Progress with MINDS, a testmanager for psychological assessment, research and education. Applications in the forensic psychiatric domain.

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ABSTRACT

Testmanager MINDS is a program package running on Windows platforms, for administration of automated neuropsychological tests and questionnaires for use in several assessment settings, in research and for use in education. Administration of a test and report (or further processing) of test results is organized by separate modules. Continuously, test- and other modules, tables of norms are added to the package. Five newly developed test modules, specifically applied for use in forensic psychiatric settings, are presented. Applications of interest in this field particularly consist of tests for processing emotional material e.g. recognition of emotional expressions, and tests appealing to frontal lobe functions such as impulse control, planning and concept shifting. Instruments for assessment in these domains have been integrated into a testbattery ("forMINDS") and are currently being used in several forensic clinics. Preliminary results, comparing the performance of intramural forensic psychiatric patients with that of healthy control subjects, are presented at the congress.

INTRODUCTION

MINDS encompasses a growing number of automated neuropsychological tests and questionnaires. Its development started in the early nineties [1,2] in order to offer a flexible tool for use in psychological assessment, research and education. The program can be applied in several types of psychological settings with various target populations, e.g. child care institutions, psychiatric settings and other mental health care institutions. For this use most test modules have been supplied with several tables of norms, tables that can be adjusted by the publishing bureau or by the user. In addition, Minds can be used in specific research projects, since every test module has been equipped with a facility to quickly aggregate data into an SPSS file. Finally, Minds is currently being used in several practically-oriented psychology courses, where it runs on a network for student computers.

Recently, there is growing interest in Minds from forensic psychiatric settings. Applications of interest for work with the forensic population particularly consist of tests for the processing of emotional material, tests appealing to frontal lobe functions e.g. impulse control, planning and concept shifting, and tests for moral reasoning. This especially appeals to function domains which are problematic in borderline and antisocial personality disorder [3]. For that reason, several applications were developed and added to the assortment of performance test modules in Minds. These test modules are presented below.

The organization of Minds is quite flexible and intuitive. Menus for performance tests, questionnaires and other system parts can be adapted in order to suit the users' demands. Test modules and other parts are represented by pictograms that can be made visible or invisible at will. In principle, the administration of a test module is apart from the presentation of its outcome, by way of a separate report module. In addition, most test modules in Minds have a number of task parameters (e.g. time parameters,

number of trials, etc), which can easily be adjusted. Most questionnaires in Minds are administered by a common program (QUEST) and outcomes are likewise reported by a common report module (REPORT). In addition, Minds is standardly equipped with a "wizard" for implementing a new questionnaire.

TEST MODULES FOR THE FORENSIC SETTING

The following test modules developed for diagnostic use with forensic populations (embedded in a testbattery called forMinds) are currently being used in several forensic clinics to evaluate their usefulness in treatment planning and monitoring of treatment effects.

AFFGO, an affective Go-Nogo task

In this task the participant is only required to react to stimuli with a predefined affective load and to restrain responses to other stimuli. There are 3 categories of stimuli: positive and negative emotion, and neutral. The task can be set up as pictorial or verbal. In the pictorial version stimuli consist of pictures from the IAPS database [4]. In this collection pictures have been classified on values for affective and arousal. The verbal version uses words from the CELEX database. A response is given by pressing the spacebar. Up to 6 trial blocks may be predefined, with changing categories of stimuli. For each block it is possible to vary the proportion of GO and NOGO trials (default: 2:1). A short practice session precedes each block, in order to learn the distinction between the two affective categories being used in the block. Outcome variables are the mean reaction time (RT) and error percentages.

CASINO Game, a shift reversal learning task

This is a reversal shift task, intended to define in what way a participant is able to learn changes in response-outcome contingencies. It is based on the work of Cools et al. [5], and is operationalized as a casino game. In this game only two playing cards are used, and in the instruction the participant is presented as the casino manager. His task is to predict, on the basis of previous outcomes, whether an imaginary casino visitor wins or loses at drawing one of the 2 cards. Which of the two cards is winning, changes from time to time, and this shift depends on the participant's predictions. That is, a shift takes place following a predefined number of correct predictions.

The task may be administered as two series of 3 blocks of trials (with the first block as a practice block, followed by 2 test blocks). In one series there is only one valence condition. Valence is defined on the basis of the shift in the series practice block (unexpected gain or unexpected loss). For instance, a setting as "Gain-Loss" results in the series order: Unexpected Gain followed by Unexpected Loss. In a "Loss-Gain" setup this order is reversed. Interval times and feedback type can be preset, as well as number of trials within blocks. In the practice blocks there are learning criteria for acquisition reversal.

IDED, an internal-external dimension learning task

This task is intended to measure response reversal and the ability to concept shifting, i.e. to switch between an internal and an external dimension. The task is based on work from Mitchell et al. [6]. On the basis of visual feedback (correct / wrong) participants learn to choose between 2 stimuli that may consist of 2 dimensions: shape and line pattern. The task consists of 9 stages in a fixed order, with changing target dimensions, of which the last 4 are crucial: Intra Dimensional Shift and Reversal, and Extra Dimensional Shift and Reversal. At each stage the rule to be learned changes, and the next stage is only started after reaching the (predefined) learning criterion in the current stage. According to Mitchell [6] this task can discriminate between two functions of the frontal cortex: response reversal and interdimensional shift learning. The proportion of errors at each stage is the main dependent variable although latencies are also registered.

Stop-Signal task

In this task inhibition control (impulsivity) can be measured [7]. It is a two-choice GO-NOGO task, where the Go-stimulus requires a left or right hand response. On some trials shortly after the onset of the Go-stimulus a Stop signal is presented, requiring to restrain from responding. Several stimuli for Go and Stop signal are available, and the Stop signal can be visually, acoustically or combined. An important parameter is the interval between onset of Go signal and Stop signal. The number of trials and trial blocks can be preset, and for each block a separate proportion of Stop trials can be preset.

GERT, Gradual Emotion Recognition Task

In this task, photographs of faces [8] are presented, portraying an emotional expression in a certain gradation. Task is to recognize, as quickly as possible and with the least possible mistakes, the emotion presented. The material consists of

expressions of 6 emotions (anger, fear, sadness, disgust, happy and surprise), as well as the neutral expressions produced by 10 experienced actors. The pictures are in black and white and facial surroundings are omitted. Ten different gradations from each emotion have been made by way of a "morphing" technique, with steps of 10%. A researcher may predefine a task selecting stimuli from any of the emotions, actors and gradations. The task can also be preset in so-called continuous mode, in which an emotion is presented as in a film starting from the neutral face up to 100% emotion. Outcome variables are RT and accuracy for each emotion, actor and gradation. In addition a confusion matrix is supplied.

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