INTRODUCTION

The relationship between cognitive functioning and Major Depressive Disorder (MDD) is well documented in the literature, and numerous studies have shown that depression is associated with deficits in a range of cognitive domains (for review see: Austin, Mitchell & Goodwin, 2001; Cohen, Lohr, Paul & Boland, 2001; Gohier, Ferracci, Surguladze et al., 2009; Hammar & Årdal, 2009). Examples of such impaired cognitive domains are executive functions (Harvey, Le Bastard, Pochon et al., 2004; Purcell, Maruff, Kyrios & Pantelis, 1997), memory (Gohier, 2009; for review see Burt, Zembar & Niederehe, 1995), attention (Murphy, Sahakian, Rubinsten et al., 1999; Hammar, Lund & Hughdal, 2003a, 2003b), and psychomotor speed (Kertzman, Reznik, Hornik-Lurie, Weizman, Kotler & Amitai, 2010). In contrast, multiple studies have shown that several cognitive functions are unimpaired in depressed patients (Hammar, Isaksen, Schmid, Årdal & Strand, 2011; Murphy, Michael, Robbins & Sahakian, 2003; Purcell et al., 1997; for review see: Hammar & Årdal, 2009; McClintock, Husain, Greer & Cullum, 2010). These contrasting findings might be explained by demographic and clinical differences between study populations, such as age, severity of depression, comorbidity, age of onset, and treatment factors such as effects of medications and hospitalization (Elliott, 2002; Hammar & Årdal, 2009; McClintock et al., 2010).

Moreover, some studies have suggested a relationship between the degree of cognitive impairment and the number of previous episodes of depression (for review see Brown, Rush & McEwen, 1999; Sweeney, Kmiec & Kupfer, 2000). In addition, several longitudinal studies do not seem to find a parallel improvement in cognitive functioning and symptom reduction during remission or symptom recovery (Austin et al., 2001; Gualtieri, Johnson & Benedict, 2006; Hammar et al., 2003; Paelecke-Habermann Pohl & Leplow, 2005; for review see Hammar & Årdal, 2009), thus indicating serious and potentially irreversible dysfunctions. Most of these results are assessed from studies investigating mixed subgroups of MDD, or only recurrent or a chronic type of depression (REC) with various numbers of depressed episodes (Hammar & Årdal, 2009b; McClintock et al., 2010). Despite the indications of MDD being a cognitively impairing disease, where some literature indicates that cognitive decline is negatively correlated with the number of depressed episodes (for review see McClintock et al., 2010), there has been a limited focus on when this impairment arises and what factors are of highest relevance in developing serious and potentially chronic cognitive impairment (Hammar & Årdal, 2009). Very few studies have systematically investigated the cognitive functioning of patients with a first depressive episode (FE) of MDD (Hammar & Årdal, 2009). It is of great interest to explore how these patients perform on cognitively demanding tasks compared to both healthy controls and REC patients.

Within the existing literature on FE and cognitive functioning, some studies have assessed performances on various memory tasks (Basso & Bornstein, 1999; Fossati, Harvey, Le Bastard, Ergis, Jouvent & Allilaire, 2004; MacQueen, Campbell, McEwan et al., 2003; Nandrino, Pezard, Poste, Réveillère & Beaume, 2002), some on executive functioning tasks (Karabekiroglu, Topcuoglu, Gönentür & Karabekiroglu, 2010; Kyte, Goodyer & Sahakian, 2005), and some on emotional processing (Nandrino, Dodin, Martin & Henniaux, 2004). All in all, however, these findings constitute quite a limited range of results, making it difficult to determine the onset of impairment in various domains with certainty. Moreover, the results are divergent and inconclusive in the matter of whether or not FE patients exhibit the same impairment as seen in REC patients, and consequently more research is needed in order to clarify the cognitive functioning of FE patients.
Some of the studies find that FE patients are impaired on selective cognitive tasks compared to healthy control persons (Karabekiroglu et al., 2010; Kyte et al., 2005; MacQueen et al., 2003). This seems to be the same type of impairment as seen in recurrent patients. For example, Karabekiroglu et al. (2010) found that FE and REC patients performed similarly to each other and more poorly than a healthy control group in the classic version of the Stroop test.

On the other hand, there is growing evidence within this narrow field of literature that FE patients exhibit unimpaired cognitive abilities similar to those of healthy controls (Fossati et al., 2004; Nandrino et al., 2002; Van der Meere, Börger, Pirila & Sallee, 2011) and significantly different from REC patients (Basso & Bornstein, 1999; Fossati et al., 2004; Karabekiroglu et al., 2010; Nandrino et al., 2004). Karabekiroglu et al. (2010) found that recurrent patients showed significantly more perseveration tendencies in the Wisconsin Card Sorting Test and significantly worse performance in word production tasks than FE patients did. In addition, Basso & Bornstein (1999) found that FE patients showed unimpaired memory functions in comparison to REC patients during the acute phase of a depressive episode, while Nandrino and colleagues (2002) found the same results during the phase of remission but not in the acute phase.

These findings suggest that FE patients perform similarly to REC patients in some cognitive domains, but on other measures they are more similar to healthy controls. These results contribute to highlight the characteristics and abilities of individuals that constitute the group of FE patients. However the findings are highly inconclusive and divergent when assembled.

The cognitive effort hypothesis suggests that MDD patients show impairment on tasks requiring effortful information processing, while having normal functioning on tasks requiring automatic information processing (Hasher & Zacks, 1979). Effortful information processing requires considerable cognitive resources and, unlike automatic processing, interferes with other cognitive activities also requiring cognitive capacity (Hasher & Zacks, 1979).

Previous experimental studies investigating the cognitive effort hypothesis in MDD have shown that REC patients are impaired on tasks requiring effortful information processing, whereas they perform as well as healthy controls on tasks requiring non-effortful information processing (Hammar, 2003; Hammar et al., 2003a, 2003b; Hasher & Zacks, 1979). To our knowledge, this has not been investigated in a group of FE patients, thus making it impossible to conclude whether FE patients perform equally to healthy controls in effortful information processing or show an impaired function, similar to REC patients. Such knowledge will be helpful in determining when the observed cognitive impairment in MDD arises, and will thus have consequences for the treatment of subgroups of MDD patients.

In order to investigate effortful and non-effortful processing, an experimental paradigm based on visual search was adopted (Wolfe, 1998). In this task subjects are instructed to look for and identify a target item among several distractor items within a visual display. The target deviates from the distractors either in a subtle way or in an obvious way, thus requiring effortful or non-effortful information processing in order to detect it.

The aim of the study was to investigate effortful and non-effortful information processing in a group of patients diagnosed with first episode depression and in a matched group of healthy controls. Considering the results from previous research on FE patients, we have reason to believe that they will show an intact ability to perform the visual search, and achieve similar performance as a healthy control group. We therefore hypothesize that there will be no significant differences in reaction times between FE patients and a matched, healthy control group of participants on effortful or non-effortful information processing in a visual attention task.

**METHOD**

**Subjects**

Thirty-one patients (16 men and 15 women) meeting the DSM-IV criteria (American Psychiatric Association, 2000) for a unipolar first episode MDD diagnosis, using MINI-International Psychiatric Structural Interviewing (Leiknes, Leganger, Malt & Malt, 1999) were included in the study. Severity of depression was assessed using the Montgomery Åsberg Depression Rating Scale (MADRS; Montgomery & Åsberg, 1979), and the cut-off was set to 20. The patients were recruited through cooperation with doctors in primary health care (N = 16) and the primary psychological health care service for students at the University of Bergen (N = 15). The patients’ ages ranged from 18 to 50 years, the mean age being 26 years (see Table 1 for demographic and clinical measures). Reported mean duration of depressive symptoms at inclusion was 1.94 months (SD = 1.19). All patients were out-patients, with no previous history of hospitalizations. At inclusion, 78% of the patients were receiving medical and/or psychological treatment and 22% had not started treatment. Two patients met the criteria of a co-morbid diagnosis of panic disorder with agoraphobia. Fourteen patients were being treated with antidepressant medication at inclusion. Thirteen patients were prescribed Selective Serotonin Reuptake Inhibitors (SSRI), one used Serotonin Noradrenaline Reuptake Inhibitor (SNRI), and one used a tetracyclic antidepressant (TeCA). Patients were excluded if they had sought treatment for earlier episodes of depression and/or if they had experienced psychotic symptoms during the depression.

The control group (N = 31) were mainly included through advertisement at the University of Bergen. The control group was individually matched with the depressed patients on gender, age, and years of education (± 2 years). Persons with a history of mental disorders, alcohol and/or substance abuse or brain damage were excluded from the study. For all subjects, vision and hearing were normal or corrected to normal.

The study was performed in accordance with the Helsinki Declaration of the World Medical Association Assembly. The Regional Committee for Medical Research Ethics and The Norwegian Data Inspectorate had approved of the study.

**Table 1. Clinical and demographic variables for the patient group and the control group**

<table>
<thead>
<tr>
<th></th>
<th>Patient group (N = 31)</th>
<th>Control group (N = 31)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>26.03±5.91</td>
<td>26.06±5.62</td>
</tr>
<tr>
<td>Years of education</td>
<td>13.97±1.68</td>
<td>14.03±1.62</td>
</tr>
<tr>
<td>IQ*</td>
<td>118.26±8.13</td>
<td>121±8.1</td>
</tr>
<tr>
<td>MADRS score</td>
<td>24.56±3.68</td>
<td>b</td>
</tr>
</tbody>
</table>

*Notes: MADRS = Montgomery Åsberg Depression Rating Scale.*

*There were no significant difference between groups on total IQ as measured by WASI.*

*Healthy control group, no history of mental illness.*

© 2012 The Authors.
Apparatus, stimuli and procedure

All participants were given information about the study and that participation was voluntary. After informed consent was obtained IQ measures were obtained by using the Wechsler Abbreviated Scale of Intelligence (WASI); two subtests were applied (Wechsler, 1999). The patients recruited through doctors had significantly higher mean age (M = 28.88, SD = 6.77) compared to the patients recruited from the primary psychological health care service for students (M = 23.00, SD = 2.59), r(19.54) = 3.23, p = 0.004. There were no differences between these patient groups in cognitive performance, years of education, MADRS score or reported mean duration of depressive symptoms at inclusion.

The experimental paradigm used was a visual search task that has previously been described in Hammar et al. (2003a, 2003b). All stimuli were presented on a computer screen in front of the subject. The target stimulus was a black rectangle in a vertical position. One type of distractor stimuli comprised black horizontal rectangles and gray vertical rectangles (see Figure 1a and b). The other type of distractor stimuli comprised black horizontal rectangles and gray vertical rectangles (see Figure 1c and d). For half of the trials, a target stimulus was presented together with the distractors. For the other half of the trials, only distractors were presented. In half of the trials there was one type of distractor. In the other half of the trials both types of distractor were presented. The idea was that trials with both types of distractor present would be a cognitive more demanding condition, requiring effortful information processing.

The experiment consisted of two blocks of 20 trials each, with 10 trials with target and one distractor type; 10 trials without target and one distractor type; 10 trials with target and two distractor types; 10 trials without target and two distractor types. There was a break of 30 seconds between the blocks. Before each trial, a fixation cross was presented for 1.5 seconds. For each trial, the visual search display stayed on until a response was made. The different displays were presented in a randomized order across trials. The subject was instructed to press the “A” key on the PC keyboard with the left hand or the right hand if the screen only consisted of distractors and to press the “L” key with the right hand if a target was present. The “A” and “L” keys are the most left- and rightward placed keys on the middle row on the computer keyboard. The stimulus presentation and recording of responses was programmed in the e-prime programming platform (http://www.pstnet.com). The experiment was presented on a Dell laptop PC screen.

Analysis

A repeated measures ANOVA was conducted to assess the performance of the patient group and control group in effortful and non-effortful conditions during the acute phase of depression. The design was a 2 × 2 factorial design with Group (First episode depressed patients and control subjects) × Condition (effortful and non-effortful cognitive processing). The data analysed consisted of reaction times (RT) in milliseconds obtained from e-Prime. Only trials with a correct response were included in the statistical analyses.

T-tests were conducted to compare the demographic variables of the groups, and clinical and cognitive differences between patients recruited from doctors and those recruited from the primary psychological health care service for students. The relationship between patients’ scores on MADRS and performance in RT on effortful conditions was investigated using the Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality and linearity.

RESULTS

There were no significant differences in age, education or measures of IQ between groups (see Table 1). There was no significant main effect of group, $F(1,60) = 0.32, p = 0.576$, partial eta squared = 0.003. There was a significant main effect of condition, WilksLambda = 0.097, $F(1,60) = 561.40, p = 0.000$, partial eta squared = 0.903. The interaction effect of Condition and group was not significant, Wilks Lambda = 0.998, $F(1,60) = 0.112, p = 0.739$, partial eta squared = 0.002. However, an inspection of the mean scores indicates that the patient group performed consistently more poorly in the cognitive effortful condition compared to the control group even though this difference was not significant (see Table 2). There was no correlation between patients’ MADRS score and performance in RT on the effortful condition, $r = -0.03, n = 31, p = 0.862$, or the non-effortful condition, $r = -0.17, n = 31, p = 0.353$.

DISCUSSION

The results support the hypothesis regarding normal information processing in FE patients. There were no significant differences between the groups regarding their reaction times either in the effortful condition or in the non-effortful condition.

These findings are consistent with previous findings showing that FE patients exhibit unimpaired cognitive abilities similar to those of healthy controls (Fossati et al., 2004; Nandrino et al., 2002; Van der Meere et al., 2011) and different from REC patients (Basso & Bornstein, 1999; Fossati et al., 2004; Karabekiroglu et al., 2010; Nandrino et al., 2004). Taken together, this would indicate that cognitive functioning in effortful information processing is normal in first episode of depression and impairment becomes evident in recurrent depression as shown in previous studies by Hammar et al. (2003a, 2003b), using the same visual search paradigm.

This study does not answer the question about whether cognitive impairment precedes recurrence of depression or the other way around, but it does say something about the cognitive abilities of individuals who seek help for the first time due to the experience of a depressive episode. Our patients show a similar functioning to a healthy control group on the visual search task. However, after investigating the data set further it is clear that the patient group show longer response times to solve the task in the effortful conditions, even though the difference in time spent was not significant between groups. This is somewhat in line with what Karabekiroglu et al. (2010) found in their comparison of healthy controls, first episode patients and recurrently depressed patients where the FE group performed between the healthy controls and the recurrently depressed, Concordant to some of the earlier studies on FE and cognitive function (Nandrino et al., 2002), the slightly poorer performance could be interpreted as an early sign of what can develop into severe cognitive impairment, as seen in recurrently depressed patients. Nandrino et al. (2002) claim that the impairment seen in recurrently depressed patients occurs as a function of the number of previous depressed
episodes. FE patients will therefore still be unimpaired or only mildly impaired. If that is truly the case, we can interpret the slightly poorer performance of our patient group as an initial emerging cognitive impairment that can, if multiple depressive episodes occur, develop into severe cognitive impairment.

Another possible explanation of the non-significant results may be that the test does not measure the type of cognitive deficits experienced during the acute phase of first time depression, even though it has proven to be a good measure for cognitive deficits in recurrently depressed patients (Hammar et al., 2003a, 2003b). If this is the case, it further underlines the importance of separating the subgroups of depression. As noted in the introduction, some findings show that even though both FE patients and recurrent depressed patients report cognitive impairment, these deficits may not be the same in both groups. In that case, further investigation is needed to establish a good tool of measurement that can properly assess the cognitive function of FE patients.

There was no correlation between patients’ MADRS scores and performance in the effortful cognitive tasks. This rules out the possibility of severity of the depression symptoms explaining the slightly poorer performance of the patient group.

The non-significant results may nonetheless be the true performance of a patient group that performs as well as a healthy control group. Based on the present findings there is reason to believe that the cognitive performance of our FE group is unimpaired in this effortful visual attention task. This emphasizes and further points out the differences between the subgroups of MDD, considering that recurrently depressed patients have repeatedly shown impaired performance on the same experimental paradigm (Hammar et al., 2003a, 2003b). However, the possibility that these cognitive functions may be visible in the subgroup of first episode patients at a later stage in the course of the disease is important to acknowledge in further research and in the treatment of this patient group. A plausible cause may be that those patients performing poorest on cognitive measures in their first episode of depression are the same patients that will experience a more chronic or recurrent MDD.

The relatively small sample size can be considered to be a limitation in the present study. However, the validity of the results is strengthened by the fact that the control group is matched regarding age, gender and IQ-level. Regardless, one should be cautious in the generalization of findings to all patients with a history of MDD. The present patient group consists of individuals who had experienced their first episodes of MDD, with moderate to severe levels of symptom load and who were outpatients in the acute phase when included in the study. Some previous findings indicate that outpatients perform better on cognitive tasks than inpatients, and that symptom severity might affect the performance as well (for review see McClintock et al., 2010). Thus, the current sample should probably not be compared to other subgroups of MDD, such as for example recurrent MDD patients, inpatients, and patients with different severity levels, as well as patients with a bipolar diagnosis or depressed patients with psychotic features. Also, the non-comprehensive nature of the paradigm used in this study limits the ability to conclude on the samples’ cognitive abilities in general, and should be interpreted only as a measure of their performance on visual attention. It will be of further interest to investigate several cognitive domains in this group, especially in longitudinal settings where course of illness and development of cognitive function are monitored.

Understanding both impairments as well as strengths in cognitive functioning in MDD across subgroups is valuable in the adjustment of treatment and prevention. It is for example important to consider cognitive strengths in the acquisition of preventive and compensatory strategies. Future studies should follow FE patients longitudinally in order to gain more knowledge of the course of cognitive functioning in this patient group.

REFERENCES


Received 1 March 2012, accepted 27 August 2012

© 2012 The Authors.
学霸图书馆
www.xuebalib.com

本文献由“学霸图书馆-文献云下载”收集自网络，仅供学习交流使用。

学霸图书馆（www.xuebalib.com）是一个“整合众多图书馆数据库资源，提供一站式文献检索和下载服务”的24小时在线不限IP图书馆。

图书馆致力于便利、促进学习与科研，提供最强文献下载服务。

图书馆导航：
图书馆首页 文献云下载 图书馆入口 外文数据库大全 疑难文献辅助工具