Functional limitations associated with mental disorders
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Chapter 5
Mediators between depression and role functioning at home or in paid employment

5.1 Abstract

**Background**- While the adverse effect of MDE on role functioning at home and in paid employment (‘participation restrictions’) is well established, the exact pathways remain unclear. We examined the mediating potential of six activity limitations (Mobility, Self-care, Cognition, Social interaction, Discrimination, and Embarrassment) in the association between major depressive episode (MDE) and participation restrictions.

**Methods**- The European Study of the Epidemiology of Mental Disorders is a cross-sectional survey, representative of the adult population of Belgium, France, Germany, Italy, the Netherlands, and Spain. In total 21,425 individuals aged 18 years and older, residing in private households, were interviewed. Presence of 12-month MDE was assessed using the Composite International Diagnostic Interview (CIDI). Activity limitations and participation restrictions in the past 30 days were measured using the WHO Disability Assessment Schedule adapted for this study (ESEMeD-WHODAS). A structural equation model based on the World Health Organization’s International Classification of Functioning, Disability and Health was designed and the extent to which limitations mediated the association between depression and participation restrictions was estimated using MPlus.

**Results**- The unadjusted association between MDE and participation restrictions was strong (regression coefficient: 0.43; SE=0.04). In the best-fitting model, only poor Cognition (concentration and attention problems) and Embarrassment mediated a significant amount of association. In this model, the remaining direct effect (regression coefficient) of MDE on participation restrictions had dropped to 0.17 (SE=0.10) which was no longer significant.

**Conclusions**- Targeting Cognition and Embarrassment in treatment could help reduce MDE-associated participation restrictions.

5.2 Introduction

Major depressive episode (MDE) is common with lifetime prevalence ranging from 3.0% in Japan to 16.9% in the US (Bijl et al., 1998a) and the burden in terms of limitations in everyday functioning is staggering. Apart from the difficulties at the individual level, the societal costs of MDE include work loss (Goering et al., 1996; Kessler and Frank, 1997; Kouzis and Eaton, 1994), reduced labor force participation and earning (Broadhead et al., 1990; Conti and Burton, 1994; Greenberg et al., 1993; Johnson et al., 1992; Stansfeld et al., 1995), and the utilization of health and support services (Kouzis and Eaton, 1997). While the
adverse effect of MDE on role functioning at home and in paid employment (further denoted as ‘participation restriction’).

The World Health Organization’s International Classification of Functioning, Disability and Health (ICF) identifies three aspects of functioning: (a) body functions and structures, (b) activities, and (c) participation. Disability similarly denotes a decrement in functioning at one or more of these levels: (a) impairment, e.g. MDE and related energy and motivation problems; (b) activity limitation, and (c) participation restriction, i.e. role functioning at home and in paid employment. A possible explanation of how MDE may lead to reduced role functioning is that MDE leads to activity limitations which in turn lead to participation restriction.

At least six activity limitations are distinguished in the ICF: (a) ‘Mobility’, such as standing and moving around; (b) ‘Self-care’ such as getting dressed; (c) ‘Cognition’ which encompasses concentration, attention, and memory; (d) ‘Social Interaction’ i.e. the ability to engage in social activities; (e) ‘Discrimination’ which refers to discrimination or unfair treatment experienced; and (f) ‘Embarrassment’ which encompasses feelings of shame. The six activity limitations (further collectively denoted as ‘limitations’) will be assessed using the WHO Disability Assessment Schedule (WHODAS), specially designed to fit the ICF.

In order to assess possible mediating effects of limitations upon role functioning at home and in paid employment, the following requirements have to be met: (1) the mediating variables must precede participation restrictions (the outcome) but follow the onset of the MDE (determinant), and (2) when limitations are modeled as mediators, the direct association between MDE and participation restrictions weakens or disappears (Kraemer et al., 2001). Accordingly, our main hypothesis was that the observed association between MDE and participation restrictions is mediated by activity limitations. Additional research questions were: (1) which activity limitations mediate most of the effect? and (2) how robust are the findings, especially across different levels of mental and physical comorbidity? The extent of mediation may well depend on whether or not MDE is comorbid with other mental or physical disorders, as comorbidity is also known to cause activity limitations and participation restrictions. In a previous report, we demonstrated substantial participation restrictions in individuals with a 12-month prevalence of MDE (The ESEMeD/MHEDEA 2000 investigators, 2004b). The current study will expand this finding by examining which limitations mediate the participation restrictions associated with MDE. A major strength of this study is that the proposed model is compatible with the ICF which has been accepted by 191 countries as the international standard to describe and measure health and disability. ICF puts all disease and health
conditions on an equal footing irrespective of their cause (press release WHO, November 2001). Therefore, the structural equation model we propose may also be applicable to diseases as mild as a common cold or as severe as heart disease or AIDS. In this study we will only describe the structural equation model for major depressive episode.

5.3 Methods

In this cross-sectional study, data from the European Study of the Epidemiology of Mental Disorders (ESEMeD) were used. ESEMeD is part of the WHO World Mental Health (WMH) Survey Initiative (Alonso et al., 2002). A detailed description of the methods of the study, including sampling frame and weighting procedure, has been presented elsewhere (The ESEMeD/MHEDEA 2000 investigators, 2004c). To summarize, ESEMeD is a cross-sectional survey representative of the adult population of Belgium, France, Germany, Italy, the Netherlands, and Spain. In total 21,425 individuals aged 18 years and older, residing in private households, were interviewed between January 2001 and July 2003. The overall response rate of the study was 61.2%, ranging from 45.9% in France to 78.6% in Spain. The ethics committees in each participating country approved the procedures and informed consent was obtained from all respondents.

5.3.1 The survey interview

The Computer Assisted Personal Interview (CAPI) used in ESEMeD is subdivided in sections. For the purpose of this study, the following sections are relevant: screening section, Composite International Diagnostic Interview, version 3 (CIDI-3.0), physical disorders section, activity limitations, and participation restrictions.

5.3.1.1 Screening section

The screening section, located at the beginning of the interview, was administered to all respondents (see Figure 5.1). Individuals who could be considered as ‘high-risk individuals’ based on their anxiety or depression symptoms as well as a random subsample (25%) of the respondents without symptoms (‘low-risk individuals’) followed the long path of the interview. The remaining 75% of the respondents without symptoms followed the short path of the interview and are not considered in this paper.

In addition, individuals were screened using the SF-12 (Ware JE et al., 1996) which addresses problems in normal daily activities, pain, and moving around due to physical and emotional problems. Individuals indicating no problems in
these areas were considered ‘low impaired’, and individuals indicating problems in at least one area were considered ‘impaired’. Activity limitations and participation restrictions were assessed in 100% of those who followed the long path of the interview and were classified as ‘impaired’ (n=5191) and 10% (n=374) of the respondents that followed the long path of the interview and were classified as ‘low impaired’ (Figure 5.1). All respondents had a known probability of selection so we were able to weigh the data to produce estimates of statistics that would have been obtained if all 21,425 respondents would have answered the questions.

**Figure 5.1.** Composition of the study sample, i.e. respondents who were administered questions about activity limitations and participation restrictions (the ESEMeD whodas). All analyses were weighted to produce estimates of statistics that would have been obtained if the entire sampling frame had participated and to restore the relative size of each country’s general population.

### 5.3.1.2 Composite International Diagnostic Interview, version 3

For ESEMeD and the World Mental Health Surveys, a further enhanced version of the CIDI, called CIDI-3.0, was developed and adapted by the Coordinating Committee of the WHO- World Mental Health (WMH) 2000 Initiative (Kessler and Ustun, 2004). The CIDI-3.0 was first produced in English and underwent a rigorous process of forward and back translations in order to obtain conceptually and cross-culturally comparable versions in each of the target countries and languages. The CIDI is a comprehensive, fully structured diagnostic interview for the assessment of mental disorders. For the purpose of this paper, 12-month diagnosis according to the DSM-IV for MDE was used. Furthermore, 12-month diagnoses for dysthymia, agoraphobia, simple phobia, social phobia, generalized anxiety disorder, panic disorder, and alcohol abuse or alcohol dependence were used to establish comorbidity.
5.3.1.3  **Physical disorders**

ESEMeD included a checklist of 19 common physical disorders that was administered in a face-to-face interview. The respondents were asked whether they had been diagnosed by a medical doctor as having arthritis or rheumatism, seasonal allergies, stroke, heart attack, heart disease, high blood pressure, asthma, tuberculosis, other chronic lung diseases, malaria or another parasitic disease, diabetes or high blood sugar, an ulcer in their stomach or intestine, thyroid disease, neurological problem, HIV, AIDS, or cancer in the 12 months prior to the interview or received any treatment for these disorders. For the analyses a dichotomous variable was created: respondents without any physical disorder scored ‘0’ and respondents with at least one physical disorder scored ‘1’ on the new variable.

5.3.1.4  **Activity limitations**

The ESEMeD-WHODAS assessed limitations in the past 30 days in six activity domains. For each domain, a single question addressed frequency, i.e. number of days the limitation was present. A variable number of questions addressed severity, with answers being coded as 1 (none), 2 (mild), 3 (moderate), 4 (severe) or 5 (cannot do). The six activity domains: (a) ‘Mobility’ (4 items, Cronbach’s α = .94) including questions about difficulties with standing for long periods, moving around inside the home, and walking long distances; (b) ‘Self-care’ (4 items, Cronbach’s α = .92), which included questions about difficulties with washing, getting dressed, and feeding; (c) ‘Cognition’ (5 items, Cronbach’s α = .88), which included questions about difficulties with concentration, memory, understanding, and ability to think clearly; (d) ‘Social Interaction’ (6 items, Cronbach’s α = .91), which included questions associated with social interaction with people, maintaining a normal social life, and participating in social activities; (e) ‘Discrimination’ (1 item) “how much discrimination or unfair treatment did you experience because of your health problems during the past 30 days”; and (f) ‘Embarrassment’ (1 item) “how much embarrassment did you experience because of your health problems during the past 30 days”. For the first four scales, the crude scores on frequency and severity were normed to a 0-100 metric. The two measures were then multiplied and normed again to a 0-100 metric. Since most respondents (88% on Mobility to 98.5% on Discrimination) reported no limitations, this led to very skewed scales. We, therefore dichotomized all scales in such a way that anyone who scored ‘0’ on the original scale, still scored ‘0’ on the new scale and anyone who scored above ‘0’, scored ‘1’ on the new scale.
5.3.1.5 Participation restrictions

The ESEMeD-WHODAS assessed ‘role functioning at home and in paid employment’ (Cronbach’s α = .71) with three questions: “Beginning yesterday and going back 30 days, how many days out of the past 30 were you (1) totally unable to work or carry out your normal activities (2) able to work, but had to cut down on what you did or not get as much done as usual, and (3) able to work, but had to cut back on the quality of your work or how carefully you worked because of problems with either your physical health, your mental health, or your use of alcohol or drugs?” The scoring rule for combining these questions is that each day out of role (question 1) was assigned a score of 1, each day of cutback in quantity (question 2) and each day of cutback in quality (question 3) was assigned a score of 0.5. When the empirical score exceeded 30 (a rare occurrence), it was fixed at 30. Since the total score was skewed, we chose to recategorize the variable in four categories: 0 (0 days), 1 (1-7 days), 2 (8-29 days), and 3 (30 days). Hence, the three questions capture ‘role functioning at home and in paid employment’ and is called ‘participation restriction’ in this paper.

5.3.2 Statistical analyses

Structural equation models for categorical and ordinal data were used to estimate the extent to which activity limitations mediated the association between MDE and participation restriction. We first estimated a fully saturated model (Figure 5.2) in which all six limitations were (a) allowed to mediate between MDE and participation restriction (the a1-6 and b1-6 paths) and (b) to be mutually associated (not depicted in Figure 5.2).

Subsequently, alterations to this model were tested in the following steps: the independent path from MDE to participation restrictions was forced to zero, in order to evaluate whether the association of MDE and participation restrictions was fully accounted for by the mediating activity limitations. We simplified the model by forcing non-significant path coefficients to zero, starting in a step-wise procedure with the weakest path between MDE and activity limitations. Next, the non-significant path coefficients between activity limitations and participation restrictions were forced to zero in a step-wise fashion. To establish the robustness of the model, we tested its invariance across four subgroups of respondents composed on the basis of comorbidity.
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Figure 5.2. The fully saturated mediation model (mutual associations between mediators not depicted). Arrows represent the associations between MDE and activity limitations (a1-a6), the associations between activity limitations and participation restrictions (b1-b6), and the direct association of MDE and participation restrictions (c).

Descriptive statistics, information about the precision of parameter estimates (and their explained variance), as well as model fitting were accomplished by the SEM program Mplus version 3.11 using the method of maximum likelihood (Muthén and Muthén, 2004).

Differences in fit function between submodels were evaluated by their $\chi^2$, Comparative Fit Index (CFI), and root mean square error of approximation (RMSEA). Because the proposed models are nested (i.e. all of one model’s free parameters are a subset of the other model’s free parameters), $\chi^2$-difference tests can be performed in order to compare the fit of nested models. When the $\chi^2$-difference test is non-significant it indicates that a simplified (more restrictive) model does not fit worse than the comparison model and should be preferred. However, with a large sample size, as in this study, even trivial discrepancies between model and data can give large $\chi^2$ values, significant $p$ values and false model rejection. Therefore, the CFI and RMSEA of each model are also given as they provide sample size adjusted estimates.

All analyses were weighted to produce estimates of statistics that would have been obtained if the entire sampling frame had participated and to restore the relative size of each country’s general population.
5.4 Results

Table 5.1 presents prevalence rates for MDE (past 12 months), limitations, and participation restrictions. The proportion of persons with more than 7 days of participation restrictions was 11.6% for the total sample and 20.8% for persons with MDE. The prevalence of limitations ranged from 1.5% for Discrimination to 11.9% for Mobility in the total group. Cognition, Social Interaction, and Embarrassment were five-to-eight fold increased in the subgroup of persons with MDE versus a two-to-three fold increase for Mobility and Self-care.

Table 5.1. Prevalence of MDE, activity limitations, and participation restrictions in ESEMeD (weighted estimates)

<table>
<thead>
<tr>
<th></th>
<th>Number of people (N=21,425)</th>
<th>Percentage of total</th>
<th>Percentage of 12-month MDE (N=847)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-month MDE</td>
<td>847</td>
<td>4.0%</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Mobility</td>
<td>2543</td>
<td>11.9%</td>
<td>27.1%</td>
</tr>
<tr>
<td>Self-care</td>
<td>621</td>
<td>2.9%</td>
<td>8.5%</td>
</tr>
<tr>
<td>Cognition</td>
<td>1056</td>
<td>4.9%</td>
<td>29.0%</td>
</tr>
<tr>
<td>Social Interaction</td>
<td>560</td>
<td>2.6%</td>
<td>17.3%</td>
</tr>
<tr>
<td>Discrimination</td>
<td>328</td>
<td>1.5%</td>
<td>12.4%</td>
</tr>
<tr>
<td>Embarrassment</td>
<td>1207</td>
<td>5.6%</td>
<td>24.9%</td>
</tr>
<tr>
<td>Participation restrictions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 days</td>
<td>17119</td>
<td>79.9%</td>
<td>46.8%</td>
</tr>
<tr>
<td>1-7 days</td>
<td>1813</td>
<td>8.5%</td>
<td>32.4%</td>
</tr>
<tr>
<td>8-29 days</td>
<td>1799</td>
<td>8.4%</td>
<td>11.6%</td>
</tr>
<tr>
<td>30 days</td>
<td>683</td>
<td>3.2%</td>
<td>9.2%</td>
</tr>
</tbody>
</table>

Table 5.2 presents the standardized coefficients of the paths linking MDE to activity limitations (column 2 and 3) and the latter to participation restrictions (column 4 and 5) in the fully saturated model (column 2 and 4) and the simplified model (column 3 and 5). Removal of the direct effect of MDE on participation restrictions (.17, SE=.06) significantly decreased the fit of the model ($\Delta \chi^2 = 9.2$, df=1, p=.002, CFI: 0.995, RMSEA: 0.038), indicating that some but not all of the association between MDE and participation restrictions is mediated by the limitations. The simplified model fitted the data well compared to the fully saturated model ($\Delta \chi^2 = 4.68$, df=3, p=.20, CFI: 0.999, RMSEA: 0.010).
Table 5.2. Standardized path coefficients estimated in the fully saturated model and the simplified model

<table>
<thead>
<tr>
<th></th>
<th>Paths (and standard error) from MDE to limitations</th>
<th>Paths (and standard error) from limitations to participation restrictions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(a1-a6)</td>
<td>(b1-b6)</td>
</tr>
<tr>
<td>Mobility</td>
<td>.10(.08)</td>
<td>.27(.06)*</td>
</tr>
<tr>
<td>Self-care</td>
<td>.18(.11)</td>
<td>.11(.08)</td>
</tr>
<tr>
<td>Cognition</td>
<td>.63(.08)*</td>
<td>.63(.08)*</td>
</tr>
<tr>
<td></td>
<td>.63(.08)*</td>
<td>.19(.05)*</td>
</tr>
<tr>
<td>Social Interaction</td>
<td>.64(.09)*</td>
<td>.64(.09)*</td>
</tr>
<tr>
<td></td>
<td>.07(.07)</td>
<td>.27(.07)*</td>
</tr>
<tr>
<td>Discrimination</td>
<td>.58(.10)*</td>
<td>.58(.10)*</td>
</tr>
<tr>
<td></td>
<td>.02(.07)</td>
<td>.19(.09)*</td>
</tr>
<tr>
<td>Embarrassment</td>
<td>.52(.09)*</td>
<td>.52(.09)*</td>
</tr>
<tr>
<td></td>
<td>.09(.07)</td>
<td>.19(.09)*</td>
</tr>
</tbody>
</table>

Note: CFI: 1.000, RMSEA: 0.000; # Path from MDE to participation restrictions, estimating the remaining direct effect of MDE on participation restrictions, was .17 (.06)

The standardized path coefficients in the simplified model show that only Cognition and Embarrassment were significantly associated with both MDE and participation restrictions, and thus mediating association between MDE and participation restrictions. Although MDE was strongly related to Social Interaction and Discrimination and participation restrictions to Self-care and Mobility, none of these four limitations mediated any association between MDE and participation restrictions. The effect of Mobility and Self-care on participation restrictions is independent of MDE and probably due to physical disorders.

The direct effect of MDE on participation restrictions according to the final model amounted to .17 (SE=0.10), compared to the 0.43 (SE=0.04) from the path model without the six mediating limitations. Constraining the direct effect of MDE on participation restrictions to zero significantly worsened the fit of the model ($\Delta \chi^2 =11.95$, df=4, p=.002; CFI: 0.993, RMSEA: 0.024). The difference between the total effect (0.43) and the direct effect (0.17) suggests that about half of the total effect is indirect, i.e. mediated by Cognition and Embarrassment.

The final model was then fitted in four subgroups: (a) persons without any other disorder than MDE (N=1662), (b) persons with one or more non-MDE mental disorders, i.e. anxiety disorders or alcohol related disorders, but not a physical disorder; N=257), (c) persons with physical disorders, but not a mental disorder other than MDE (N=2986), and (d) persons with both non-MDE mental disorders and physical disorders (N=660). The strength of the significant paths from the final model (a3-a6, b1-b3, b6, c) could not be constrained to be equal across the four subgroups without significant loss of fit. However, if the strength of these
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paths was allowed to differ between subgroups, the final model had a good overall fit (CFI=0.998; RMSEA=0.005; \( \chi^2 =15.15, \) df=15, p=0.42). Thus, the mediation model is robust as it was independent of whether or not MDE was comorbid with other mental and/or physical disorders.

5.5 Discussion

This study found that the impact of MDE on participation restrictions was considerable, as has been reported by numerous earlier studies (Bijl and Ravelli, 2000; Kessler and Frank, 1997; Ormel et al., 1994). The association between MDE and participation restrictions observed in this study might actually be an underestimation due to the difference in time frame of the ESEMeD-WHODAS (past 30 days) compared to the CIDI (past 12 months). Most episodes of major depression in the general population last 2-6 months, and activity limitations tend to wax and wane with the onset and remission of depression (Buist-Bouwman et al., 2004; Judd et al., 2000; Ormel et al., 2004). In our sample approximately 65% did not meet the diagnostic criteria for MDE anymore when the timeframe of the WHODAS was reached.

A new finding is that approximately half of the impact of MDE on participation restrictions was mediated by problems with Cognition and by feelings of Embarrassment. These activity limitations showed a six-to-eight fold increase compared to persons without MDE in the past 12 months. To our knowledge, this mediation has not been addressed previously. Consequently, interventions aimed at improving cognition and reducing embarrassment may relieve personal suffering associated with MDE and could also positively influence the societal effects of MDE by reducing participation restrictions. Targeting these mediating limitations might be especially valuable when depression occurs in the context of neuropsychological impairments. Such impairments, as measured by simple neuropsychological tests as verbal fluency, block design and so on, in depressed patients predict an unfavorable outcome of antidepressant therapy (Kampf-Sherf et al., 2004) and cognitive behavior therapy (Crews Jr and Harrison, 1995). Thus, improvement of concentration and attention may lead to decreased participation restrictions and might also improve the effectiveness of antidepressive treatment. With respect to other mental disorders, neurocognitive training has already yielded such positive effects. For instance, in brain damaged patients, general improvement of cognitive functions (including attention) was accompanied with better ability to manage common social situations and development of compensatory strategies (Robertson, 2002; Robertson and Murre, 1999). Embarrassment is related to a negative evaluation of oneself and limits the ability to engage in effective social interaction. Patients suffering from MDE may be at particular risk to be embarrassed about their condition because of self-
stigmatization (Roeloffs et al., 2003; Wolpert, 2001). Stigma in the context of MDE is associated with greater unmet mental health care needs (Roeloffs et al., 2003), and predicts antidepressant drug noncompliance (Sirey et al., 2001a) and treatment discontinuation (Sirey et al., 2001b). Embarrassment may therefore be a useful target for intervention with the aim of improving treatment adherence, outcomes and consequences of MDE.

This study has strengths and weaknesses. Its major strength is that the model is compatible with the ICF which is the international standard to describe and measure health and disability. While the current application of the model was limited to MDE, the model can easily be applied to other mental and physical disorders. The model may thus be valuable in comparing the limitation pathways of any disorder via which they affect participation restrictions and other major outcomes. An additional strength is the large representative cross-national sample which ensures generalizability across six European countries. However, six limitations should be mentioned as well. First, data were cross-sectional which prohibits firm conclusions about time order and causation, although the time order that we assumed between MDE, activity limitations, and participation restrictions makes conceptually more sense than the other way around (Buist-Bouwman et al., 2004; Judd et al., 2000; Ormel et al., 2004a). Furthermore, the association between activity limitations and participation restrictions did not change much when controlling for MDE whereas the association between MDE and participation restrictions weakened substantially after controlling for limitations. Thus, a causal relation from MDE through activity limitations to participation restrictions is more likely than vice versa. The second limitation is that the assessment of activity limitations and participation restrictions relied heavily on respondents’ memory and perception. These problems lead to measurement error which will deflate associations. On the other hand, depressed individuals might tend to give pessimistic appraisals which would inflate associations. A third limitation is that MDE was determined using the CIDI, which is administered by lay interviewers. CIDI diagnoses have acceptable reliability and validity (Wittchen et al., 1991; Wittchen, 1994), but have shown some variance with diagnoses made by clinicians (Brugha et al., 2001). Fourth, the prevalence of Social Interaction problems was low in those with a 12-month prevalence of MDE. This could mean that MDE does not strongly impair social interaction, but it might also be due to the threshold implied in the wording of the screening question in the Social Interaction section. It is also possible that some people tend to consider social interaction difficulties as unrelated to ‘health problems’ if they are due to mental illness, even in the context of a psychiatric interview that stressed at multiple occasions that mental health is part of overall health and that the word health refers to both physical
and mental health. Two final limitations concern the temporal and causal structure amongst the activity limitations and their comprehensiveness. Our current approach allowed the activity limitations to correlate and did not specify restrictive causal relationships amongst the activity limitations. The limitations, however, might be causally related in a highly specific way. For instance, Cognition problems, caused by MDE, might precede and influence Social Interaction which itself may not be causally affected by MDE. While we do not think that different causal structures will yield much different mediation effects, some dependency on how the limitations influence one another cannot be ruled out.

5.6 Conclusions

Despite the study limitations, we found that Cognition and Embarrassment accounted for half the association between MDE and participation restrictions. We firmly recommend that this study will be replicated using longitudinal data. If confirmed, it suggests that the consequences of MDE e.g. work loss might be reduced by improving Cognition and reducing Embarrassment. This could be promising, because depression itself is often difficult to treat. In this new approach, personal suffering associated with MDE might be relieved as well as the societal costs associated with MDE.