating attribute. The same can be said for DEPRESSION > CONSEQUENCES > FATAL CONSEQUENCES, e.g. “suicide”, “death” and “it can destroy your life”.

Perception, e.g. “everything seems pointless” is seen as a property, consequence and cause of depression: DEPRESSION > PERCEPTION & DEPRESSION > CONSEQUENCES > PERCEPTION & PERCEPTION > DEPRESSION. It is also seen as in relation to negative self-view: ... > PERCEPTION > NEGATIVE SELF-VIEW (e.g. “doubt in your own ability”).

The last shared attribute is the definition of depression as a label with many meanings (DEPRESSION : A LABEL WITH MANY MEANINGS). This is interesting and a bit ironic in light of the present study because it illustrates that medicine endorsers and sceptics alike acknowledge that ‘depression’ as a category is a somewhat fuzzy category.

Treatment: A matter of Identity

We find the main differences between the prototypes for treatment seem to be in relation to identity. This interpretation rests on a single unique attribute type contained in the negative prototype. It is a sub-relation to a larger group of negative statements about medicine and we have termed it identity threat (DEPRESSION < TREATMENT : MEDICINE : BAD : IDENTITY THREAT). It contains attributes such as “antidepressants can change a man totally”, “[medicine] can inhibit working with oneself”, “antidepressants can inhibit personal development” and “medicine turns people off”.

It has a similar but different sibling attribute type, also unique to the negative prototype, called ‘drug-like substance’ (DEPRESSION < TREATMENT : MEDICINE : BAD : DRUG-LIKE SUBSTANCE), which encompasses a range of attributes construing antidepressant medicine in analogy to drugs in general, e.g. “just another drug – like alcohol”, “doping”, “blunting” and “dependency”. These drug analogies seem to be variations of threats to authentic life experience and identity.

The negative prototype also contains a third evaluation of medicine, namely that it is ‘only for extreme cases’. This suggests an implicit cost-benefit view of ADM, where its cost can only be justified by the most desperate of needs. As this cost side is not specified we would assume that it inherits meaning from the explicit negative attribute types mentioned above, i.e. identity threat and drug-like substance.

Furthermore, the negative depression prototype contains two important evaluations which are less about medicine itself and more about its use, namely a push and a pull effect. The push effects (PUSH > MEDICINE) are comprised of attributes such as “way too much antidepressant medicine is prescribed”, “easier to prescribe than to talk with people”, “pharmaceutical industry is comprised of bandits who have to sell” and “prescriptions are random”. The pull effect (PULL > MEDICINE) is comprised of attributes such as “people eat it [ADM] like painkillers”, “the easy way out”, “spoiled attitude: life mustn’t hurt” and “society does not accept pain”.

Lastly, the negative depression prototype contains the treatment attribute ‘support and counselling initiatives’, e.g. “municipality sponsored fitness course”, “initiatives against workplace stress”, “the health care system should not put all responsibility on the shoulders of relatives”, “depression prevention by teaching people proactive personal development”.

In sum, many negative evaluations of ADM and its use are expressed in the negative depression prototype, but only two attribute types represent the nature of the

perceived specific negative aspects of medicine. These are identity threat and 'drug-like substance'.

In contrast hereto, the positive depression prototype only contains positive evaluations of ADM expressed through one single attribute type, namely that medicine is 'good' (MEDICINE : GOOD), e.g. "is good, it works", "necessary", "means everything", "wouldn't have been here without it". Some of these positive evaluations seem to be implicit negations of the drug-analogy, e.g. "not addictive", "not dangerous" and "not harmful".

The positive depression prototype contains two additional treatment attributes, namely BIOMEDICAL HEALTH CARE > TREATMENT OF DEPRESSION and PSYCHOLOGICAL PEER SUPPORT > TREATMENT OF DEPRESSION. Biomedical health care is based on agents and institutions such as "doctors", "hospitalization", "psychiatrist", "admission to psychiatric emergency ward" and "frequent medical follow up". Psychological peer support contains attributes such as "understanding surroundings and colleagues", "encouragement from relatives", "friends: 'private therapy'" and "talking with someone who understands".

It is an interesting contrast that the positive depression prototype contains a more private and more psychological type of support, while the negative prototype contains a more public/systematic and practical type of treatment support (SUPPORT AND COUNSELLING INITIATIVES > TREATMENT OF DEPRESSION, e.g. "municipality sponsored fitness course"). However, it is difficult to say whether this is a particularly significant difference.

When it comes to medicine, both depression prototypes contain the notion that medicine is symptom treatment (MEDICINE : MEDICINE TARGET SYMPTOMS) and that medicine has side-effects (MEDICINE > SIDE-EFFECTS). It is possible that people who harbour positive ADM attitudes simply see symptom treatment as a rather useful part of treatment and side-effects as minor costs compared to the benefits.

While only the positive depression prototype endorsed biomedical healthcare, both depression prototypes acknowledge PSYCHOLOGICAL HEALTHCARE > TREATMENT OF DEPRESSION, e.g. "talk therapy", "tools for thinking", "psychologists", "others with conversation therapy educations" and "cognitive therapy".

Furthermore, both depression prototypes share two types of support and three types of treatment behaviour. The support types are PEER SUPPORT FOR COPING > TREATMENT ... (e.g. "help from colleagues", "self-help groups", "support from

girlfriend” and “it helps when relatives support the chosen treatment initiatives”) and ACCEPTANCE AND SUPPORT IN SOCIETY > TREATMENT (e.g. “anti-stigma campaigns”, “celebrities advocate openness about depression”, “mental health campaigns” and “reduce health care waiting time”). The treatment behaviours are HEALTHY LIVING, e.g. “exercise”, coping behaviour, e.g. “behaviour change” and COGNITIVE BEHAVIOUR, e.g. “positive thinking”.

Summary of the proposed dimensions

There are many interesting differences and commonalities between the negative and the positive prototype, but we propose that there are three basic underlying dimensions along which beliefs are stratified in relation to ADM attitude.

The causal beliefs seem stratified along a dimension with biomedical beliefs dominating the positive depression prototype (e.g. biological causes and genes) and psychosocial beliefs dominating the negative depression prototype (e.g. sociocultural pressure and behaviour).

The beliefs about depression itself along with its consequences seem stratified along a dimension with causal attributions dominating the positive depression prototype (e.g. ability decrease and somatic effects) and intentional attributions dominating the negative depression prototype (e.g. behaviour).

For treatment beliefs the core difference seems to be related to ideas about authentic self-identity. This interpretation is primarily based on the observation that the negative depression prototype only contains two unique attributes which actually specify the perceived negative effects of medicine, namely identity threat and ‘drug-like substance’. The rest of the codes in the negative depression prototype are about use of medicine rather than about medicine itself and the positive depression prototype basically expresses that medicine is a good thing which works.

This observation also resonates with our results from a forthcoming quantitative study in which we have found ADM attitude to correlate significantly with endorsement of beliefs about ADM as an identity threat (e.g. “antidepressant medication inhibits personal development”, “In the medical perspective, mind and soul are reduced to chemistry and biology” and “when you take antidepressants you have less control over your thoughts and feelings”).

Relation to previous research

Biomedical vs Psychosocial

The distinction between biomedical and psychosocial perspectives seems to be fairly common in some genres of the literature on beliefs about mental illnesses, including depression, while relatively absent from others. The biomedical model occurs frequently in research on stigma and mental health literacy⁴⁵, in research on treatment preferences⁴ and in qualitative studies of beliefs about depression in general^{46,47}. However, ADM adherence related research of the quantitative kind tends to focus more on medication beliefs than on beliefs about depression as either biological or psychosocial^{6,10}.

Our finding that the biomedical vs the psychosocial distinction matters most for causal attributions, resonates with classical attribution research⁴⁸, according to which causal beliefs are dominantly structured by dimensions of controllability and stability. There is a fairly large body of research which demonstrates that mentally ill people are held more responsible for their own illness if its causes are seen as controllable (under some degree of volitional control) and unstable (not constant)⁴⁹. In line with this finding, seeing mental illness as biologically caused is related to less blaming of the mentally ill⁵⁰ and greater acceptance of medical treatment⁴⁵. It is, however, also related to greater stigma and social distance^{45,50}.

Causality vs Intentionality

Our finding that views on depression and its consequences are divided along a dimension with causality at one end and intentionality at the other resonates somewhat with dimensions proposed by Haslam et al.⁴⁹. Haslam has proposed four new dimensions for understanding beliefs about mental illness, namely, pathologising, moralising, medicalising and psychologising. Pathologising denotes the identification of something, e.g. deviant behaviour, as mental illness. Moralising is related to the controllability dimension by referring to perceived intentionality as a central construct. Whenever something is perceived as being under volitional control it can be judged to reflect bad intentions, inadequate self-restraint, weak character or deliberate flouting of social norms. Medicalising occurs when deviant behaviour is explained somatically and thus seen in a biomedical perspective. Psychologising explains behaviour in terms of mental states that are not fully conscious or rational.

Whereas pathologising is primarily a matter of identifying something irregular it does not in itself ascribe much meaning to the phenomena. The remaining three dimensions however are intrinsically related to causality and intentionality. Moralising is only possible for behaviours which are intentional. And while

medicalising, which is related to the biomedical perspective, and *psychologising*, which is related to the psychosocial perspective, seem to be at odds with each other, they both represent causal attributions by downplaying intentionality, either by referring to somatic or psychological causations of behaviour which attenuate deliberation and volitional control.

Identity

Notions of identity and authenticity seem oddly absent from large parts of the quantitative literature especially studies about medication adherence. However, it is a relatively prominent theme in the quantitative literature. This is particularly evident from a recent analysis of 107 narrative interviews⁵¹. Here it was found that in many cases reservations about antidepressant medication has to do with self-identity, personhood and authenticity. This creates a crisis of legitimacy which is further corroborated by perceived analogies between antidepressants and illicit drugs. These findings support the need for looking further into the role of perceptions of identity in relation to use of antidepressant medication.

Confirmation bias and the need for cognitive closure

People have a tendency to overemphasize information that resonates with their current beliefs and attitudes while downplaying information that does the opposite. This phenomenon is known as confirmation bias⁵² and it is related to cognitive dissonance⁵³, prior attitude effect⁵⁴ and attitude polarization⁵⁵. Confirmation bias can be seen as motivated by a need for cognitive closure, that is, a desire to reduce confusion and ambiguity by ending the potentially infinite epistemic sequence related to knowledge formation in a broad sense. This is sometimes referred to as "seizing and freezing", where seizing refers to the mental selection of closure affording evidence and freezing refers to the mental outcome whether it is an answer, a belief or a category.

It has often been suggested that people's beliefs and attitudes in relation to depression and antidepressants might be somewhat change resistant according to cognitive models such as those mentioned above^{6,56}. To the best of our knowledge this has yet to be proved, but we find it very likely to be the case for the following reasons: firstly, because cognitive bias is such a ubiquitous phenomenon, secondly, because depression is a complex concept covering a disparate array of instances and thirdly, because people tend to harbour strong attitudes towards depression and its treatment, as illustrated by the frequent media debates^{57,58}.

Limitations

In addition to being exploratory, this was also a methodologically experimental study. As such, a number of issues should be addressed.

Abstract concepts are inherently difficult to elicit. When participants are asked to name attributes that they find characteristic of a concept, abstract concepts elicit fewer attributes than concrete concepts⁵⁹.

This finding was replicated in our pilot-interviews where we tested traditional elicitation methods, such as free elicitation. When we applied these techniques to depression, participants mentioned under 10 attributes and then looked to the interviewer for further questions or instructions.

We could of course have chosen to complete the study with this limited number of attributes per participant. However, since our goal was to elicit relatively detailed prototypes of depression, we were interested in eliciting a higher number of attributes per respondent. To achieve this aim, the principal researcher developed a diagrammatic concept elicitation protocol, abbreviated DiCE. This protocol increased the number of elicited attributes dramatically to approximately 70 attributes per participant.

It seems fair to assume that there is some sort of trade-off between the number of attributes a participant produces and the degree to which these attributes represent how the participant intuitively thinks about the concept in question. This means that by increasing the number of attributes we also increase the risk of 'forcing' participants to mention aspects of depression, which they would either not normally think of or which they do not endorse as true, important and representative or prevalent aspects. On the other hand, with a very low number of attributes we would increase the risk of arbitrariness due to the fact that it is uncertain whether order of mentioning plays any significant role salience and importance. Important attributes could be mentioned late in an interview because it took long time to find the words. Likewise, respondents may hold back sensitive attributes until they feel that they have displayed an acceptable image or until they feel secure about the interviewer (rapport) and the interview process itself²⁹.

Based on these considerations, it is difficult to establish a golden standard for number of attributes to elicit per participant, but it is not uncommon to strive for a high number in order to get a fuller picture of a given concept⁶⁰. For the present study, we assume that the high number of attributes elicited have increased the number of shared attributes and potentially decreased the differences between the

two clusters. Thus, for the positive and negative depression prototypes, it can be difficult to assess the relative importance of the unique codes. We have tried to accommodate to this by looking for meaningful patterns within and between depression prototypes, which again has led to the dimension proposed above.

Content coding was crucial to this study and therefore is a potential limitation, since it will always involve some degree of subjective interpretation. The translation of the 2466 attribute tokens into meaningful attribute types was done singlehandedly by the primary researcher. Nevertheless, we have tried to limit idiosyncrasy by formulating logical and explicit inclusion/exclusion rules for each code and by following traditional guidelines for inter-coder reliability²⁶. However, scores achieved by inter coder reliability test where coders apply an existing scheme to a subset of the data must to some degree be considered an effect of the training which test coders receive. If resources had allowed, the study could have benefited from at least two independent coding scheme development processes. The result of these could have been compared and differences resolved by mutual agreement between coders. In retrospect, the coding scheme applied in the present study was probably more detailed and redundant than desirable in relation to the aims of the study.

Furthermore, the relational network approach which was utilized both in coding and in cluster analysis seems to add limited value. It was pursued in order to produce a visual data output in the form of clear and comparable diagrams representing distinct depression prototypes. However, the original data output from R was almost incomprehensible to uninitiated readers and as such this part of the methodological experiment must be deemed relatively unsuccessful. Future research of this kind could possibly benefit from a leaner coding system and a simpler cluster analysis. Based on such an approach, clear diagrammatic depictions could still be developed post hoc.

Conclusion

Despite several limitations, the present study contributes to current research, both in regards to content and methodological innovation.

Methodologically, this study has devised a protocol which succeeds at eliciting a great number of attributes of a concept which is both abstract and sensitive.

The cluster analysis resulted in two depression prototypes, which correspond to positive and negative attitudes towards antidepressants. Differences between the positive and the negative clusters were structured along three dimensions.

Differences between perceived causes of depression were structured along a biomedical vs psychosocial dimension. Biomedical causes seem to be more prominent in the minds of people with positive attitudes towards antidepressant medication while psychosocial causes seem to be more prominent in the minds of people with negative attitudes towards antidepressant medication.

Differences between perceptions of depression itself as well as its consequences were structured along a causality vs intentionality dimension. People with positive attitudes towards antidepressant medication seem more apt to construe depression and its consequences as something that happens to depressed people (causality) whereas people with negative attitudes towards antidepressant medication seem more apt to construe depression and its consequences as related to the intentional behaviour of depressed people.

Finally, differences between perceptions of depression treatment were structured along an identity dimension. Even though the identity aspect only figures prominently in the depression prototype related to negative attitudes towards antidepressant medication it is likely to play an implicit but powerful role in both depression prototypes. Our hypothesis is that while people with negative attitudes towards antidepressant medication see the latter as a threat to authentic self-identity, people with positive attitudes see medication as an enabler of identity which has been repressed and distorted by depression as an illness.

We have pursued and confirmed the identity hypothesis in a forthcoming survey study. Future research should investigate the role of perceptions of identity in relation to treatment preferences, adherence and outcome. Furthermore, guidelines should be developed for addressing this sensitive and seemingly overlooked existential aspect of depression treatment in the clinic.

Acknowledgements

This study was sponsored by Innovation Fund Denmark. The authors would like to thank the following people who commented on manuscript drafts: Klaus G. Grunert (Professor at Aarhus University) and Bjarke Ebert (Lead Medical Advisor at Lundbeck).

Declaration of interest

The primary author was an employee at Lundbeck at the time of the study, but the study does not involve or address any specific pharmaceutical compounds and the study was primarily sponsored by Innovation Fund Denmark under the Industrial PhD programme in collaboration with Aarhus University.

References

1. Addis, M. E., Truax, P. & Jacobson, N. S. Why do people think they are depressed?: The Reasons For Depression Questionnaire. *Psychother. Theory, Res. Pract. Train.* **32**, 476–483 (1995).
2. Fitzgerald, J. M. J. M. & Richardson, H. H. Use of the reasons for depression questionnaire with adolescents. *J. Clin. Psychol.* **58**, 1045–1056 (2002).
3. Meyer, B. & Garcia-Roberts, L. Congruence between reasons for depression and motivations for specific interventions. *Psychol. Psychother.* **80**, 525–42 (2007).
4. Khalsa, S.-R., McCarthy, K. S., Sharpless, B. A., Barrett, M. S. & Barber, J. P. Beliefs about the causes of depression and treatment preferences. *J. Clin. Psychol.* **67**, 539–549 (2011).
5. Horne, R., Weinman, J. & Hankins, M. The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. *Psychol. Health* **14**, 1–24 (1999).
6. Aikens, J. E., Nease, D. E., Nau, D. P., Klinkman, M. S. & Schwenk, T. L. Adherence to maintenance-phase antidepressant medication as a function of patient beliefs about medication. *Ann. Fam. Med.* **3**, 23–30 (2005).
7. Brown, C. *et al.* Beliefs about antidepressant medications in primary care patients: relationship to self-reported adherence. *Med. Care* **43**, 1203–1207 (2005).
8. Gaudiano, B. A., Nowlan, K., Hughes, J. A. & Miller, I. W. Gender differences in hospitalised patients' perceived reasons for their depression. *J. Psychiatr. Intensive Care* 1–10 (2013). doi:10.1017/S1742646413000186
9. Brown, C. *et al.* Primary care patients' personal illness models for depression: a preliminary investigation. *Fam. Pract.* **18**, 314–320 (2001).
10. Hunot, V. M., Horne, R., Leese, M. N. & Churchill, R. C. A cohort study of adherence to antidepressants in primary care: the influence of antidepressant concerns and treatment preferences. *Prim. Care Companion J. Clin. Psychiatry* **9**, 91–9 (2007).

11. Weinman, J., Petrie, K. J., Moss-morris, R. & Horne, R. The illness perception questionnaire: A new method for assessing the cognitive representation of illness. *Psychol. Health* **11**, 431–445 (1996).
12. Vollmann, M., Scharloo, M., Langguth, B., Kalkouskaya, N. & Salewski, C. Illness representations as mediators of the relationship between dispositional optimism and depression in patients with chronic tinnitus: A cross-sectional study. *Psychol. Heal.* (2013). doi:10.1080/08870446.2013.828294
13. Lynch, J., Moore, M., Moss-Morris, R. & Kendrick, T. Are patient beliefs important in determining adherence to treatment and outcome for depression? Development of the beliefs about depression questionnaire. *J. Affect. Disord.* **133**, 29–41 (2011).
14. Foucault, M. *Naissance de la clinique*. (Presses universitaires de France, 1963).
15. Geertz, C. in *Anthropological Approaches to the study of Religion* (ed. Michael, B.) 1–46 (Routledge, 1966). at <https://books.google.com/books?hl=da&lr=&id=OvPpCEwxjxMC&pgis=1>
16. Wittgenstein, L. *Philosophical Investigations*. (John Wiley & Sons, 2010). at http://books.google.dk/books?id=XN9yyhYMDoC&printsec=frontcover&dq=inauthor:wittgenstein&hl=&cd=6&source=gbs_api
17. Rosch, E. H. Natural categories. *Cogn. Psychol.* **4**, 328–350 (1973).
18. Rosch, E. H. & Mervis, C. B. Family resemblances: Studies in the internal structure of categories. *Cogn. Psychol.* **7**, 573–605 (1975).
19. Beach, L. R. Cue probabilism and inference behavior. *Psychol. Monogr. Gen. Appl.* **78**, 1–20 (1964).
20. Lalljee, M., Lamb, R. & Carnibella, G. Lay prototypes of illness: Their content and use. *Psychol. Heal.* **8**, 33–49 (1993).
21. Von Lengerke, T. Distinctiveness of disease prototypes in lay illness diagnosis: An exploratory observational study. *Psychol. Health Med.* **10**, 108–121 (2005).
22. Bishop, G. D. & Converse, S. A. Illness representations: A prototype approach. *Heal. Psychol.* **5**, 95–114 (1986).

23. Bishop, G. D., Briede, C. & Cavazos, L. Processing illness information: The role of disease prototypes. *Basic Appl. Soc. Psych.* (1987). doi:10.1080/01973533.1987.9645875
24. Heise, D. R. in *Attitude Measurement* (ed. Summers, G. F.) 235–253 (Rand McNally, 1970). at <<http://www.indiana.edu/~socpsy/papers/AttMeasure/attitude..htm>>
25. Croft, W. & Cruse, D. A. *Cognitive Linguistics*. (Cambridge University Press, 2004). at <http://books.google.dk/books?id=I6Z9H-eRSgoC&pg=PA328&dq=intitle:cognitive+linguistics+inauthor:croft&hl=&cd=1&source=gbs_api>
26. Krippendorff, K. *Content Analysis: An Introduction to Its Methodology*. (SAGE Publications, 2013). at <<http://www.sagepub.in/textbooks/Book234903>>
27. Krippendorff, K. Bivariate Agreement Coefficients for Reliability of Data. *Sociol. Methodol.* **2**, 139 (1970).
28. Fleiss, J. L. Measuring nominal scale agreement among many raters. *Psychol. Bull.* **76**, 378–382 (1971).
29. Supphellen, M. Understanding core brand equity: guidelines for in-depth elicitation of brand associations. *Int. J. Mark. Res.* **42**, 319–338 (2000).
30. BUTTS, C. T. & CARLEY, K. M. Structural Change and Homeostasis in Organizations: A Decision-Theoretic Approach. *J. Math. Sociol.* **31**, 295–321 (2007).
31. Pihur, V., Datta, S. & Datta, S. Weighted rank aggregation of cluster validation measures: A Monte Carlo cross-entropy approach. in *Bioinformatics* **23**, 1607–1615 (Oxford University Press, 2007).
32. Kaufman, L. & Rousseeuw, P. J. *Finding Groups in Data: An Introduction to Cluster Analysis*. (Wiley & Sons, Inc., 2009). at <<https://books.google.com/books?hl=da&lr=&id=YeFQHiikNo0C&pgis=1>>
33. Dopazo, J. & Carazo, J. M. Phylogenetic Reconstruction Using an Unsupervised Growing Neural Network That Adopts the Topology of a Phylogenetic Tree. *J. Mol. Evol.* **44**, 226–233 (1997).
34. Handl, J., Knowles, J. & Kell, D. B. Computational cluster validation in post-genomic data analysis. *Bioinformatics* **21**, 3201–3212 (2005).

35. Dunn†, J. C. Well-Separated Clusters and Optimal Fuzzy Partitions. *J. Cybern.* **4**, 95–104 (1974).
36. Rousseeuw, P. J. Silhouettes: A graphical aid to the interpretation and validation of cluster analysis. *J. Comput. Appl. Math.* **20**, 53–65 (1987).
37. Datta, S. & Datta, S. Comparisons and validation of statistical clustering techniques for microarray gene expression data. *Bioinformatics* **19**, 459–466 (2003).
38. Yeung, K. Y., Haynor, D. R. & Ruzzo, W. L. Validating clustering for gene expression data. *Bioinformatics* **17**, 309–318 (2001).
39. Brock, G., Pihur, V., Datta, S. & Datta, S., 2011. clValid: Validation of clustering results (R package, Version 0.6-4). at <<https://cran.r-project.org/web/packages/clValid/index.html>>
40. Pihur, V., Datta, S. & Datta, S., 2012. RankAggreg: Weighted rank aggregation (R package, Version 0.4-3). at <<https://cran.r-project.org/web/packages/RankAggreg/index.html>>
41. Banks, D. & Carley, K. Metric inference for social networks. *J. Classif.* **11**, 121–149 (1994).
42. Belsky, J. & Pluess, M. Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychol. Bull.* **135**, 885–908 (2009).
43. Melfi, C. A. *et al.* The effects of adherence to antidepressant treatment guidelines on relapse and recurrence of depression. *Arch. Gen. Psychiatry* **55**, 1128 (1998).
44. Hansson, M., Chotai, J. & Bodlund, O. Patients' beliefs about the cause of their depression. *J. Affect. Disord.* **124**, 54–9 (2010).
45. Schomerus, G. G. *et al.* Evolution of public attitudes about mental illness: a systematic review and meta-analysis. *Acta Psychiatr. Scand.* **125**, 440–452 (2012).
46. Schreiber, R. & Hartrick, G. KEEPING IT TOGETHER: HOW WOMEN USE THE BIOMEDICAL EXPLANATORY MODEL TO MANAGE THE STIGMA OF DEPRESSION. *Issues Ment. Health Nurs.* **23**, 91–105 (2002).

47. Buus, N., Johannessen, H. & Stage, K. B. Explanatory models of depression and treatment adherence to antidepressant medication: A qualitative interview study. *Int. J. Nurs. Stud.* **49**, 1220–1229 (2012).
48. Weiner, B., Perry, R. P. & Magnusson, J. An attributional analysis of reactions to stigmas. *J. Pers. Soc. Psychol.* **55**, 738–748 (1988).
49. HASLAM, N., BAN, L. & KAUFMANN, L. Lay conceptions of mental disorder: The folk psychiatry model. *Aust. Psychol.* **42**, 129–137 (2007).
50. Read, J., Haslam, N., Sayce, L. & Davies, E. Prejudice and schizophrenia: a review of the ‘mental illness is an illness like any other’ approach. *Acta Psychiatr. Scand.* **114**, 303–18 (2006).
51. Ridge, D. *et al.* ‘My dirty little habit’: Patient constructions of antidepressant use and the ‘crisis’ of legitimacy. *Soc. Sci. Med.* **146**, 53–61 (2015).
52. Nickerson, R. S. Confirmation bias: A ubiquitous phenomenon in many guises. *Rev. Gen. Psychol.* **2**, 175–220 (1998).
53. Harmon-Jones, E. & Mills, J. *Cognitive dissonance: progress on a pivotal theory in social psychology.* (American Psychological Association, 1999). at <<http://doi.wiley.com/10.1002/cbm.420>>
54. Taber, C. S. & Lodge, M. MOTIVATED SKEPTICISM IN THE EVALUATION OF POLITICAL BELIEFS (2006). *Crit. Rev.* **24**, 157–184 (2012).
55. Lord, C. G., Ross, L. & Lepper, M. R. Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *J. Pers. Soc. Psychol.* **37**, 2098–2109 (1979).
56. Read, J., Cartwright, C., Gibson, K., Shiels, C. & Magliano, L. Beliefs of people taking antidepressants about the causes of their own depression. *J. Affect. Disord.* **174**, 150–156 (2015).
57. Reid, I. C. Are antidepressants overprescribed? No. *BMJ* **346**, f190–f190 (2013).
58. Fountoulakis, K. N., Hoschl, C., Kasper, S., Lopez-Ibor, J. & Möller, H.-J. The media and intellectuals’ response to medical publications: the anti-depressants’ case. *Ann. Gen. Psychiatry* **12**, 11 (2013).
59. Recchia, G. & Jones, M. N. The semantic richness of abstract concepts. *Front. Hum. Neurosci.* **6**, 315 (2012).

60. Breivik, E. & Supphellen, M. Elicitation of product attributes in an evaluation context: A comparison of three elicitation techniques. *J. Econ. Psychol.* **24**, 77–98 (2003).

Supporting information

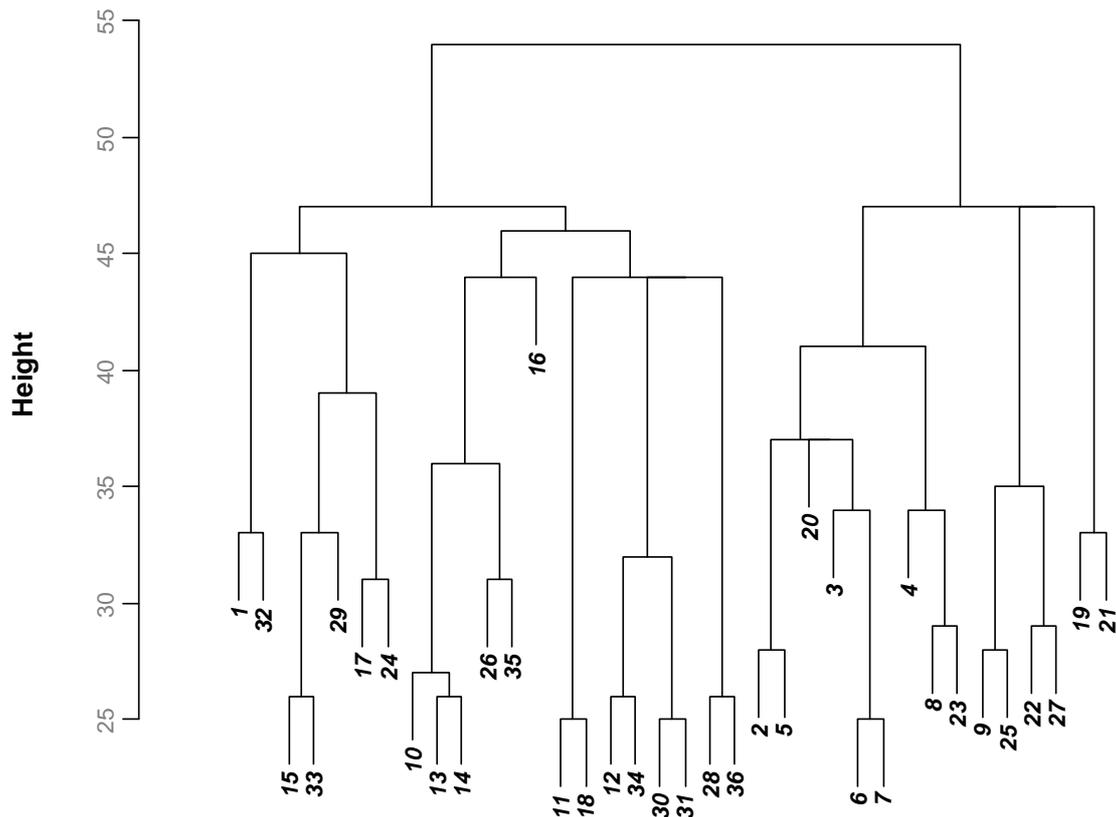
Appendix 1: Comparison of clustering solutions: internal clustering validity measures, clustering stability measures and aggregate ranks

Clustering algorithm	Validity measure	Number of clusters k			
		2	3	4	5
AGNES	Connectivity	17.095	28.629	37.674	46.648
	Dunn index	.560	.520	.532	.532
	Silhouette width	.111	.079	.071	.069
	APN	.001	.002	.002	.002
	AD	33.833	32.056	30.429	28.958
	ADM	.005	.008	.009	.010
	FOM	.007	.007	.007	.007
	Aggregate rank	2	6	8	12
CLARA	Connectivity	24.943	47.877	52.866	54.567
	Dunn index	.500	.500	.532	.532
	Silhouette width	.102	.042	.040	.037
	APN	.001	.001	.002	.001
	AD	34.091	32.815	31.358	29.856
	ADM	.003	.006	.007	.007
	FOM	.007	.007	.007	.007
	Aggregate rank	3	9	13	10
DIANA	Connectivity	20.178	32.437	42.283	43.967
	Dunn index	.553	.553	.544	.544
	Silhouette width	.112	.078	.060	.064
	APN	.001	.003	.003	.003
	AD	33.816	32.248	30.733	29.374
	ADM	.004	.014	.016	.015
	FOM	.007	.007	.007	.007
	Aggregate rank	1	14	17	19
PAM	Connectivity	22.571	41.192	52.866	54.567
	Dunn index	.520	.500	.532	.532
	Silhouette width	.100	.053	.040	.037
	APN	.001	.001	.002	.001
	AD	34.009	32.593	31.360	29.856
	ADM	.003	.005	.008	.007

	FOM	.007	.007	.007	.007
	Aggregate rank	4	7	16	11
SOTA	Connectivity	23.180	34.897	49.731	56.163
	Dunn index	.520	.532	.544	.544
	Silhouette width	.104	.065	.061	.063
	APN	.002	.003	.004	.004
	AD	33.965	32.357	30.606	29.091
	ADM	.006	.011	.013	.017
	FOM	.007	.007	.007	.007
	Aggregate rank	5	15	18	20

Note. In the rank aggregation, the seven clustering validity measures were weighted by their coefficients of variation: $CV(\text{Connectivity}) = .321$, $CV(\text{Dunn}) = .032$, $CV(\text{Silhouette}) = .354$, $CV(\text{APN}) = .492$, $CV(\text{AD}) = .054$, $CV(\text{ADM}) = .501$, $CV(\text{FOM}) = .006$.

Appendix 2: Dendrogram of divisive analysis (DIANA) clustering, based on Hamming distances between individual graphs



General discussion

The thesis consists of three studies which are all steps in the search for illness and treatment beliefs of *particular* import to attitudes and adherence towards treatment for depression. The thesis seeks to answer the following questions:

RQ1: Are the particular beliefs about depression and depression treatment, which are measured with the Antidepressant Compliance Questionnaire (ADCQ), related to antidepressant adherence?

RQ2: Is it possible to establish a preliminary quantitative measure of antidepressant related identity concerns with sound internal consistency and significant relation to attitudes towards antidepressants?

RQ3: How can we elicit belief clusters of particular relevance to depression and antidepressants?

RQ4: Within variations in perceptions of depression, can we identify discrete mental models?

RQ5: If so, are these models related to patient status or attitudes towards antidepressants?

Based on the research of the thesis, the short answers to these questions are as follows:

RQ1 answer: The results of study 1 indicated that ADCQ is likely not a valid measure of particular beliefs about depression and depression treatment in relation to antidepressant adherence. I therefore suggest that ADCQ is used with extreme caution unless some other study proves a relevance in relation to a validated measure of antidepressant adherence.

RQ2 answer: The identity concern results were positive and confirmed by triangulation in study 2 and 3. A preliminary quantitative measure was established.

RQ3 answer: A new methodology (DiCE) was developed as a way to elicit attributes pertaining to sensitive subjects. Besides from elicitation interviews, the approach relies on content coding and cluster analysis. I find it likely that this approach can be transferred to other subject areas.

RQ4 answer: Two discrete mental models were identified.

RQ5 answer: The models were related to attitudes, but not to patient status.

The search for more particular depression beliefs

For study 1, I administered ADCQ together with the Morisky Medication Adherence Scale (MMAS-4). In order to have a benchmark, I also applied the BMQ. This allowed for a direct comparison of two very different measures of beliefs related to antidepressant adherence, but more importantly, it made it possible to validate both potential positive and negative results related to the ADCQ. That is, if results obtained with the BMQ were more or less in line with earlier results achieved for this measure in relation to ADM adherence as measured by MMAS-4 or a similar scale, then I would be able to assert with higher confidence that any results obtained for the unproven ADCQ would not be due to particularities of the sample, the adherence measure or other such contingencies.

It turned out that results obtained with BMQ were more or less as expected, whereas results obtained with ADCQ were surprisingly poor. That is, ADCQ exhibited a relatively low degree of internal consistency and it did not relate to our measure of adherence in any meaningful way.

This falsification, however, does not allow me to answer the question of whether adherence to antidepressant medication is related to people's ideas about 'what depression is' as well as their implicit or explicit ideas about how antidepressants 'work in the mind'. In principle, the poor performance of ADCQ could both be due to low content validity and low concurrent validity. This is an unpleasant result, because not being able to verify or reject my own hypothesis, I am instead left with the task of questioning a measure to which I do not have authorship.

Study 2 and 3 continues where study 1 stopped by affirming that there is a relation between ADM attitudes and perceptions of depression and depression treatment specifically. This is not the same as establishing which particular type of depression beliefs that relate the most to ADM adherence, but it is of relevance to the task. It underlines that while people's treatment behaviours might to a large degree correlate with implicit cost-benefit analyses, as expressed by the universality of BMQ, these cost-benefit analyses are likely to be intricately related to certain particularities involved in conceptualising depression.

Two such particularities have been investigated in this thesis:

1. People's perceptions of identity (study 2 and 3)
2. The reduction of complex phenomena into simplified mental models which seem to follow internal structural logics rather than, or as well as, attention to real world phenomena (study 3)

Identity concerns

In study 2, the relation between perceptions of identity and ADM attitude was tested explicitly, whereas in study 3, it emerged based on exploratory elicitation, coding and cluster analysis.

Study 2 was inspired by a study about preferences for enhancement pharmaceuticals, in which the participants were more reluctant to enhance traits considered fundamental to self-identity (such as mood, motivation and self-confidence) compared to traits considered less fundamental to self-identity (such as wakefulness, concentration and absentmindedness)¹.

The fact that the relation between identity concerns and ADM attitudes is demonstrated in two very different papers attests to its importance, even though both studies have several limitations, which will be covered later in the general discussion (in the section on Limitations).

The data on identity concerns raise some other important questions. How and why are people concerned with identity, and which role does identity play for people with positive attitudes towards antidepressant medication?

To answer the first question, I believe that human beings have a natural inclination towards implicit essentialism and dualism. This does not mean that I assume people to harbour strong opinions about the works of Plato, Aristotle (different variations of essentialism) and Descartes (mind-body dualism). Rather, it means that people are inclined to conceive of things, including themselves and other people, as having essential properties without which they would not be themselves.¹ It also means that people are likely inclined to think of mind and body (matter) as two ontologically separate entities.²

What matters here is not as much the underlying philosophies as the implications. An essentialist belief in authentic self-identity is naturally at odds with elements that might pose a threat towards such an identity. Supplementary to this is the dualistic notion of the body and the mind as two very different things where identity pertains exclusively to the latter. This entails that medicalizing the mind is radically different from medicalizing the body.

I am not going to take a stance on these matters in the present thesis. In my capacity as a researcher engaged in investigating how other people conceptualize depression, antidepressants, identity etc., I find it prudent to suspend my own judgements in these regards. I will, however, point out the irony in the fact that the postmodernist

stance and the contemporary natural sciences stance should be much the same. Anti-essentialism is a core element in postmodern thinking, and the typical postmodern view of identity is that it is ultimately relative³. This is to a large degree also the view of contemporary psychiatry, and anti-dualism is an explicit part of DSM-IV:

“The term mental disorder unfortunately implies a distinction between “mental” disorders and “physical” disorders that is a reductionistic anachronism of mind/body dualism. A compelling literature documents that there is much “physical” in “mental” disorders and much “mental” in “physical” disorders. The problem raised by the term “mental” disorders has been much clearer than its solution, and, unfortunately, the term persists in the title of DSM-IV because we have not found an appropriate substitute.”²

The question remains which role identity plays for laypeople with positive attitudes towards antidepressant medication. A couple of non-mutually exclusive hypotheses can be posed:

1. Laypeople with positive ADM attitudes are, in a sense, non-believers in the existence or importance of pure and authentic self-identity.
2. Laypeople with positive ADM attitudes see traditional ADM treatment target traits (such as mood) as less central to identity.
3. Laypeople with positive ADM attitudes see ADM treatment targets as being enabled or restored to natural states (potentially resonating with authentic self-identity) rather than modified or enhanced ‘away’ from a natural and authentic state.
4. Laypeople with positive ADM attitudes see depression as a more functional and less existential condition. This would resonate with the finding in study 3 that people with positive ADM attitudes appear to be more focused on causal aspects of depression (such as what depressed people can or cannot do rather than how they feel). On a side-note, it would also resonate with a growing body of literature suggesting that cognitive dysfunction is as fundamental, or maybe even more fundamental, to depression than mood disorder⁴.

Based on the papers in this thesis, I am unable to confirm or reject any of the four hypotheses above. Furthermore, we should take into account that identity concerns are not the only part of people’s mental and behavioural processes regarding depression and ADM. The relative importance, prevalence and context dependency of identity concerns are still unknown.

Mental models

The results of study 3 raises the question is how we should understand these depression prototypes. My theory is that they reflect a propensity to think and infer about depression and depression treatment in a particular way which is partially immune to information and concrete examples. To use an entrenched metaphor, the depression prototypes are the mental glasses through which people see depression related to real world phenomena. They represent images, likely associations, and even conclusions which people will be predisposed towards when thinking about depression as a general subject or as a concrete instance - that is, whether it is in a conversation around the dinner table or when a colleague is diagnosed with depression.

This interpretation is in line with both classical prototype theories on which the study was based and also with the newer literature on heuristics and cognitive bias.

Limitations

All studies in this thesis have clear limitations, some of which are interdependent because of the partially joint data collection process. Some of these limitations are based on deliberate pragmatic choices and others on my past level of research skill and experience.

All studies depend on the original sample consisting of the 688 people who chose to respond to the survey. Though fairly representative in terms of standard demographics, this sample is likely skewed in a couple of ways.

Based on the media through which the survey was advertised, one could argue that there could be an underrepresentation of people who rarely inform themselves by means of online and offline news as well as depression information sites.

Furthermore, the non-patients and non-relatives who chose to respond might generally be more interested in the subject of depression than average. However, most recruitment processes will face the challenge of trying to guess the differences between people who choose to participate and people who do not. Furthermore, when I contacted people regarding follow-up interviews for study 3, many expressed initial doubt as to which survey I was referring to, suggesting that people are not always that involved in the online content they interact with.

Moreover, none of the studies in this thesis have had the aim of reflecting the beliefs of a highly representative sample of the general population. Rather, they all seek to

compare groups or investigate relations between belief, adherence, attitudes and belief models.

For study 1, the sample had a relatively high degree of adherence, which is not entirely representative of general antidepressant medication adherence as reported in the literature. This is likely due to the fact that patients included in study 1 had to report themselves as active users of antidepressant medication, thereby already creating a slight bias towards patients who see themselves as relatively adherent. In addition, adherence was measured by the MMAS-4, which can be said to measure minor fluctuations differentiating the 'worst of the best' from the 'best of the best' (as stated in the section on attitudes in the general introduction). Nevertheless, the results regarding the BMQ in relation to MMAS-4 closely resembled earlier studies in which these two instruments have been co-applied.

A general limitation for study 1 and 2 is that they were cross-sectional. Longitudinal studies could have informed us more reliably about beliefs in relation to adherence and persistence at several time points (initiation, drug holidays, drop outs etc.) and also about whether observed relations were unidirectional or bidirectional. It is not unlikely that beliefs and attitudes influence each other in a bidirectional way, where beliefs are sometimes formed as a post hoc rationalisation of attitude.

Since study 2 was based on exploratory factor analysis, there is a limitation in the necessary interpretative leaps from items to factors. That is, the claim that the five items reflect medication identity concerns will always, to some degree, be just that, a claim. It is, however, a well-founded claim based on both theory and anticipations about how the items 'should behave'.

Study 3 is subject to some limitations unique to the aim of 'mapping mental models'. The idea of a mental model is in itself a bit fuzzy, but I have tried to sharpen my operationalization of the concept through the theoretical foundations of prototype theory in combination with cognitive bias theories.

A crucial first step in the data collection was the elicitation procedure. As I did not achieve any useful results with existing techniques, such as free elicitation, I devised my own. Although this new technique is standing on the shoulders of older approaches, it is unproven and there are no earlier applications to compare it to. This is a limitation in itself.

It was a deliberate aim to strive for a very high number of attributes per interview based on a minimal amount of prompting. This goal was achieved to a degree where

it is possible that the number of attributes per interview (approximately 70) was in fact too high. During the interviews, I had blinded myself to whether respondents harboured positive or negative ADM attitudes, but I presumed that it would be impossible not to guess it quite early in each interview. However, since the attribute yield per respondent was very high, the common ground between positive and negative ADM attitude respondents seemed very wide. As such, it was often surprisingly easy to stay oblivious to people's attitudes during interviews. This caused me a great deal of concern as to whether the cluster analysis would be able to produce any meaningful results based on attitude differences. Fortunately, this was not the case, but it is possible that the results would have been clearer or more interesting (for instance yielding more than two clusters) if the elicitation technique had been different.

Another challenge was the content coding. I tried to stay as true as possible to the guidelines of Krippendorff, who is considered a great authority on the subject. However, the process could have been strengthened severely if all 2466 attributes had been coded by two or more coders in a collaborative coding system design with iterative conflict resolving and code interrogation. Instead, this process was mostly conducted by me with the exception of an intercoder reliability test on a random subset of the attributes, fortunately with satisfying results.

Lastly, the experimental network approach might have been more confusing than sense making, since the original data output from R was almost incomprehensible to uninitiated readers. It was pursued for didactic reasons and in order to resemble a network of association structures. While it does not seem to have done any harm, it also seems to have added a limited amount of value. A leaner coding system and a simpler cluster analysis might have sufficed, and clear diagrammatic network depictions could still have been developed post hoc.

Clinical implications

As mentioned above, I am cautious about advocating any ideas about the correct definition of depression and identity. I will also refrain from any simplistic notions about whether antidepressants are a good or bad way to treat depression. Instead, I will underline the importance of taking seriously the fact that people's opinions, intuitions and attitudes differ in these matters. Moreover, they are likely deeply rooted in cultural beliefs and personal narratives, which are, at least to some degree, non-conscious and hard to influence by simplified attempts to enhance public mental health literacy.

I believe that one of the biggest caveats lies in the mismatch between statistics and individuals. While many insights about depression as a construct can be established by means of statistics, it is difficult to translate these insights back to individuals. Unique instances of depression can be in great danger of becoming *lost in translation* when seen through the eyes of experts and laypeople alike. For experts, depression is notoriously hard to diagnose compared to other illnesses both mental and somatic ⁵. For laypeople, many rather unscientific notions about depression, such as '*antidepressant medication inhibits personal development*', are irrefutable on the individual level. That is, we can see statistically that treating depression with antidepressant medication decreases risk of relapse, years of lost productivity, etc. But we cannot rule out that in some instances, use of antidepressant medication will somehow hinder some form of personal development as understood by a patient or relative.

Freedman et al. 2013 states that accurate diagnosis must be part of the ongoing clinical dialogue with the patient ⁵. I would say that this is also true for proper treatment. Both in regards to finding the right treatment type that yields the best clinical outcome for each unique patient, but also in regards to resolving any perceptual or emotional issues that might arise from the rift between conflicting perceptions of depression.

The fact that study 1 was unable to validate the ADCQ has indirect clinical relevance, insofar as there are currently a lack of a valid measure of beliefs particular to depression and depression treatment in relation to antidepressant adherence. That is, we still lack a more complete and quantitatively validated list of issues that should be addressed in the clinic when prescribing antidepressants.

The results from study 2 indicate that identity concerns strongly influence attitudes towards antidepressant medication. This finding has very important implications for clinical practice. It is often advocated that clinicians should discuss possible side effects and the importance of adherence when administering antidepressants, but such advice neglects the less technical and more existential aspects of taking antidepressant medication. I suggest that clinicians should be ready to discuss identity-related concerns with patients on the same level of priority as more technical aspects of medicine taking. The preliminary quantitative measure of antidepressant related identity concerns developed in study 2 might be used as a brief questioning guide for assessing whether patients have any identity related concerns about taking antidepressants. However, I believe that such concerns should also be addressed on a societal level since attitudes towards antidepressants are

carried by almost all members of society resulting in social norms, which are quite proven influencers of behaviour ⁶, such as adherence, and probably also of quality of life for those to whom the norms are of relevance.

It is less straight forward to define the clinical relevance of study 3, which was to a large degree a method development paper. As such, I believe that it has methodological relevance, but it has yet to be proven whether it will be beneficial to apply the method to other subject areas, such as, for instance, belief models behind political conflicts. However, the first part of the method, that is, the diagrammatic elicitation interviews, might be made clinically relevant if used as a patient communication method, since it facilitates conversation about very sensitive subjects.

Future research

The fact that the Antidepressant Compliance Questionnaire is seemingly inadequate for shedding light on any relations between perceptions of depression and ADM adherence does not mean that such a questionnaire might not be constructed.

However, we should carefully consider which types of treatment behaviour we wish to measure. This is partly why I have devoted a great part of this thesis to attitudes. Patients are non-patients before they become patients. Their initial 'pre-depression' attitudes towards antidepressants can influence whether they seek help, accept diagnosis, and initiate treatment. I would recommend that much attention is devoted both to how we measure adherence as well as to enhancing our understanding of various stages in 'treatment-careers', for instance in line with the medicine-taking career study by Buus 2014 ⁷.

In this thesis, the demonstration of the relation between identity concerns and ADM attitudes is only at the early stages. Future research could seek to construct a solid medical identity concerns scale and relate it to concerns about taking medicine for mental illnesses in general and depression in particular.

I believe that the elicitation procedure devised for study 3 could be promising for future research on prototypes. The diagrammatic method affords two important benefits: a high attribute yield and a way to interview people about general considerations related to extremely sensitive subjects. The whole process could be refined and streamlined, especially the coding process and the cluster analysis, which could benefit from some degree of digital automation.

The technique could be used to elicit illness models but also mental models within other complex domains. For instance, in political conflict situations (for example between Israel and Palestine), it might be possible to achieve greater understanding of opposing views.

Lastly, it would be of great clinical value if we could design dialogue tools for establishing better mutual understanding between health care providers and patients. It would be especially helpful with systematic ways of addressing some of the more existential and less technical aspects of medication use. In this regard, a slimmed down version of the diagrammatic elicitation procedure might constitute such a tool. Future research would have to assert the possible utility of such a tool.

References

1. Riis, J., Simmons, J. P. & Goodwin, G. P. Preferences for Enhancement Pharmaceuticals: The Reluctance to Enhance Fundamental Traits. *J. Consum. Res.* **35**, 495–508 (2008).
2. Ahn, W., Proctor, C. C. & Flanagan, E. H. Mental Health Clinicians' Beliefs About the Biological, Psychological, and Environmental Bases of Mental Disorders. *Cogn. Sci.* **33**, 147–182 (2009).
3. Murphy, J. W. & Choi, J. M. Postmodernism, Unraveling Racism, and Democratic Institutions. 135 (1997).
4. Bortolato, B., Carvalho, A. F., Soczynska, J. K., Perini, G. I. & McIntyre, R. S. The Involvement of TNF- α in Cognitive Dysfunction Associated with Major Depressive Disorder: An Opportunity for Domain Specific Treatments. *Curr. Neuropharmacol.* **13**, 558–76 (2015).
5. Freedman, R. *et al.* The initial field trials of DSM-5: new blooms and old thorns. *Am. J. Psychiatry* **170**, 1–5 (2013).
6. Ajzen, I. & Fishbein, M. *Understanding Attitudes and Predicting Social Behavior*. (PRENTICE-HALL, 1980).
7. Buus, N. Adherence to anti-depressant medication: A medicine-taking career. *Soc. Sci. Med.* **123**, 105–113 (2014).

Appendices

Popular scientific account of my research

Perception(s) of depression

[This brief popular scientific article won a research communication award. It was originally published on *videnskab.dk* May 12 2013 (in Danish) and translated into English in order to be published on *sciencenordic.com* May 15 2013].

Stories about depression are abundant in the news. Headlines such as ‘The Danes are popping pills like candy’ or ‘Depression is still a taboo’ are common in the daily papers. But where are the nuances and why do we care to read the same stories again and again? Maybe it is because of our own collective mental gridlock.

Many articles about depression hinge on one of two typical ideas. One is about medicine being a bad thing. We could call it the Prozac Nation Story. The other is about society not recognising depression as a real illness. That one we could call the Stigma Story. Each story seems to come pre-programmed with certain conclusions and practical implications.

The Prozac Nation Story maintains that people take a lot of medicine for something that is not really an illness. In the Prozac Nation Story, depression is not a thing in itself, but always something created by society and/or a basic part of life. In the Stigma Story, the focus lies instead on the poor, depressed people whose dreadful condition is not even recognised by society.

None of the two stories have a patent on the truth. They merely represent different aspects. The fact that they both remain politically correct evergreens reflects a large public interest in the subject. But what does this screaming lack of complexity and progress reflect?

What do people think when they think about depression?

In the course of my doctoral studies I have attempted to understand how people understand depression. I have some experience with depression myself and I have worked as a volunteer phone counsellor on a ‘Depression Helpline’, speaking with depressed people and their relatives.

Inspired by these experiences, I have conducted field research in the form of interviews and association tests all over Denmark – from the northern end of Jutland to the southern end of Zealand.

I have spoken with people still in deep depression as well as with people who have emerged on the other side. I have spoken with deeply involved relatives as well as with people who did not know, or think, that there was such a thing as depression. I have spoken with psychiatrists, psychologists, yoga instructors and crystal healers. On top of that, I have gathered several hundred survey answers and comments online.

Can we perceive the perceptions of others?

Imagine that you are looking at a round, four-legged slab of wood, which you decide to be a table of some sort. This singular table is now (re)cognised by you through your internal mental table, which itself has been formed by your experience with many other tables out there in the world. We understand singularities through our mental abstraction of pluralities.

Our mental models are flexible. When is a table small enough to be a chair? When is a cup a bowl? When is a hill a mountain? When is depression an illness?

The cognitive psychologist Eleanor Rosch has developed some fine methods for researching people's mental models.

The category 'dog', for instance, can be described by its attributes: four paws, a snout, a tail, etc. But it can also be described by means of good examples (called prototypes in this line of science).

I could show you 20 pictures of different dogs and you would probably be able to intuitively sort them on your mental dog scale. Some dogs are just more doglike than other dogs. Try it, if you please, with a Labrador, a Chihuahua, a Bulldog, etc.

And consider, if you please, the cultural implications of this mental exercise [sentence added 2015]. Is the same dog the most doglike dog in China as in England?

Easier said than done

When I embarked on my doctoral studies, it was my plan to use some research methods from the same origin as the classic dog example in my attempt to uncover the category of depression.

But you cannot just show people twenty pictures of 'depression' and then ask them to sort them from the least to the most depression-like depression. Unfortunately.

In my first attempts, I used an open interview technique with the goal of making people mention as many aspects of depression as they could possibly think of.

However, it quickly became clear that people tend to remain talking about the one aspect that is on the top of their minds, or which is simply of greatest personal concern. One person spoke at great length about stress in the modern society, another about childhood vulnerability, a third about the burden on relatives and about becoming the parent of one's partner.

If I were to compare how different people composed the category of depression, I would have to make them talk about all aspects that they could think of, including their non-favourites. My idea was that a deep and broad understanding of our collective depression categories would be the key to unlock the gridlocked public debate.

But how do you make people produce a plethora of words without putting the words in their mouths yourself?

Butterfly net – for thoughts

After many attempts, I finally developed a method that works. I have named it DiCE (Diagrammatic Concept Elicitation).

The method is a sort of combined interview and association test. It is structured by a visual diagram on which the words of the interviewee are inserted (on a type of post-it notes) during the interview.

As such, it resembles the classic brainstorming scenario that most of us are culturally programmed to participate in. The white space on the diagram sort of calls out for more and invites the interviewees to associate with little or no prompting from the interviewer.

The diagram is like a butterfly net for catching thoughts [*error in original sentence corrected 2015*]. It allowed me, at last, to uncover many different comparable aspects of people's perceptions of depression.

I ended up with several thousand 'thoughts', which I inserted in an enormous spreadsheet. Through analysis and statistical modelling, I have managed to produce some very visual diagrams that illustrate what I mean by 'mental models': clouds of words tied together in various ways. The words are much the same from model to model, but their framing, number, frequency and configuration vary from person to person and from group to group (for instance, patients vs. relatives).

The result is qualitatively meaningful, mathematically precise and visually intuitive.

The data analysis is extensive and still ongoing, but it is already clear that subtle linguistic variations correlate with various attitudes [*this was written in early 2013*]. I have measured the latter with more classical survey techniques.

Emerging patterns

An example of a simple pattern is that people inclined towards the Prozac Nation story have a tendency to describe depression in behavioural terms: “depressed people don’t perform well at work”, etc.

People inclined toward the Stigma Story have a tendency to describe the same aspects in the light of ability: “depressed people can’t perform well at work”, etc.

From storytelling towards action

The pattern above is one among many, which I describe in my forthcoming thesis. The most important part of the thesis, however, lies after it, so to speak. It is the part where I try to use a fairly detailed map of our various perceptions of depression in the attempt to design better solutions for the reality that persists outside of our favourite stories. The reality where depression (and mental illness in general) constitutes a complex problem regardless of how we choose to frame or reduce it.

A problem that we can become better at dealing with – if we unlock our collective mental gridlock.

[*End of article*]

Depression: Taler vi om det samme?

Nyhederne er fulde af historier om depression. Overskrifter som: 'Danskerne propper sig med lykkepiller' eller 'depression er stadigvæk tabu' går tit igen i dagspressen. Men hvor er nuancerne, og hvorfor gider vi læse de samme historier igen og igen? Måske er det fordi, vores egne forestillinger er ret fastlåste.

Mange artikler følger en af to typiske strukturer: Den ene handler om, at medicin er en skidt ting. Vi kunne kalde den 'Prozac Nation'-historien. Den anden handler om, at samfundet ikke anerkender depression som en sygdom. Den kunne vi kalde 'Stigma'-historien.

De to historier medfører automatisk hver deres konklusion og handleforskrift. Prozac Nation-historien hævder, at folk propper sig med medicin for noget, som egentlig ikke er en sygdom.

I Prozac Nation er depression ikke en selvstændig ting, men noget samfundsskabt og/eller en del af livet. I Stigma-historien er problemet omvendt, at folk ikke anerkender depression som en selvstændig ting, hvilket er synd for de deprimerede.

Ingen af de to historier har patent på virkeligheden. De repræsenterer snarere forskellige aspekter af den. De mange artikler skyldes øjensynligt en stor interesse for emnet. Men hvorfor de mange gentagelser, og hvorfor så få nuancer?

Hvad forstår folk ved depression?

I løbet af mit ph.d.-studie har jeg forsøgt at forstå, hvordan folk forstår depression. Jeg har selv erfaring med depression og har tidligere arbejdet som telefonpasser på Depressionslinjen, hvor jeg talte med både deprimerede og deres pårørende.

Inspireret af mine erfaringer har jeg i forbindelse med min forskning gennemført interviews og lavet associationsundersøgelser overalt i landet - fra Aars i Nordjylland til Næstved på Sydsjælland.

Jeg har talt med folk i dyb depression og folk, som er kommet ud på den anden side. Jeg har talt med dybt involverede pårørende og med folk, der enten ikke vidste eller ikke mente, at depression findes. Jeg har talt med psykiatere, psykologer, læger, yogainstruktører og krystalhealere.

Oven i det har jeg indhentet flere hundrede spørgeskemabesvarelser og kommentarer via nettet.

Hvordan forstår man en forståelse?

Forestil dig, at du kigger på en rund skive træ med fire ben og beslutter dig for, at der er tale om en slags skammel. Du forstår nu den enkelte skammel i kraft af din mentale skammel, som igen er formet af mange andre skamler ude i verden. Vi er nødt til at forstå alle enkelthederne i kraft af mentale flerheder.

Vores mentale kasser er fleksible. Hvornår er en skammel stor nok til at være et bord? Hvornår er en kop en skål? Hvornår er en bakke et bjerg? Hvornår er depression en sygdom? Den kognitive psykolog Eleanor Rosch har udviklet nogle fine metoder til at studere folks mentale kategorier.

Kategorien 'hund' kan for eksempel beskrives med de elementer, den indeholder, altså fire poter, en snude, en hale osv. Men den kan også beskrives via gode eksempler (i fagsprog kaldet prototyper).

Hvis jeg viste dig 20 forskellige billeder af hunde, ville du sandsynligvis kunne rangordne dem på din mentale hundeskala. Nogle hunde er bare mere hundagtige end andre hunde. Prøv selv med labrador, pekingeser, boxer osv.

Men er det mon den samme hund, som er den mest hundede hund på Amager som i Hellerup eller i Grønland?

Hvordan undgår man at lægge folk ord i munden?

Da jeg påbegyndte min ph.d., var det min plan at bruge metoderne fra hundeeeksemplet til at undersøge kategorien 'depression'.

Man kan dog ikke bare vise folk 20 forskellige billeder af depression og så bede dem rangordne dem efter den mest depressionsagtige depression. Desværre.

I første forsøg benyttede jeg i stedet en åben interview-teknik, hvor målet var at få folk til at nævne alle de aspekter af depression, som de nu kunne komme i tanke om.

Det blev dog hurtigt klart, at folk har det med at holde sig til dét ene aspekt, som falder dem først ind eller som ligger dem mest på sinde. En person talte langt og længe om, hvordan stress havde kørt ham ned. En anden om samfundets ansvar. En tredje om at 'være mor' for sin deprimerede mand.

Hvis jeg skulle være i stand til at sammenligne, hvordan folk komponerede kategorien depression på forskellig vis, ville jeg være nødt til at få dem til at diske op med nogle flere noder i stedet for bare at nynne hver sin favorittone. Min idé var jo, at vi kun kan låse op, hvis vi kender baggrundsmekanismerne.

Men hvordan gør man det uden selv at lægge ord i munden på folk?

Sommerfuglenet afdækker depressionsopfattelser

Efter mange forsøg har jeg opfundet en metode, som virker, og som har fået navnet DiCE (Diagrammatic Concept Elicitation).

Metoden er en slags kombination af interview og associationsteknik. Processen bliver struktureret via af et visuelt diagram, hvorpå interview-personens ord bliver sat ind (med specielle post-it notes) under selve interviewet.

Interview-forløbet ligner til forveksling det klassiske brainstorm-scenarie, som de fleste af os er kulturelt opdraget til at deltage i. De hvide felter på diagrammet kalder på mere og lokker interviewpersonerne til at associere, uden at interviewerens behøver at sige særligt meget.

Diagrammet virkede som et slags sommerfuglenet for tanker. Endelig lykkedes det at afdække flere forskellige og sammenlignelige aspekter af folks depressionsopfattelser.

Metoden afslører sproglige forskydninger

Alt i alt endte jeg med flere tusinde 'tanker', som jeg satte ind i et kæmpe regneark. Via statistik og analyse fremkommer der i sidste ende nogle meget visuelle diagrammer, som illustrerer det, jeg mener med forskellige mentale modeller:

En samling ord som er forbundet på forskellig vis. Typerne af ord går igen, men deres ordlyd, antal, frekvens og konfiguration varierer fra person til person og fra gruppe til gruppe (for eksempel patienter vs. pårørende).

Det er kvalitativt meningsfuldt, matematisk præcist og visuelt intuitivt på én og samme tid.

Data-analysen er omfangsrig og igangværende, men det er allerede tydeligt, at der er subtile sproglige forskydninger, som nøje følger forskellige holdninger. Holdningerne har jeg 'målt' med mere klassisk spørgeskemateknik.

Tegner sig allerede et mønster

Et mønster, som i den grad springer i øjnene, er, at folk, som typisk hælder til Prozac Nation-historien, har en tendens til at beskrive depression i kraft af adfærd: 'Deprimerede passer ikke deres arbejde' osv.

Folk, som derimod hælder til Stigma-historien, har en tendens til at beskrive de samme ting, men som noget man kan eller ikke kan: 'Når man er deprimeret, kan man ikke passe sit arbejde' osv.

Det er blot ét eksempel blandt mange - resten kommer med i min ph.d.-afhandling.

Fra historie til handling

Den vigtigste del af mit arbejde ligger dog efter ph.d.'en - nemlig at bruge min nye viden til at låse op for fastlåste forestillinger og til at udvikle bedre kommunikation og bedre praktiske værktøjer til at håndtere den virkelighed, som trænger sig på uden for historiefortællingerne:

At depression og psykisk sygdom generelt er et alvorligt og komplekst problem - uanset hvordan vi vælger at fokusere på det.

Et problem som vi kan og bør blive meget bedre til at tage os af og forholde os til.

Alphabetical list of all references in the thesis

- Addis, M. E., & Jacobson, N. S. (1996). Reasons for depression and the process and outcome of cognitive-behavioral psychotherapies. *Journal of Consulting and Clinical Psychology, 64*(6), 1417–1424. <http://doi.org/10.1037/0022-006X.64.6.1417>
- Addis, M. E., Truax, P., & Jacobson, N. S. (1995). Why do people think they are depressed?: The Reasons For Depression Questionnaire. *Psychotherapy: Theory, Research, Practice, Training, 32*(3), 476–483. <http://doi.org/10.1037/0033-3204.32.3.476>
- Ahn, W., Proctor, C. C., & Flanagan, E. H. (2009). Mental Health Clinicians' Beliefs About the Biological, Psychological, and Environmental Bases of Mental Disorders. *Cognitive Science, 33*(2), 147–182. <http://doi.org/10.1111/j.1551-6709.2009.01008.x>
- Aikens, J. E., & Klinkman, M. S. (2012). Changes in patients' beliefs about their antidepressant during the acute phase of depression treatment. *General Hospital Psychiatry, 34*(3), 221–226. <http://doi.org/10.1016/j.genhosppsych.2012.01.004>
- Aikens, J. E., Nease, D. E., & Klinkman, M. S. (2008). Explaining patients' beliefs about the necessity and harmfulness of antidepressants. *Annals of Family Medicine, 6*(1), 23–29. <http://doi.org/10.1370/afm.759>
- Aikens, J. E., Nease, D. E., Nau, D. P., Klinkman, M. S., & Schwenk, T. L. (2005). Adherence to maintenance-phase antidepressant medication as a function of patient beliefs about medication. *Annals of Family Medicine, 3*(1), 23–30. <http://doi.org/10.1370/afm.238>
- Ajzen, I., & Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, New Jersey: PRENTICE-HALL. Retrieved from http://www.pearsonhighered.com/educator/academic/product/0,,0139364358,00%2ben-USS_01DBC.html
- Andersen, M., Eldberg, K., Foged, A., & Søndergaard, J. (2009). Generisk substitution. Indflydelse på medicinbrugernes tryghed og komplians.
- Anderson, C., & Roy, T. (2013). Patient experiences of taking antidepressants for depression: a secondary qualitative analysis. *Research in Social &*

Administrative Pharmacy : RSAP, 9(6), 884–902.
<http://doi.org/10.1016/j.sapharm.2012.11.002>

Andrade, S. E., Kahler, K. H., Frech, F., & Chan, K. A. (2006). Methods for evaluation of medication adherence and persistence using automated databases. *Pharmacoepidemiology and Drug Safety*, 15(8), 565–74; discussion 575–7. <http://doi.org/10.1002/pds.1230>

Banks, D., & Carley, K. (1994). Metric inference for social networks. *Journal of Classification*, 11(1), 121–149. <http://doi.org/10.1007/BF01201026>

Barge-Schaapveld, D. Q. C. ., Nicolson, N. A., Berkhof, J., & deVries, M. W. (1999). Quality of life in depression: daily life determinants and variability. *Psychiatry Research*, 88(3), 173–189. [http://doi.org/10.1016/S0165-1781\(99\)00081-5](http://doi.org/10.1016/S0165-1781(99)00081-5)

Beach, L. R. (1964). Cue probabilism and inference behavior. *Psychological Monographs: General and Applied*, 78(5-6), 1–20. <http://doi.org/10.1037/h0093853>

Beck, A. T., WARD, C. H., MENDELSON, M., MOCK, J., & ERBAUGH, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, 4, 561–571. Retrieved from <http://eutils.ncbi.nlm.nih.gov/entrez/eutils/elink.fcgi?dbfrom=pubmed&iid=13688369&retmode=ref&cmd=prlinks>

Belsky, J., & Pluess, M. (2009). Beyond diathesis stress: Differential susceptibility to environmental influences. *Psychological Bulletin*, 135(6), 885–908. <http://doi.org/10.1037/a0017376>

Bishop, G. D., Briede, C., & Cavazos, L. (1987). Processing illness information: The role of disease prototypes. *Basic and Applied Social Psychology*. <http://doi.org/10.1080/01973533.1987.9645875>

Bishop, G. D., & Converse, S. A. (1986). Illness representations: A prototype approach. *Health Psychology*, 5(2), 95–114. <http://doi.org/10.1037/0278-6133.5.2.95>

Blatt, S. J., & Maroudas, C. (1992). Convergences among psychoanalytic and cognitive-behavioral theories of depression. *Psychoanalytic Psychology*. Retrieved from <http://psycnet.apa.org/journals/pap/9/2/157/>

- Bortolato, B., Carvalho, A. F., Soczynska, J. K., Perini, G. I., & McIntyre, R. S. (2015). The Involvement of TNF- α in Cognitive Dysfunction Associated with Major Depressive Disorder: An Opportunity for Domain Specific Treatments. *Current Neuropharmacology*, 13(5), 558–76. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/26467407>
- Bostrom, A., Fischhoff, B., & Morgan, M. G. (1992). Characterizing Mental Models of Hazardous Processes: A Methodology and an Application to Radon. *Journal of Social Issues*, 48(4), 85–100. <http://doi.org/10.1111/j.1540-4560.1992.tb01946.x>
- Bostrom, A., Morgan, M. G., Fischhoff, B., & Read, D. (1994). What Do People Know About Global Climate Change? 1. Mental Models. *Risk Analysis*, 14(6), 959–970. <http://doi.org/10.1111/j.1539-6924.1994.tb00065.x>
- Breivik, E., & Supphellen, M. (2003). Elicitation of product attributes in an evaluation context: A comparison of three elicitation techniques. *Journal of Economic Psychology*, 24(1), 77–98. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0167487002001563>
- Brock, G., Pihur, V., Datta, S. & Datta, S., 2011. clValid: Validation of clustering results (R package, Version 0.6-4). (n.d.). Retrieved February 27, 2016, from <https://cran.r-project.org/web/packages/clValid/index.html>
- Brown, C., Battista, D. R., Bruehlman, R., Sereika, S. S., Thase, M. E., & Dunbar-Jacob, J. (2005). Beliefs about antidepressant medications in primary care patients: relationship to self-reported adherence. *Medical Care*, 43(12), 1203–1207. <http://doi.org/10.1097/01.mlr.0000185733.30697.f6>
- Brown, C., Dunbar-Jacob, J., Palenchar, D. R., Kelleher, K. J., Bruehlman, R. D., Sereika, S., & Thase, M. E. (2001). Primary care patients' personal illness models for depression: a preliminary investigation. *Family Practice*, 18(3), 314–320. Retrieved from <http://eutils.ncbi.nlm.nih.gov/entrez/eutils/elink.fcgi?dbfrom=pubmed&iid=11356741&retmode=ref&cmd=prlinks>
- Brown, J. S. L., Casey, S. J., Bishop, A. J., Prytys, M., Whittinger, N., & Weinman, J. (2011). How black African and white British women perceive depression and help-seeking: a pilot vignette study. *The International Journal of Social Psychiatry*, 57(4), 362–74. <http://doi.org/10.1177/0020764009357400>

- BUTTS, C. T., & CARLEY, K. M. (2007). Structural Change and Homeostasis in Organizations: A Decision-Theoretic Approach. *The Journal of Mathematical Sociology*, 31(4), 295–321. <http://doi.org/10.1080/00222500701542517>
- Buus, N. (2014). Adherence to anti-depressant medication: A medicine-taking career. *Social Science & Medicine*, 123, 105–113. <http://doi.org/10.1016/j.socscimed.2014.11.010>
- Buus, N., Johannessen, H., & Stage, K. B. (2012). Explanatory models of depression and treatment adherence to antidepressant medication: A qualitative interview study. *International Journal of Nursing Studies*, 49(10), 1220–1229. <http://doi.org/10.1016/j.ijnurstu.2012.04.012>
- Chakraborty, K., Avasthi, A., Kumar, S., & Grover, S. (2009). Attitudes and beliefs of patients of first episode depression towards antidepressants and their adherence to treatment. *Social Psychiatry and Psychiatric Epidemiology*, 44(6), 482–8. <http://doi.org/10.1007/s00127-008-0468-0>
- Conner, M. T. (2008). Initiation and Maintenance of Health Behaviors. *Applied Psychology*, 57(1), 42–50. <http://doi.org/10.1111/j.1464-0597.2007.00321.x>
- Conrad, P. (1985). The meaning of medications: Another look at compliance. *Social Science & Medicine*, 20(1), 29–37. [http://doi.org/10.1016/0277-9536\(85\)90308-9](http://doi.org/10.1016/0277-9536(85)90308-9)
- Cornwall, P. L., Scott, J., Garland, A., & Pollinger, B. R. (2005). Beliefs about Depression in Patients and Their Partners. *Behavioural and Cognitive Psychotherapy*, 33(2), 131–138. <http://doi.org/10.1017/S1352465804002061>
- Coyne, J. (2012). The Antidepressant Wars, a Sequel: How the Media Distort Findings and Do Harm to Patients. Retrieved November 20, 2015, from <http://blogs.plos.org/mindthebrain/2012/12/26/the-antidepressant-wars-a-sequel-how-the-media-distort-findings-and-do-harm-to-patients/>
- Cramer, J. A., Mattson, R. H., & Prevey, M. L. (1989). How often is medication taken as prescribed? A novel assessment technique., 261(22), 3273–3277. <http://doi.org/10.1001/jama.1989.03420220087032>
- Croft, W., & Cruse, D. A. (2004). *Cognitive Linguistics*. Cambridge University Press. Retrieved from http://books.google.dk/books?id=I6Z9H-eRSgoC&pg=PA328&dq=intitle:cognitive+linguistics+inauthor:croft&hl=&cd=1&source=gbs_api

- Datta, S., & Datta, S. (2003). Comparisons and validation of statistical clustering techniques for microarray gene expression data. *Bioinformatics*, 19(4), 459–466. <http://doi.org/10.1093/bioinformatics/btg025>
- Davé, S. (2012). Discontinuation of antidepressant therapy among patients with major depressive disorder. *Open Journal of Psychiatry*, 02(04), 272–280. <http://doi.org/10.4236/ojpsych.2012.24038>
- De Las Cuevas, C., Peñate, W., & Sanz, E. J. (2013). Psychiatric outpatients' self-reported adherence versus psychiatrists' impressions on adherence in affective disorders. *Human Psychopharmacology*, 28(2), 142–150. <http://doi.org/10.1002/hup.2293>
- De las Cuevas, C., Peñate, W., & Sanz, E. J. (2014). Risk factors for non-adherence to antidepressant treatment in patients with mood disorders. *European Journal of Clinical Pharmacology*, 70(1), 89–98. <http://doi.org/10.1007/s00228-013-1582-9>
- Demyttenaere, K., Bruffaerts, R., Albert, A., Mesters, P., Dewé, W., Debruyckere, K., & Sangeleer, M. (2004). Development of an antidepressant compliance questionnaire. *Acta Psychiatrica Scandinavica*, 110(3), 201–207. <http://doi.org/10.1111/j.1600-0447.2004.00350.x>
- Demyttenaere, K., Reines, E. H., Lönn, S. L., & Lader, M. (2011). Satisfaction With Medication Is Correlated With Outcome but Not Persistence in Patients Treated With Placebo, Escitalopram, or Serotonin-Norepinephrine Reuptake Inhibitors. *The Primary Care Companion For CNS Disorders*. <http://doi.org/10.4088/PCC.10m01080>
- Diefenbach, M. A., & Leventhal, H. (1996). The common-sense model of illness representation: Theoretical and practical considerations, 5(1), 11–38. <http://doi.org/10.1007/BF02090456>
- Dopazo, J., & Carazo, J. M. (1997). Phylogenetic Reconstruction Using an Unsupervised Growing Neural Network That Adopts the Topology of a Phylogenetic Tree. *Journal of Molecular Evolution*, 44(2), 226–233. <http://doi.org/10.1007/PL00006139>
- Dunn†, J. C. (1974). Well-Separated Clusters and Optimal Fuzzy Partitions. *Journal of Cybernetics*, 4(1), 95–104. <http://doi.org/10.1080/01969727408546059>

- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Orlando, FL, US: Harcourt Brace Jovanovich College Publishers.
- Edwards, S., Tinning, L., Brown, J. S. L., Boardman, J., & Weinman, J. (2007). Reluctance to Seek Help and the Perception of Anxiety and Depression in the United Kingdom. *The Journal of Nervous and Mental Disease*, 195(3), 258–261. <http://doi.org/10.1097/01.nmd.0000253781.49079.53>
- Ferrari, A. J., Charlson, F. J., Norman, R. E., Patten, S. B., Freedman, G., Murray, C. J. L., ... Whiteford, H. A. (2013). Burden of depressive disorders by country, sex, age, and year: findings from the global burden of disease study 2010. *PLoS Medicine*, 10(11), e1001547. <http://doi.org/10.1371/journal.pmed.1001547>
- Fitzgerald, J. M. J. M., & Richardson, H. H. (2002). Use of the reasons for depression questionnaire with adolescents. *Journal of Clinical Psychology*, 58(9), 1045–1056. <http://doi.org/10.1002/jclp.10036>
- Fleiss, J. L. (1971). Measuring nominal scale agreement among many raters. *Psychological Bulletin*, 76(5), 378–382. <http://doi.org/10.1037/h0031619>
- Fortune, G., Barrowclough, C., & Lobban, F. (2004). Illness representations in depression. *British Journal of Clinical Psychology*, 43(4), 347–364. <http://doi.org/10.1348/0144665042388955>
- Foucault, M. (1963). *Naissance de la clinique*. Paris: Presses universitaires de France.
- Fountoulakis, K. N., Hoschl, C., Kasper, S., Lopez-Ibor, J., & Möller, H.-J. (2013). The media and intellectuals' response to medical publications: the anti-depressants' case. *Annals of General Psychiatry*, 12(1), 11. <http://doi.org/10.1186/1744-859X-12-11>
- Freedman, R., Lewis, D. A., Michels, R., Pine, D. S., Schultz, S. K., Tamminga, C. A., ... Yager, J. (2013). The initial field trials of DSM-5: new blooms and old thorns. *The American Journal of Psychiatry*, 170(1), 1–5. <http://doi.org/10.1176/appi.ajp.2012.12091189>
- Gabriel, A. A., & Violato, C. C. (2010). The development and psychometric assessment of an instrument to measure attitudes towards depression and its treatments in patients suffering from non-psychotic depression. *Journal of Affective Disorders*, 124(3), 9. <http://doi.org/10.1016/j.jad.2009.11.009>

- Gabriel, A., & Violato, C. (2009). The development of a knowledge test of depression and its treatment for patients suffering from non-psychotic depression: a psychometric assessment. *BMC Psychiatry*, 9, 56. <http://doi.org/10.1186/1471-244X-9-56>
- Gabriel, A., & Violato, C. (2010). Depression Literacy among Patients and the Public: A Literature Review. *Primary Psychiatry*, 17(1), 55–64. Retrieved from <http://cat.inist.fr/?aModele=afficheN&cpsidt=22385591>
- Gaudiano, B. A., Nowlan, K., Hughes, J. A., & Miller, I. W. (2013). Gender differences in hospitalised patients' perceived reasons for their depression. *Journal of Psychiatric Intensive Care*, 1–10. <http://doi.org/10.1017/S1742646413000186>
- Geertz, C. (1966). Religion as a cultural system. In B. Michael (Ed.), *Anthropological Approaches to the study of Religion* (pp. 1–46). London: Routledge. Retrieved from <https://books.google.com/books?hl=da&lr=&id=OvPpCEwxjxMC&pgis=1>
- Green, L. W., Levine, D. M., & Deeds, S. (1975). Clinical trials of health education for hypertensive outpatients: Design and baseline data. *Preventive Medicine*, 4(4), 417–425. [http://doi.org/10.1016/0091-7435\(75\)90030-4](http://doi.org/10.1016/0091-7435(75)90030-4)
- Hagger, M. S., & Orbell, S. (2003). A Meta-Analytic Review of the Common-Sense Model of Illness Representations. *Psychology and Health*, 18(2), 141–184. <http://doi.org/10.1080/088704403100081321>
- Hames, J. L., Hagan, C. R., & Joiner, T. E. (2013). Interpersonal processes in depression. *Annual Review of Clinical Psychology*, 9, 355–77. <http://doi.org/10.1146/annurev-clinpsy-050212-185553>
- Hamilton, M. (1960). A rating scale for depression. *Journal of Neurology*. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC495331/pdf/jnnpsyc00273-0060.pdf>
- Handl, J., Knowles, J., & Kell, D. B. (2005, August 1). Computational cluster validation in post-genomic data analysis. *Bioinformatics*. Oxford University Press. <http://doi.org/10.1093/bioinformatics/bti517>
- Hansen, D. G., Vach, W., Rosholm, J.-U., Søndergaard, J., Gram, L. F., & Kragstrup, J. (2004). Early discontinuation of antidepressants in general practice: association with patient and prescriber characteristics. *Family Practice*, 21(6), 623–9. <http://doi.org/10.1093/fampra/cmh608>

- Hansen, H. V., & Kessing, L. V. (2007). Adherence to antidepressant treatment. *Expert Review of Neurotherapeutics*, 7(1), 57–62.
<http://doi.org/10.1586/14737175.7.1.57>
- Hansson, M., Chotai, J., & Bodlund, O. (2010). Patients' beliefs about the cause of their depression. *Journal of Affective Disorders*, 124(1-2), 54–9.
<http://doi.org/10.1016/j.jad.2009.10.032>
- Harmon-Jones, E., & Mills, J. (1999). *Cognitive dissonance: progress on a pivotal theory in social psychology*. Washington D.C: American Psychological Association. Retrieved from <http://doi.wiley.com/10.1002/cbm.420>
- Haslam, N. (2005). Dimensions of folk psychiatry. *Review of General Psychology*, 9(1), 35–47. Retrieved from
http://www18.homepage.villanova.edu/diego.fernandezduque/Teaching/CognitivePsychology/Lectures_and_Labs/s8Concepts/ConceptsArticles/FolkPsychiatryHeuristics.pdf
- HASLAM, N., BAN, L., & KAUFMANN, L. (2007). Lay conceptions of mental disorder: The folk psychiatry model. *Australian Psychologist*, 42(2), 129–137.
<http://doi.org/10.1080/00050060701280615>
- Heise, D. R. (1970). The Semantic Differential and Attitude Research. In G. F. Summers (Ed.), *Attitude Measurement* (pp. 235–253). Chicago: Rand McNally. Retrieved from
<http://www.indiana.edu/~socpsy/papers/AttMeasure/attitude..htm>
- Herborg, H., & Thomsen, D. (2005). Evidensrapport 9, v. 1.2. Retrieved from
<https://bibliotek.dk/da/moreinfo/netarchive/870970-basis%253A26213525>
- Hjarsbech, P. U., Nielsen, M. B. D., Andersen, M. F., Rugulies, R., & Christensen, U. (2015). Struggling at work – a qualitative study of working Danes with depressive symptoms. *Disability and Rehabilitation*, 37(18), 1674–1682.
<http://doi.org/10.3109/09638288.2014.973970>
- Horne, R., Chapman, S. C. E., Parham, R., Freemantle, N., Forbes, A., & Cooper, V. (2013, January). Understanding patients' adherence-related Beliefs about Medicines prescribed for long-term conditions: A meta-analytic review of the Necessity-Concerns Framework. (Y. Xia, Ed.) *PLoS ONE*. Public Library of Science. <http://doi.org/10.1371/journal.pone.0080633>

- Horne, R., Weinman, J., & Hankins, M. (1999). The beliefs about medicines questionnaire: The development and evaluation of a new method for assessing the cognitive representation of medication. *Psychology & Health, 14*(1), 1–24. <http://doi.org/10.1080/08870449908407311>
- Hung, Y., Wang, Y.-C., & Chou, J.-P. (2014). The Components of Adherence for Depression Patients. *中華心理衛生學刊, 27*(2), 201–221. Retrieved from <http://www.airitilibrary.com/Publication/Index?FirstID=10237283-201406-201407020002-201407020002-201-221>
- Hunot, V. M., Horne, R., Leese, M. N., & Churchill, R. C. (2007). A cohort study of adherence to antidepressants in primary care: the influence of antidepressant concerns and treatment preferences. *Primary Care Companion to the Journal of Clinical Psychiatry, 9*(2), 91–9. Retrieved from <http://eprints.pharmacy.ac.uk/1120/>
- Jacob, S. A., Hassali, M. A. A., & Ab Rahman, A. F. (2015). Attitudes and beliefs of patients with chronic depression toward antidepressants and depression. *Neuropsychiatric Disease and Treatment, Volume 11*, 1339. <http://doi.org/10.2147/NDT.S82563>
- Jorm, A. F. (2000). Mental health literacy Public knowledge and beliefs about mental disorders. *The British Journal of Psychiatry, 177*(5), 396–401. Retrieved from <http://bjp.rcpsych.org/content/177/5/396.short>
- Kahneman, D. (2003). A perspective on judgment and choice: Mapping bounded rationality. *American Psychologist, 58*(9), 697–720. <http://doi.org/10.1037/0003-066X.58.9.697>
- Karp, D. A. (n.d.). Taking Anti-Depressant Medications: Resistance, Trial Commitment, Conversion, Disenchantment.
- Kaufman, L., & Rousseeuw, P. J. (2009). *Finding Groups in Data: An Introduction to Cluster Analysis*. Hoboken, New Jersey: Wiley & Sons, Inc. Retrieved from <https://books.google.com/books?hl=da&lr=&id=YeFQHiikNoOC&pgis=1>
- Kessing, L. V., Hansen, H. V., Demyttenaere, K., & Bech, P. (2005). Depressive and bipolar disorders: patients' attitudes and beliefs towards depression and antidepressants. *Psychological Medicine, 35*(8), 1205–1213. <http://doi.org/10.1017/S0033291705004605>

- Khalsa, S.-R., McCarthy, K. S., Sharpless, B. A., Barrett, M. S., & Barber, J. P. (2011). Beliefs about the causes of depression and treatment preferences. *Journal of Clinical Psychology, 67*(6), 539–549. <http://doi.org/10.1002/jclp.20785>
- KLEINMAN, A. (1978). Concepts and a model for the comparison of medical systems as cultural systems. *Social Science & Medicine. Part B: Medical Anthropology, 12*, 85–93. [http://doi.org/10.1016/0160-7987\(78\)90014-5](http://doi.org/10.1016/0160-7987(78)90014-5)
- Krippendorff, K. (1970). Bivariate Agreement Coefficients for Reliability of Data. *Sociological Methodology, 2*, 139. <http://doi.org/10.2307/270787>
- Krippendorff, K. (2013). *Content Analysis: An Introduction to Its Methodology* (Third). SAGE Publications. Retrieved from <http://www.sagepub.in/textbooks/Book234903>
- Kumpakha, A., Bhattarai, S., Sharma, S., & Hc, P. (2013). Improving Patient Compliance in Antidepressant Therapy through Counselling. *Indian Journal of Pharmacy Practice, 6*(3), 34–39. Retrieved from <http://www.ijopp.org/article/114>
- Lalljee, M., Lamb, R., & Carnibella, G. (1993). Lay prototypes of illness: Their content and use. *Psychology and Health, 8*(1), 33–49. <http://doi.org/10.1080/08870449308403165>
- Leventhal, H., Leventhal, E. A., & Breland, J. Y. (2011). Cognitive Science Speaks to the “Common-Sense” of Chronic Illness Management. *Annals of Behavioral Medicine, 41*(2), 152–163. <http://doi.org/10.1007/s12160-010-9246-9>
- Leventhal, H., Meyer, D., & Nerenz, D. (1980). The common sense representation of illness danger. In S. Rachman (Ed.), *Contributions to Medical Psychology* (pp. 7–30). New York, NY: Pergamon Press. Retrieved from <http://books.google.dk/books?id=mNYnAQAAIAAJ>
- Leydon, G. M., Rodgers, L., & Kendrick, T. (2007). A qualitative study of patient views on discontinuing long-term selective serotonin reuptake inhibitors. *Family Practice, 24*(6), 570–5. <http://doi.org/10.1093/fampra/cmm069>
- Lin, E. H., Von Korff, M., Katon, W., Bush, T., Simon, G. E., Walker, E., & Robinson, P. (1995). The role of the primary care physician in patients' adherence to antidepressant therapy. *Medical Care, 33*(1), 67–74. <http://doi.org/10.1097/00005650-199501000-00006>

- Lingam, R., & Scott, J. (2002). Treatment non-adherence in affective disorders. *Acta Psychiatrica Scandinavica*, 105(3), 164–172. <http://doi.org/10.1034/j.1600-0447.2002.1r084.x>
- Lord, C. G., Ross, L., & Lepper, M. R. (1979). Biased assimilation and attitude polarization: The effects of prior theories on subsequently considered evidence. *Journal of Personality and Social Psychology*, 37(11), 2098–2109. <http://doi.org/10.1037/0022-3514.37.11.2098>
- Lynch, J., Moore, M., Moss-Morris, R., & Kendrick, T. (2011). Are patient beliefs important in determining adherence to treatment and outcome for depression? Development of the beliefs about depression questionnaire. *Journal of Affective Disorders*, 133(1-2), 29–41. <http://doi.org/10.1016/j.jad.2011.03.019>
- Malpass, A., Shaw, A., Sharp, D., Walter, F., Feder, G., Ridd, M., & Kessler, D. (2009). “Medication career” or “moral career”? The two sides of managing antidepressants: a meta-ethnography of patients’ experience of antidepressants. *Social Science & Medicine* (1982), 68(1), 154–68. <http://doi.org/10.1016/j.socscimed.2008.09.068>
- Mechanic, D. (1978). *Medical sociology*. Free Pr. Retrieved from http://books.google.dk/books?id=IENrAAAAMAAJ&q=intitle:medical+sociology+inauthor:mechanic&dq=intitle:medical+sociology+inauthor:mechanic&hl=&cd=2&source=gbs_api
- Melartin, T. K., Rytsälä, H. J., Leskelä, U. S., Lestelä-Mielonen, P. S., Sokero, T. P., & Isometsä, E. T. (2005). Continuity is the main challenge in treating major depressive disorder in psychiatric care. *Journal of Clinical Psychiatry*, 66(2), 220–227. <http://doi.org/10.4088/JCP.v66n0210>
- Melfi, C. A., Chawla, A. J., Croghan, T. W., Hanna, M. P., Kennedy, S., & Sredl, K. (1998). The effects of adherence to antidepressant treatment guidelines on relapse and recurrence of depression. *Archives of General Psychiatry*, 55(12), 1128. Retrieved from <http://archpsyc.ama-assn.org/cgi/reprint/55/12/1128.pdf>
- Meyer, B., & Garcia-Roberts, L. (2007). Congruence between reasons for depression and motivations for specific interventions. *Psychology and Psychotherapy*, 80(Pt 4), 525–42. <http://doi.org/10.1348/147608306X169982>

- Misri, S., Eng, A. B., Abizadeh, J., Blackwell, E., Spidel, A., & Oberlander, T. F. (2013). Factors impacting decisions to decline or adhere to antidepressant medication in perinatal women with mood and anxiety disorders. *Depression and Anxiety, 30*(11), 1129–1136. <http://doi.org/10.1002/da.22137>
- Morisky, D. E., Green, L. W., & Levine, D. M. (1986). Concurrent and predictive validity of a self-reported measure of medication adherence. *Medical Care, 24*(1), 67–74. <http://doi.org/10.1097/00005650-198601000-00007>
- Murphy, J. W., & Choi, J. M. (1997). Postmodernism, Unraveling Racism, and Democratic Institutions, 135. Retrieved from <https://books.google.com/books?id=IGdJ8pGQVmsC&pgis=1>
- Nickerson, R. S. (1998). Confirmation bias: A ubiquitous phenomenon in many guises. *Review of General Psychology, 2*(2), 175–220. <http://doi.org/10.1037/1089-2680.2.2.175>
- Nolen-hoeksema, S., & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion, 7*(6), 561–570. <http://doi.org/10.1080/02699939308409206>
- Partridge, B., Lucke, J., & Hall, W. (2014). Over-diagnosed and over-treated: a survey of Australian public attitudes towards the acceptability of drug treatment for depression and ADHD. *BMC Psychiatry, 14*(1), 74. <http://doi.org/10.1186/1471-244X-14-74>
- Paykel, E. S. (2008). Partial remission, residual symptoms, and relapse in depression. *Dialogues in Clinical Neuroscience, 10*(4), 431–7. Retrieved from </pmc/articles/PMC3181895/?report=abstract>
- Peterson, C., & Villanova, P. (1988). An Expanded Attributional Style Questionnaire. *Journal of Abnormal Psychology, 97*(1), 87–89. <http://doi.org/10.1037/0021-843X.97.1.87>
- Pihur, V., Datta, S., & Datta, S. (2007). Weighted rank aggregation of cluster validation measures: A Monte Carlo cross-entropy approach. In *Bioinformatics* (Vol. 23, pp. 1607–1615). Oxford University Press. <http://doi.org/10.1093/bioinformatics/btm158>
- Pihur, V., Datta, S. & Datta, S., 2012. RankAggreg: Weighted rank aggregation (R package, Version 0.4-3). (n.d.). Retrieved February 27, 2016, from <https://cran.r-project.org/web/packages/RankAggreg/index.html>

- Prins, M. A., Verhaak, P. F. M., Bensing, J. M., & van der Meer, K. (2008). Health beliefs and perceived need for mental health care of anxiety and depression-- the patients' perspective explored. *Clinical Psychology Review, 28*(6), 1038–58. <http://doi.org/10.1016/j.cpr.2008.02.009>
- Read, J., Cartwright, C., Gibson, K., Shiels, C., & Magliano, L. (2015). Beliefs of people taking antidepressants about the causes of their own depression. *Journal of Affective Disorders, 174*, 150–156. <http://doi.org/10.1016/j.jad.2014.11.009>
- Read, J., Haslam, N., Sayce, L., & Davies, E. (2006). Prejudice and schizophrenia: a review of the “mental illness is an illness like any other” approach. *Acta Psychiatrica Scandinavica, 114*(5), 303–18. <http://doi.org/10.1111/j.1600-0447.2006.00824.x>
- Recchia, G., & Jones, M. N. (2012). The semantic richness of abstract concepts. *Frontiers in Human Neuroscience, 6*, 315. <http://doi.org/10.3389/fnhum.2012.00315>
- Reid, I. C. (2013). Are antidepressants overprescribed? No. *BMJ, 346*(jan22 3), f190–f190. <http://doi.org/10.1136/bmj.f190>
- Ridge, D., Kokanovic, R., Broom, A., Kirkpatrick, S., Anderson, C., & Tanner, C. (2015). “My dirty little habit”: Patient constructions of antidepressant use and the “crisis” of legitimacy. *Social Science & Medicine, 146*, 53–61. <http://doi.org/10.1016/j.socscimed.2015.10.012>
- Riis, J., Simmons, J. P., & Goodwin, G. P. (2008). Preferences for Enhancement Pharmaceuticals: The Reluctance to Enhance Fundamental Traits. *Journal of Consumer Research, 35*(3), 495–508. <http://doi.org/10.1086/588746>
- Rosch, E. H. (1973). Natural categories. *Cognitive Psychology, 4*(3), 328–350. [http://doi.org/10.1016/0010-0285\(73\)90017-0](http://doi.org/10.1016/0010-0285(73)90017-0)
- Rosch, E. H., & Mervis, C. B. (1975). Family resemblances: Studies in the internal structure of categories. *Cognitive Psychology, 7*(4), 573–605. [http://doi.org/10.1016/0010-0285\(75\)90024-9](http://doi.org/10.1016/0010-0285(75)90024-9)
- Rousseeuw, P. J. (1987). Silhouettes: A graphical aid to the interpretation and validation of cluster analysis. *Journal of Computational and Applied Mathematics, 20*, 53–65. [http://doi.org/10.1016/0377-0427\(87\)90125-7](http://doi.org/10.1016/0377-0427(87)90125-7)

- Sansone, R. A., & Sansone, L. A. (2012). Antidepressant adherence: Are patients taking their medications? *Innovations in Clinical Neuroscience*, 9(5-6), 41–46. Retrieved from /pmc/articles/PMC3398686/?report=abstract
- Sawamura, K., Ito, H., Koyama, A., Tajima, M., & Higuchi, T. (2010). The effect of an educational leaflet on depressive patients' attitudes toward treatment. *Psychiatry Research*, 177(1-2), 4. <http://doi.org/10.1016/j.psychres.2010.02.002>
- Schomerus, G. G., Schwahn, C. C., Holzinger, A. A., Corrigan, P. W. P. W., Grabe, H. J. H. J., Carta, M. G. M. G., & Angermeyer, M. C. (2012). Evolution of public attitudes about mental illness: a systematic review and meta-analysis. *Acta Psychiatrica Scandinavica*, 125(6), 440–452. <http://doi.org/10.1111/j.1600-0447.2012.01826.x>
- Schreiber, R., & Hartrick, G. (2002). KEEPING IT TOGETHER: HOW WOMEN USE THE BIOMEDICAL EXPLANATORY MODEL TO MANAGE THE STIGMA OF DEPRESSION. *Issues in Mental Health Nursing*, 23(2), 91–105. <http://doi.org/10.1080/016128402753542749>
- Schweizer, S., Peeters, F., Huibers, M., Roelofs, J., van Os, J., & Arntz, A. (2010). Does illness attribution affect treatment assignment in depression? *Clinical Psychology & Psychotherapy*, 17(5), 418–426. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1002/cpp.662/abstract>
- Shafir, E., & LeBoeuf, R. A. (2002). Rationality. *Annual Review of Psychology*, 53(1), 491–517. Retrieved from <http://www.annualreviews.org/doi/abs/10.1146/annurev.psych.53.100901.135213>
- Skelton, J. A., & Croyle, R. T. (1991). Mental Representation, Health, and Illness: An Introduction. In link.springer.com (pp. 1–9). New York, NY: Springer US. http://doi.org/10.1007/978-1-4613-9074-9_1
- Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family*. Retrieved from <http://www.jstor.org/stable/10.2307/350547>
- Supphellen, M. (2000). Understanding core brand equity: guidelines for in-depth elicitation of brand associations. *International Journal of Market Research*,

42(3), 319–338. Retrieved from
<http://www.warc.com/fulltext/JMRS/14256.htm>

Taber, C. S., & Lodge, M. (2012). MOTIVATED SKEPTICISM IN THE EVALUATION OF POLITICAL BELIEFS (2006). *Critical Review*, 24(2), 157–184.
<http://doi.org/10.1080/08913811.2012.711019>

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, 53–55. <http://doi.org/10.5116/ijme.4dfb.8dfd>

The Global Crisis of Depression. (n.d.). Retrieved December 1, 2015, from
<http://kofiannanfoundation.org/newsroom/speeches/2014/11/global-crisis-depression>

Thwaites, R., Dagnan, D., Huey, D., & Addis, M. E. (2004). The Reasons for Depression Questionnaire (RFD): UK Standardization for clinical and non-clinical populations. *Psychology and Psychotherapy: Theory, Research and Practice*, 77(3), 363–374. <http://doi.org/10.1348/1476083041839367>

Van Geffen, E. C. G., Hermsen, J. H. C. M., Heerdink, E. R., Egberts, A. C. G., Verbeek-Heida, P. M., & van Hulst, R. (2011). The decision to continue or discontinue treatment: experiences and beliefs of users of selective serotonin-reuptake inhibitors in the initial months--a qualitative study. *Research in Social & Administrative Pharmacy : RSAP*, 7(2), 134–50.
<http://doi.org/10.1016/j.sapharm.2010.04.001>

Van Servellen, G., Heise, B. A., & Ellis, R. (2011). Factors associated with antidepressant medication adherence and adherence-enhancement programmes: a systematic literature review. *Mental Health in Family Medicine*, 8(4), 255–71. Retrieved from
<http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3487599&tool=pmcentrez&rendertype=abstract>

Vollmann, M., Scharloo, M., Langguth, B., Kalkouskaya, N., & Salewski, C. (2013). Illness representations as mediators of the relationship between dispositional optimism and depression in patients with chronic tinnitus: A cross-sectional study. *Psychology and Health*. <http://doi.org/10.1080/08870446.2013.828294>

Von Lengerke, T. (2005). Distinctiveness of disease prototypes in lay illness diagnosis: An exploratory observational study. *Psychology, Health & Medicine*, 10(1), 108–121. <http://doi.org/10.1080/13548500512331315416>

- Weiner, B., Perry, R. P., & Magnusson, J. (1988). An attributional analysis of reactions to stigmas. *Journal of Personality and Social Psychology*, 55(5), 738–748.
<http://doi.org/10.1177/0146167295215004>
- Weinman, J., Petrie, K. J., Moss-morris, R., & Horne, R. (1996). The illness perception questionnaire: A new method for assessing the cognitive representation of illness. *Psychology & Health*, 11(3), 431–445.
<http://doi.org/10.1080/08870449608400270>
- Weissman, M. M. (1976). Assessment of Social Adjustment by Patient Self-Report. *Archives of General Psychiatry*, 33(9), 1111.
<http://doi.org/10.1001/archpsyc.1976.01770090101010>
- WHO, & Lo, T. O. (2003). Adherence to long-term therapies. (E. Sabate, Ed.) World Health Organisation. Geneva. Retrieved from
http://scholar.google.com/scholar?q=related:3TYy-bmSf4oJ:scholar.google.com/&hl=en&num=20&as_sdt=0,5
- Wittgenstein, L. (2010). *Philosophical Investigations*. John Wiley & Sons. Retrieved from
http://books.google.dk/books?id=XN9yyyhYMDoC&printsec=frontcover&dq=inauthor:wittgenstein&hl=&cd=6&source=gbs_api
- Wright, J. H., & Beck, A. T. (1983). Cognitive therapy of depression: theory and practice. *Hospital & Community Psychiatry*, 34(12), 1119–1127. Retrieved from
<http://eutils.ncbi.nlm.nih.gov/entrez/eutils/elink.fcgi?dbfrom=pubmed&id=6642458&retmode=ref&cmd=prlinks>
- Yeung, K. Y., Haynor, D. R., & Ruzzo, W. L. (2001). Validating clustering for gene expression data. *Bioinformatics*, 17(4), 309–318.
<http://doi.org/10.1093/bioinformatics/17.4.309>