Depression, Antidepressants and Driving Ability

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Background
Depression is characterized by sadness, loss of interest in activities, and decreased energy. It is also well known that depression is associated with cognitive decline. Not only do depressed patients often complain about their cognitive abilities, objective cognitive assessments support the notion that at least some cognitive functions, including memory and executive functions, are impaired in depression [1-2]. Little, however, is known about the relationship between depression and driving ability. Given the energetic and cognitive deficits seen in depression, one may predict that driving ability of depressed patients may be compromised, but to date no study has compared actual driving performance of depressed patients to that of healthy subjects.

Depression is commonly treated by antidepressant drugs. Successful pharmacological therapy may reduce the negative effects of depression on driving ability, by alleviating the depressive symptoms. On the other hand, antidepressants can have serious side effects, which may adversely affect driving ability and cognition. Hence, especially in the first three weeks, before a therapeutic effect is evident, adverse effects of antidepressants may further exacerbate the already existing performance decrements due to the depressive illness itself. The importance of the present study is to gain insight in the influence of depression, as well as the time course of the interaction between depression effects and those of pharmacological treatment, with regard to driving and cognition.

Objectives
The present study examined the effect of depression on driving ability, using standardised on-the-road driving tests and laboratory tests. Furthermore, the present study was to investigate the effects of pharmacological treatment with a SSRI-type antidepressant for no more than three weeks and for more than 6 weeks, but less than one year on driving performance in patients with a unipolar depressive disorder.

Methodology
The study is conducted according to a 4-way parallel groups design. Existing data from 24 medicated-free depressed patients was used. Twenty four subjects receiving SSRI treatment for no more than 3 weeks were recruited and twenty four subjects receiving SSRI treatment for more than 6 weeks, but less than one year were recruited. Twenty four healthy subjects also were recruited. Groups are matched for age, gender, IQ and driving ability.

In the two treatment groups, only those depressed patients were recruited who received one of the following SSRI-type antidepressants: Citalopram (Cipramil®): 20-60 mg/day, Fluoxetine (Prozac®): 20-60 mg/day, Paroxetine (Seroxat®): 20-50 mg/day, Sertraline (Zoloft®): 50-200 mg/day, Venlafaxine (Efexor®): 75-375 mg/day, Fluvoxamine (Fevarin®): 100-300 mg/day
Effects of depression and drug effects were assessed using cognitive tests and two actual driving tests.

**Cognitive assessments.**
Attention, memory and reaction speed were assessed by different tasks.

Short-term memory and long-term memory was measured by the visual verbal learning test. This test is an adapted version of the auditory verbal learning test [3]. The visual change detection test [4] measures focus of attention. Selective attention is assessed by the left-right task. This is a parametric version of the well-known colour-word response conflict task [5]. DSST (Digit Symbol Substitution Task) is a computerized version of the original paper and pencil test taken from the Wechsler Adult Intelligence Scale [6], which is an indication of psychomotor speed. Critical Flicker Fusion is a measure of CNS arousal and activation [7]. Vigilance (attention) was measured by the continuous performance test (CPT) [8].

**Subjective measures**
Depression scores were assessed by the 17-item Hamilton Depression Rating Scale [9] and the Beck Depression Inventory [10]. Besides that, mood was measured by the Profile of Mood States (POMS) [11] and sleep quality was assessed by the Groninger Slaapvragenlijst [12].

**Driving assessment**
*Highway-driving Test.* In the Road Tracking Test, the subjects operates a specially instrumented vehicle over a 100 km (61 miles) primary highway circuit while maintaining a constant speed of 95 km/h (58 miles) and a steady lateral position between the delineated boundaries of the right (slower) traffic lane [13]. An electro-optical device mounted at the rear back of the car continuously measures lateral distance separating the vehicle and the left lane-line. Standard deviation of lateral position (SDLP) is a measure of road tracking error, in practical terms, a composite index of allowed weaving, swerving and overcorrecting.

*Car-following-test.* The Car Following Test [14] involves the use of two vehicles. The preceding vehicle is under an investigator's control, and the following vehicle, the subject's. The test begins with the two vehicles traveling in tandem at speeds of 70 km/h on a secondary highway. Subjects attempt to drive 15-30 m behind the preceding vehicle and to maintain that headway as it executes a series of deceleration manoeuvres. During the test, the speed of the leading car is automatically controlled by a modified cruise-control system. At the beginning it is set to maintain a constant speed of 70 km/h (43 miles), and by activating a microprocessor, the investigator can start sinusoidal speed changes reaching an amplitude of -10 km/h and returning to the starting level within 50 sec. Between deceleration manoeuvres, the investigator in the leading car randomly activates the brake lights of his vehicle by activating a second mode of the microprocessor. The subject is instructed to react to brake lights by removing his/her foot from the speed pedal as fast as possible. Headway between the two cars is continuously recorded.

**Results**
Results of the cognitive assessments and driving tests in the aforementioned populations will be presented, but were not available at the time of abstract submission. It was hypothesized that an unmedicated depressive episode would be associated with impaired driving ability and cognition when compared to performance of healthy controls. We
further expected that patients with major depressive disorder receiving SSRI treatment for no more than 3 weeks have a similar or reduced level of performance on actual driving and cognitive assessments as compared to unmedicated patients. Furthermore, we expected that patients receiving SSRI treatment for more than 6 weeks have a similar level of performance on driving and cognition compared to healthy control subjects.

References