Chapter 8

General Discussion
The main goal of this thesis was to evaluate two different forms of guided Internet-based treatment for people with depressive symptoms in the general population. This section contains the main findings of the different studies together with the implications of the results. The limitations of the study are discussed and suggestions for future research are given.

**Main findings and prior research**

**Clinical effects and economic evaluation**

In the introduction we stated that it was a challenge to develop (cost)-effective interventions to address the undertreatment of depression and improve the current mental health care for this disorder. One way to tackle this problem is to develop Internet-based treatments. Both Internet-based cognitive behavioral therapy (CBT) and problem solving therapy (PST) in our study showed moderate between-group effect sizes after treatment. These results add to the growing evidence that Internet-based treatment can be an effective way to treat people with depression (Andersson and Cuijpers, 2009). Just as importantly, Internet-based treatment consisting of problem solving procedures also works with depressive symptoms, which was not shown in earlier Internet research. Besides, the effect size of Internet-based PST at post-treatment in our study ($d = 0.47$) falls within the range of that for traditional PST ($d = 0.42$) (Cuijpers et al., 2007d). Our long-term follow-up data are too limited to permit conclusions about the long-term effectiveness of both interventions. Other studies showed maintenance of treatment effects over time (Mackinnon et al., 2008).

No differences were found in clinical effects between Internet-based CBT and PST in the short term. This corresponds with the lack of large differences between traditional forms of psychotherapy (Cuijpers et al., 2008b). This could therefore be seen as support for the “Dodo Bird Verdict” that says that all psychotherapies are equally efficacious and “all should have prizes” (Luborsky et al., 1975). The Dodo Bird Verdict is based on research comparing traditional forms of psychotherapies. For different forms of Internet-based treatment it is not known whether this Verdict is applicable. The fact that we didn’t find significant differences between the two treatments does not imply that these differences don’t exist. Small differences between the interventions could be missed due to a lack of power to detect these differences. Or, perhaps these differences will emerge over time.

An important second step after showing clinical effectiveness is to conduct an economic evaluation. This is because resources are scarce and health policy makers have to make decisions about which interventions to spend their money on. Regarding cost-utility, a conservative analysis shows that the cost-utility of the interventions in our study depends on what society is willing to pay for one extra year in full health. For example, with a value of 30,000 Euro placed on one quality adjusted life year, the probability of CBT and PST being cost-effective compared
to waiting is 52% and 61% respectively. These probabilities rise in tandem with higher ceilings for the willingness to pay. The results for the cost-effectiveness of the interventions are more favourable; the probabilities of CBT and PST being cost-effective are high, with comparatively small values placed on one clinically significant and reliably improved case of depression.

Economic evaluations of Internet-based treatment are scarce (Kaltenthaler et al., 2006) but the results are promising (McCrone et al., 2004). However, we need to be aware of cost shifting. For example, reduced costs for less therapist contact may be replaced by costs related to the computer treatment itself. According to Cavanagh and Shapiro (2004) at least three types of costs can be distinguished, namely the direct costs of the computer treatment software itself, overhead costs of housing and maintaining such treatment systems and the personnel costs required to support the service. As characteristics and features vary between treatment programs, we need to compare the different computer treatments to know more about their relative cost-effectiveness.

Working mechanisms and predictors

Mediating variables of treatment can provide information about what factors lead to the change in depression. More knowledge on working mechanisms could improve our therapeutic techniques and maximize treatment effectiveness. In our study, it was shown that depression change could be due to changes in dysfunctional attitudes, worrying, negative problem orientation and perceived control for both CBT and PST. This means the same target behaviors played a mediating role in both CBT and PST. One possible explanation for this finding is that changes in mediators are proxies for another process that leads to changes in depression. These processes could be common non-specific factors or other, more fundamental, cognitive processes which are still unknown.

There are no prior Internet-based studies evaluating mediators of change. For traditional psychotherapy most research focuses on cognitive variables as possible mediators for CBT with inclusive results (Garratt et al., 2007; Longmore and Worrell, 2007). With regard to Internet-based treatment, it is suggested that mediators should be included such as understanding the written material in the programs, homework completion and other aspects more directly related to online behaviors (Andersson, 2009). But, if for example adherence to homework is a mediator, then we still don’t know what it is exactly that leads to the change. It could be some form of cognitive change, or behaving in a different way or something else. Change can take place in a short period of time, such as in a day or even in an hour. Therefore, we need alternative means in addition to self-assessments to measure this change. These might be frequent assessments by mobile phone or other methods like qualitative research with interviews to find out what happens with people during therapy.

An unsolved issue is that it has not been established which target groups are best suited to Internet-based interventions is more or less suited. In our study,
just as in most studies, there were also many people for whom these treatments were not enough, i.e. who did not show change to a clinically significant degree. We found that predictive factors of treatment success are dependent on how treatment outcome is defined, as was also recently reported by Van et al. (2008). Greater depression severity and no medication use predicted improvement while clinically significant change was best predicted by higher education level and higher age. The association between greater severity and improvement can be explained by the fact that higher initial depression scores leave more room for improvement. The relationship between medication use and improvement, which was also found in another study (Ruwaard et al., 2009) is remarkable and needs to be further explored. Importantly, the significant predictors in our study hold not only for Internet-based treatment but also for the control condition. At this moment, knowledge of predictors of outcome is too limited, making it difficult to state for whom Internet-based treatment for depression is suitable.

**Clinical implications**

This study shows that a guided Internet-based problem solving intervention is a worthwhile alternative to CBT based interventions. If our results could be replicated, Internet-based PST could be of value for clinical practice. The combination of the generic character of Internet-based PST and the short duration of the intervention make it suitable, for instance, as a first step in a stepped care path, in which people start with guided Internet-based PST, and if this is not effective, they proceed to the next step, which is more intensive. Of course, this holds not only for Internet-based PST but for Internet-based CBT as well. Some authors have proposed a role for Internet-based treatment in a stepped care model, either as a first step to treat depression or as a relapse prevention strategy (Cavanagh and Shapiro, 2004; Gega et al., 2004). In fact, in England, a computerized CBT intervention for depression, called Beating the Blues, is recommended as an early option for the stepped care management of depression in primary and secondary care (NICE, 2006). The role of Internet-based treatment as a first step in stepped care is not straightforward; for example, the same treatment (i.e. CBT) in another format (i.e. face-to-face) may not be accepted when the first treatment (Internet-based CBT) has failed (Andersson et al., 2009b). But, acceptance may be higher when a different psychological treatment is offered, like Internet-based PST followed by face-to-face CBT. Few controlled studies have examined stepped care protocols for depression, which is clearly a research area for the years ahead.

In addition to stepped care, evidence suggests that Internet-based CBT for depression can be successfully implemented in community mental health clinics and primary care centers as a stand alone treatment (Gega et al., 2004; Proudfoot et al., 2003; van den Berg et al., 2004). In the Netherlands, various mental health clinics offer forms of Internet-based treatment for depression in primary and
secondary care. In this way, Internet-based treatment can contribute to a reduction in waiting lists which are substantial in mental health care.

More knowledge on predictors of outcome may have implications for clinical practice. This information can, for example, be used to inform people about success rates of specific Internet-based interventions for people with depression and specific profiles. This would help them make informed choices as to which interventions to spend their time and energy on. Besides, new or adapted interventions should be developed for those who do not benefit from current ones. This seems more like tailoring treatment to the specific needs and profiles of people. Tailoring treatments to individual needs has mainly been applied in the area of health behavior, like changing smoking habits (Strecher et al., 2005). In a separate study we found several predictors of smoking cessation in Internet-based interventions, including residing in a high income country. Therefore, a special challenge lies, for example, in creating smoking cessation interventions for developing countries (Abdullah and Husten, 2004).

In mental health care, tailored treatment has just begun and it is suggested that tailored programs can be delivered over the Internet (Andersson et al., 2009a). In the Netherlands, Internet-based treatments are now being developed for people with low socio-economic status and various ethnic backgrounds (Trimbos-Institute). In our study we examined whether pre-treatment characteristics moderated response to CBT and PST. This is because it could well be the case that people with predominantly negative thoughts react better to CBT and people with mainly practical problems respond to PST. We found no moderating characteristics. The question is whether screening at baseline for specific patient profiles and tailoring treatment is more (cost-) effective than not tailoring treatment. This remains an area for future investigation.

Main limitations

When interpreting our results the following limitations should be kept in mind. First of all, participants were not diagnosed according to DSM-criteria. So, we cannot say whether our results hold for people with a diagnosis of depression. We did however include participants with moderate and severe symptoms. Second, attrition rates (unreturned questionnaires) are relatively high compared to other studies. We performed longitudinal data analyses to make optimal use of the available data and in some studies we used imputation techniques to make statements about the intention to treat sample. Results could be biased as a result of estimating data although we did not find evidence for this. Third, the study lacked the power to detect differences between the two active interventions. And fourth, our sample is relatively highly educated and was recruited from the general population. Therefore, we do not know whether Internet-based treatment works with other populations, like low educated groups or clinical samples.
Future research

There are plenty of future challenges regarding Internet-based treatment for depression. We will discuss some of them. High attrition and low adherence is one example. In the context of this thesis, the term attrition is used to describe an individual who fails to complete trial assessments. Adherence refers to the extent to which people complete treatment modules. Although the two constructs are interrelated they are not the same. High attrition rates can form a threat to the internal validity of the study. Although advanced imputation techniques to handle missing data are available, imputed data remain an estimate, nothing more. We have to find ways to minimize attrition, like telephone reminders/assessments, shortening follow-up assessments or using other communication tools to conduct assessments, such as mobile phones. It is also important to increase adherence rates, as completion of homework assignments is found to be significantly correlated with outcome in cognitive therapy (Kazantzis et al., 2000). The development of theoretical models of adherence and the role of disease factors and their impact on treatment uptake and maintenance are examples of areas that need further investigation (Christensen et al., 2009).

Another area for future research concerns the role of support during Internet-based treatment. Research has indicated that some form of support is needed for Internet therapy to work (Andersson and Cuijpers, 2009; Spek et al., 2007a). But the optimal form of support, in terms of duration, communication medium, content and expertise, is still unknown. One study evaluating various forms of support is now being conducted (Donker et al., 2009). In that study three different conditions are being compared, namely unguided Internet-based PST, Internet-based PST with support on demand, Internet-based PST combined with weekly support, and non-directive counseling without an intervention. This study will give insight into the (cost-) effectiveness of the different levels of support and the non-specific effects of coaching.

A third challenge has to do with effectiveness research. Most Internet studies recruit participants from the community, and there are few Internet studies in which treatment has been implemented in a clinical setting. People with depression receiving treatment in specialized mental health care may be different from people recruited from community. The question is whether Internet-based treatment also works for these people. Other effectiveness research could focus on different comparators. For example, there is a need to compare the various Internet-based treatment programs, as characteristics vary between programs. A related question concerns the effectiveness of Internet-based treatments relative to other forms of self-help (Titov, 2007), like bibliotherapy. This is because the implementation costs of guided bibliotherapy may be lower than for Internet-based treatment.

Fourth, there is a need for accurate diagnostic procedures in future trials. Most Internet studies regarding depression do not use a diagnostic assessment which is an important instrument for obtaining an estimate of the clinical relevance
of the populations (Andersson and Cuijpers, 2008). Furthermore, accurate diagnosing and screening for suitability of treatment could increase the probability that the treatment program will fit the patient’s specific needs (Andersson et al., 2009a). However, a full diagnostic interview takes time and requires expertise and can therefore lead to extra costs and long waiting lists. We have to find an optimal way to screen people without losing the advantages of using the Internet. Andersson et al. (2009b) suggested the use of alternative means as a complement to the self-assessments, such as telephone, web cameras or video telephony, to keep some of the advantages of Internet-based treatment while maintaining diagnostic accuracy.

**Conclusions**

Research, including our study, shows that guided Internet-based treatment is an effective way of treating people with depression. It therefore constitutes a good alternative to traditional forms of psychotherapy. Our study indicates that Internet-based treatment does not necessarily have to be CBT but can be a form of PST as well. Knowledge about long term results and cost-effectiveness is still limited but results are promising. Of course there are a lot of things we don’t know yet about Internet-based treatment, but this does not need to restrain us from going a step further. Now, we have to find ways to introduce and implement Internet-based treatment for depression in the current health care system, such that public awareness and accessibility of these treatments will increase.