VIENNA TEST SYSTEM NEURO
Tests and Training Programs for Neuropsychology
For queries and catalog orders
Mon. – Thurs.: 8 a.m. – 5 p.m.
Fri.: 8 a.m. – 2 p.m.

Email
info@schuhfried.at

Callback service
Free Call via www.schuhfried.com

Telephone
+43 2236 42315

Fax
+43 2236 46597

Website
www.schuhfried.com

Address
SCHUHFRIED GmbH
Hyrtlstrasse 45
2340 Moedling
Austria

Help Desk
Queries on installation and operation for our customers
Mon. – Thurs.: 8.30 a.m. – 4.30 p.m.
Fri.: 8.30 a.m. – 1.30 p.m.

Email
support@schuhfried.at

Telephone
+ 43 2236 42315-60

Your own personal online demonstration of the Vienna Test System
Fast, efficient, personal: Upon request a member of the SCHUHFRIED team will – in the same way as at a webinar – take you through the Vienna Test System online and answer your questions on computerized psychological assessment. All that you need for this personal consultation is a telephone, a computer with internet access and a little time.

Email
info@schuhfried.at

Telephone
+43 2236 42315

Get in touch!
Cognitive training
cOGniplUS
Psychological assessment
Vienna Te ST S YSTeM
Multimedia system
Biofeed Back 2000
x-pert

For the sake of readability the masculine form has been used throughout to designate both genders.

Media owner and editor: SCHUHFRIED GmbH
Place of publication: Moedling
Publisher: Paul Gerin Druckerei, Wolkersdorf
Editor-in-chief: Doreen Kallweit | KURZ und KALLWEIT
Responsible in law: Gerald Schuhfried

Graphics: Johanna Kurz, Vienna, www.kurzundkallweit.at
Photos: SCHUHFRIED GmbH, Shutterstock.com: Yuri Arcurs (Cover, S.3, 4, 18, 19, 25, 26, 29, 30, 57, 62, 64, 66, 67, 69), angizzard (S.5), Marychnenko Oleksandr (S.10), Daboost (S.16), mkabakov (S.16), StockLite (S.16), digieye (S.17, 69), Digital Genetics (S.17), Sergej Khakimullin (S.24-25), Konstantin Sutyagin (S.25), Lisa F. Young (S.25), Polina Nefidova (S.25), granata1111 (S.25), wavebreakmedia ltd (S.26, 29), oly (S.26), Sandra van der Steen (S.28), Kzenon (S.30), Dianne McFadden (S.31), idea for life (S.34-61), Konstanttin (S.26, 30), Pieter Beens (S.68), Peshkov Danii (S.69), istock: R-J-Seymour (S.70), pixelio.de: stummi123 (S.5)

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Using psychological tests for neuropsychological and clinical psychological purposes

Neuropsychological tests can be used in many different contexts:
› to determine current cognitive and affective state
› to obtain objective information about disabilities and any resulting social and professional handicaps
› to evaluate rehabilitation options and the possibility of reintegration into work; to plan rehabilitation measures
› change assessment: to identify changes in cognitive and affective functions over the course of a disease, or to assess the effects of therapy
› to describe the results in medical reports or expert opinions


Use in neurological disorders
Psychometric tests provide objective information about cognitive disabilities and their statistical norms help in the grading of disorders/injuries. Neuropsychological deficits can be observed in the following neurological disorders, among others:
› craniocerebral trauma
› Parkinson's disease
› multiple sclerosis
› cerebrovascular accident
› epilepsy

Use in mental disorders and psychiatry
Psychiatric patients often display impairments in the areas of attention, memory and the executive functions. Assessing these impairments by means of neuropsychological tests plays a major part in confirming a diagnosis (including in the early, pre-psychotic stages of the disease) and in planning therapy. Mental disorders in which neuropsychological functions may be impaired include:
› anxiety disorders
› affective disorders
› schizophrenia
› personality disorders
› attention deficit/hyperactivity disorders (ADHD)
› alcohol dependency
Advantages of the Vienna Test System NEURO

Precise assessment
- Computer-based neuropsychological tests guarantee the reliability of the assessment process through standardized instructions, practice phases and error-free scoring.
- Administration of the tests on a computer enables patients’ time-critical responses to be measured with a high level of precision.
- The test protocol provides exact details of the patient’s response behavior on an item-by-item basis. It contains structured and easily understood details of each selected answer, the exact working time and any corrections that were made to the answer.
- Determining the type and location of a brain injury by means of imaging techniques and appative tests provides initial indications of possible function impairments. Neuropsychological tests enable these function impairments to be assessed both qualitatively and quantitatively; the test results provide information about the extent and nature of a deficit.

Flexibility
In accordance with the issue under investigation and your hypothesis, you can select tests yourself in the Vienna Test System and combine them into test batteries. In addition the Vienna Test System NEURO contains test sets compiled by experts that are tailored to a specific disorder and cover the most important dimensions relevant to the disorder.

Economical assessment
- Standardized computerized instructions and practice phases reduce the time needed for test instructions.
- By comparison with manual scoring of paper-and-pencil tests, computerized scoring saves a huge amount of time. With the Vienna Test System NEURO all test results are compiled automatically and free of calculation errors and are available as soon as testing ends.
- The Word Reports with readymade text segments that are included in the Vienna Test System NEURO make report writing easy.
- The user-friendly administration software makes data management efficient and straightforward.

Extensive norms
Extensive norm samples are available in the Vienna Test System NEURO. It is possible to select norm samples based on gender, education or age as well as the total norm sample. For many tests the comparison group includes people aged over 85. The norms of all tests are revised at least every eight years.

Linking assessment, training and evaluation
The Vienna Test System NEURO is complemented by the computer-based program CogniPlus, which can be used to train cognitive functions. The neuropsychological tests and evaluation procedures in the Vienna Test System NEURO and the CogniPlus training programs are inter-coordinated. The corresponding tests and training modules address identical cognitive functions and are based on the same theoretical models.

Patient-friendly input devices
For ease of input, two special ergonomic keyboards have been developed. They make it easy for people with motor disabilities or those with little computer experience to work the tests.

Parallel versions
The Vienna Test System NEURO contains many parallel versions of tests that help to avoid practice, memory and learning effects when tests are administered for change assessment.
The path to your Vienna Test System NEURO

WHAT DO I WANT TO TEST?

Questions to ask:

How many times a year will I test?
Will I test regularly or sporadically?
Will I test locally or at different locations?
Do I want testing to be supervised or not?
Do I want to use a desktop PC, a laptop or a tablet computer for testing?
Do respondents need to be tested online?

Content

NEURO

How do I want to test?

Testing at a single fixed workstation (desktop PC)
Testing at a single mobile workstation (laptop, tablet computer)
Testing with a test system network in a local network
Testing with a networked system in geographically dispersed or global networks
Online testing with administration software

You need:
Administration software incl. dongle
= Web Direct Testing in the SCHUHFRIED-Webshop

Setting

Questions to ask:

What abilities/traits/possible deficits do I want to identify?

Disorder
Establishing current cognitive and affective state
Forming an objective picture of function impairments
Change assessment
Preparing a report

Introduction

Questions to ask:

How many times a year will I test?
Will I test regularly or sporadically?
Will I test locally or at different locations?
Do I want testing to be supervised or not?
Do I want to use a desktop PC, a laptop or a tablet computer for testing?
Do respondents need to be tested online?

What abilities/traits/possible deficits do I want to identify?

Disorder Establishing current cognitive and affective state Forming an objective picture of function impairments Change assessment Preparing a report

Online testing without administration software

= Web Direct Testing in the SCHUHFRIED-Webshop
Pricing Models
- Unlimited testing
  7-year flat rate
- Charging by test administrations
  50 test administrations
  1 test administration

Included at no extra cost:
- Variety of Norms and Language Versions
  - Administration software in 14 languages
  - Test presentation in up to 27 languages
  - Scoring of results in up to 14 languages
  - During translation tests are adapted if necessary to different cultural environments

Testing
- Accessories required in some cases

Tests
- A–Z
- Test type
- Dimensions list for NEURO
- Free advice from your advisor

Test-sets
- Combination of test dimensions
- 14 test sets for HR, Neuro, Traffic and Sport
- With manual, report and profile evaluation
- Based on validation studies or relating to standards or guidelines
- Accessories required in some cases

COGBAT Cognitive Basic Assessment
DRIVESC Fitness to Drive Screening
If necessary, test sets from other sectors can also in integrated into your Vienna Test System NEURO (see main catalog for details).

Test batteries
- Compiled by you from individual tests
- Accessories required in some cases

I need advice.

Consulting
- Test (battery) creation
- Test administration
- Scoring of test batteries
- Validation studies
- Norming
- Reports

Free services
- Demo version
- Online presentation
- Help desk

I've still got questions! or
I want to know more!

Vienna Test System Neuro
### Overview of all the dimensions in the Vienna Test System NEURO

The Vienna Test System NEURO can be used to assess all relevant neuropsychological functions and subfunctions. This page provides a summary of all these dimensions. A similar dimensions list is included in each Vienna Test System NEURO. It enables you to find the right tests for a particular issue more quickly.

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<td>FBS</td>
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</table>
Testing with the Vienna Test System NEURO

The user interface of the Vienna Test System NEURO

The user interface of the Vienna Test System NEURO contains the following tabs.

**SETTINGS tab**
- Here you can adjust the default settings of your Vienna Test System NEURO.
- Define access authorizations. One Vienna Test System can be used by several people: each person has a separate login and can save their favorite settings.
- Install new tests and test sets or activate license extensions.
- Define accessories or special input devices.

**PERSON tab**
- Enter new respondents/clients or edit the data of those already in the system. You can enter the information manually or import it from other databases.
- As well as using the standard entry fields, you can add other fields of your choice.
- Use the “Visible/Invisible” option to conceal personal information and maintain greater anonymity.
- Assign each person a language in which testing will be carried out by default.
- Use the “Web testing” option to send out email invitations to online testing.

**TEST tab**
- Here you will find all the functions needed to start a test session.
- Choose between dimensions, tests, test sets and test batteries.

**RESULT tab**
- View all the results of a test session in various formats (e.g. table, profile).
- As scoring methods you can choose between individual scoring, test battery scoring, cross-dimension scoring, test set scoring and profile comparison of test repetitions.
- Import or export raw and/or norm scores on the test variables.

*Data protection*
The Vienna Test System NEURO includes functions that prevent unauthorized use of the system and the data – especially personal data – collected by it. Access can be authorized at different levels by means of passwords.

Read more... about test results and test scoring. page 12
Test selection and administration

Test selection

Select a respondent and decide whether you want to administer a test, a test set or a test battery. The "Dimensions" option helps you find the right test. Click on the trait that is to be tested. The Vienna Test System NEURO then suggests the most suitable test or test form.

Testing

Simply click the “Start testing” button. Testing begins and proceeds as follows:

Instructions
Each test begins with instructions, in which the task is described.

Practice phase
A practice phase then follows to check whether the respondent has understood the task. If he has not, the test administrator can intervene. The instructions and the practice phase are often linked and contain a series of stages based on the principles of programmed learning.

Test phase
The respondent now works the test items. There is no involvement of the test administrator at this stage; this ensures a high level of objectivity.

Worth knowing
Detailed information on these procedures and explanations of the menu options can be found in the main VIENNA TEST SYSTEM catalog.
Test results, test scoring and output of results

As soon as testing has finished, the results are available. The results are shown in clear and easily understood form in a table, a chart (“profile”) and a Word report.

RESULT tab
Testing with the Vienna Test System NEURO

Table
The table lists the results and relates them to the scores of a comparison group. It shows the test variables, the raw scores obtained, and the corresponding norm scores. The norm scores compare to either an overall sample or, where appropriate, to subsamples based on age, gender, educational level or other criteria. The raw scores can be compared with the relevant groups, depending on the requirements of the specific situation.

Profile
This chart enables the results to be taken in at a glance. The normal range is shaded grey, so that deviations are immediately obvious. The diagram can be copied into MS Office® documents by using Copy/Paste.

Word report
A report template is provided for all test sets and tests. Clicking on "Word report" incorporates the test results into this report template. This report can be edited (e.g. to add a logo or to adapt to the required corporate design or corporate wording), printed and saved using Microsoft Word®.

A large number of report templates have already been prepared: they give the dimensions that were tested, describe how the respondent scored and explain how the results are to be interpreted. Examples illustrate the significance of the dimensions. The report’s scope and the way in which the results are described can be varied for different purposes (e.g. expert opinion or patient records).

Example of test scoring

### Table

<table>
<thead>
<tr>
<th>Perception and Attention Functions: Alertness (WAFA)</th>
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<tbody>
<tr>
<td>Test administration: 16.06.2012</td>
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<table>
<thead>
<tr>
<th>Test results</th>
<th>Norm sample</th>
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<td>Test variable</td>
<td>Raw score</td>
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<tr>
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<tr>
<td>Mean reaction time, corrected for age</td>
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<tr>
<td>Dispersion of reaction time</td>
<td>54</td>
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<tr>
<td>Number of &quot;missed reactions&quot;</td>
<td>6</td>
</tr>
<tr>
<td>Number of &quot;false alarms&quot;</td>
<td>3</td>
</tr>
</tbody>
</table>

| Alertness auditory (intricate) | | | | |
| Mean reaction time | 36 | 76 (62-86) | 57 (43-62) |
| Mean reaction time, corrected for age | 360 | 0.693 | 56 (42-66) |
| Dispersion of reaction time | 15 | 109 | 10 |
| Number of "missed reactions" | 6 |
| Number of "false alarms" | 6 |

Comment: Alertness visual is a comparison with the entire comparison sample "Norm sample". The confidence intervals given in parentheses refer to the comparison scores have a 95% probability of error.

### Profile

<table>
<thead>
<tr>
<th>Alertness visual (intricate)</th>
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<tbody>
<tr>
<td>Mean reaction time</td>
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<tr>
<td>Mean reaction time, corrected for age</td>
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<td>Dispersion of reaction time</td>
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<table>
<thead>
<tr>
<th>Alertness auditory (intricate)</th>
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</thead>
<tbody>
<tr>
<td>Mean reaction time</td>
</tr>
<tr>
<td>Mean reaction time, corrected for age</td>
</tr>
<tr>
<td>Dispersion of reaction time</td>
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</tbody>
</table>

<table>
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<tr>
<th>PR</th>
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<tbody>
<tr>
<td>1.4</td>
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</tbody>
</table>

Comment: The shaded area represents the normal range, as seen on the norm score scale.

### Progress chart

- Reaction time in milliseconds - Alertness visual (intricate)
- Reaction time in milliseconds - Alertness auditory (intricate)
Accessories

Most of the tests in the Vienna Test System NEURO can be worked with the mouse and keyboard. For some, however, special input devices or accessories are needed.

Input devices: Response Panels

Two ergonomic Response Panels have been designed for simple input and can be used for many tests. These input devices can increase motivation and acceptance in clients who find the mouse, computer or touch screen difficult to use.

Standard Response Panel

- 7 color keys
- 10 number keys
- 1 sensor key
- connection for foot-operated keys
- 2 USB connections

Universal Response Panel

- 2 twist knobs
- 2 analog joysticks
- 7 color keys
- 10 number keys
- 1 sensor key
- connection for foot-operated keys
- 2 USB connections

Worth knowing

The Standard and Universal response panels can also be used as input devices for CogniPlus.
Hardware

Motor performance series

Needed for the test:
MLS Motor Performance Series

The Motor Performance Series is a highly reliable test that has been developed from Fleishman's factor analysis of fine motor skills. Both dynamic and static dimensions of finger/hand/arm movement are measured.

The MLS Work Panel features:
- holes of different diameters for steadiness, one- and two-handed
- a groove with several bends and angles for line tracking, one-handed
- 2 x 20 contact points for aiming, one- and two-handed
- 25 small holes on both left and right sides for inserting pins, one- and two-handed
- two small metal plates for tapping, one- and two-handed
- USB connection

Flicker tube

Needed for the test:
FLIM Flicker/fusion Frequency

The flicker frequency analysis measures CNS activation (arousal).
- stimulus light from 10.0 to 80.0 Hertz in steps of 0.1 Hertz
- minimal influence of extraneous physiological and physical variables

Peripheral perception

Needed for the test:
PP Peripheral Perception

The Peripheral Perception test measures the ability to perceive and process peripheral stimuli.
- peripheral display: light diode matrix, 8 rows and 64 columns on each side
- light stimuli from the center to the periphery of the visual field
- ultrasound distance measurement determines head position

Hardware programs

Hardware test

The Hardware Test can be used to test the functioning of the individual components of the Test System. Upon completion of the test a report appears on the screen and can be printed out if necessary.

Calibration Module

The time-critical tests of the Vienna Test System are designed to identify and compensate for delays in stimulus output that arise for technical reasons. This enables reliability to be guaranteed to within about three percentile rank points. In areas in which even greater reliability is needed, use of the Calibration Module is recommended. This enables measurement to be accurate to the nearest percentile rank, irrespective of the computer system used.
The setting

Regular or occasional testing? Local or global?
Find the ideal test setting for your requirements.

Local testing
The administration station and the test station are on the same computer (PC, laptop).

Testing at an individual workstation with a desktop PC
The classic setup: the Vienna Test System NEURO is installed locally on a desktop PC. The test administrator and the client both work at this workstation. The test administrator carries out the administration. The client then works the tests.
If required, two monitors can be connected. One monitor is used solely to work the tests. The test administrator observes the test process on the second monitor and can intervene if necessary.

Testing at an individual workstation with laptop or tablet computer: mobile testing
This works in the same way as testing at an individual workstation with a desktop PC, the only difference being that the Vienna Test System NEURO is installed on a laptop or tablet computer. Using a mobile device enhances flexibility, since testing can be carried out anywhere. SCHUHFRIED can supply a practical carry case (with or without laptop compartment) for transporting accessories such as foot pedals and the response panel.

Worth knowing
Do you sometimes want to test on a desktop PC and sometimes on a laptop or tablet computer? Or test on a tablet computer and then transfer the data to a desktop PC and manage it there? You can buy one Vienna Test System NEURO, install it on multiple computers and carry out testing by inserting a dongle (= a USB stick containing the test license or the license for the system) into the machine that is currently in use.
Testing with the Vienna Test System NEURO

Decentral testing
The administration station and the test station are on different computers.

NEW Online testing without administration software: Web Direct Testing

You can now test without administration software – and hence without needing to install anything!
To carry out online testing without administration software:
1) Register in the SCHUHFRIED webshop (www.schuhfried.com).
2) Select the required test(s) or test sets, then go to the checkout and pay for them.
3) You will immediately receive a code via which the tests can be started. Pass this code on your testee.
4) As soon as the testee has finished the tests, you will be emailed a pdf with the results.

NEW Online testing with administration software

Utilize the advantages of the administration software and of online testing. In this case the Vienna Test System NEURO is installed not on a PC but on a server (within your company or at SCHUHFRIED).

Testing with a networked system in geographically dispersed or global networks

The advantage of this scenario is that central management of data is combined with decentral testing of individuals, wherever they may be.

The key features of a networked test system are as follows:
- Testing requires an intranet or an internet connection.
- All client management, defining of test batteries and scoring of results takes place centrally via a computer.
- Clients can be tested simultaneously at different locations. The Vienna Test System NEURO is installed on each computer that is used for testing.
- On the central computer access authorizations can also be defined.
- Test administration licenses can be purchased centrally and then distributed to the decentral systems.

NEW Web-based test presentation is now available.

Integrating the tests into existing management systems

The Vienna Test System NEURO is easy to integrate into existing workflows and software programs such as the clinic IT environment. The customizable interface in the Vienna Test System NEURO facilitates integration and data exchange. The benefit to you: you start the tests from an administration interface with which you are familiar – this makes the system easy to use and boosts efficiency.

System requirements
For up-to-date information on system requirements visit www.schuhfried.com.
**Targeted therapy of cognitive deficits with CogniPlus**

CogniPlus is a scientifically based program for training attention, executive functions, memory, neglect/visual field, spatial processing and visuomotor skills. It is closely coordinated with the Vienna Test System NEURO, enabling training needs to be identified from the results of neuropsychological tests and training progress to be monitored by means of tests.

CogniPlus is scientifically based, incorporates up-to-date psychological findings and covers all the important areas of cognitive training. Studies of the specificity of attention therapy (Sturm et al., 1994) show that in some cases training programs that are not tailored to the impaired function can actually have a deleterious effect. CogniPlus meets this need for specificity and ensures that relevant dimensions are trained and improved.

It is available in 16 languages at no extra cost, which means that the majority of clients can train in their native language. In addition, the close links between CogniPlus and the Vienna Test System NEURO means that assessment, training and evaluation can be economically coordinated.
Many prominent scientists have worked with experts at SCHUHFRIED to develop CogniPlus. Extensive experience combined with the know-how of the best of the best makes CogniPlus one of the most advanced cognitive training programs on the market today.

Firm foundations: In 1993 Prof. Walter Sturm and his colleagues developed the AIXTENT training program for the treatment of attention disorders. Efficiency studies showed that training must be deficit-specific if it is to be effective. Building on this insight, SCHUHFRIED worked with Prof. Sturm to produce a second-generation version of AIXTENT (AIXTENT II), which later became known as CogniPlus.

1 Developed by prominent scientists

Each CogniPlus training program is tailored to a specific deficit, because studies have shown that use of over-complex training programs may actually cause performance to deteriorate. Training programs are only offered for cognitive functions that are scientifically proven to be trainable.

2 Based on a function-specific intervention approach

CogniPlus training programs are always developed in the light of the relevant up-to-date scientific literature. Theory-led design is a top priority. All our partners are noted for their theoretical expertise as well as their practical clinical experience.

3 Embedded in a context of scientific theory

Clients want to apply their improved skills as quickly as possible in everyday life. In CogniPlus the ability dimensions being trained are almost always embedded in lifelike scenarios. This has been achieved through collaboration with computer game programmers, who have produced impressive three-dimensional scenes. It is this appealing, modern and motivating appearance that makes CogniPlus popular with clients.

4 Realistic and motivating design

CogniPlus is an intelligent interactive system which is neither too easy nor too difficult for the client. It reliably identifies the client’s ability level and adapts automatically to it. One of the conditions for successful training is thus met: the users of the program are motivated.

5 Adapts automatically to the client’s ability

The CogniPlus training programs can be used across the entire ability range. This opens up completely new opportunities for use alongside the traditional areas of application such as the rehabilitation of patients with brain damage. For example, CogniPlus can be used to improve the driving-related skills of people convicted of traffic offences, to improve the attention of children with ADHD, or to improve the mental activation of patients with MCI.

6 Training at all ability levels

The Aixtent training programs, which led to the development of the CogniPlus attention training modules, are listed with recommendation strength A in the guidelines of the Society for Neuropsychology (Gesellschaft für Neuropsychologie – GNP, 2009) and the German Society for Neurology (Deutsche Gesellschaft für Neurologie – DGN, 2008).

7 Recommended by respected institutions
The Test – Training – Evaluation concept

To enable assessment, training and subsequent analysis of effectiveness to be efficiently linked, the CogniPlus training programs are coordinated with the tests in the Vienna Test System NEURO. The corresponding tests and training programs are based on the same theoretically clearly defined constructs. However, the tests and training programs do not use the same tasks. This enables a reliable distinction to be made between the material-specific learning effect and the material-independent training effect which is being aimed at.

The process

The first step in planning cognitive training measures is a reliable assessment of the client’s condition. This can be achieved partly by using psychological tests, such as those contained in the Vienna Test System NEURO. Testing with the Vienna Test System NEURO provides an automatic classification of the client’s ability by comparison with norm scores.

On the basis of the test results, training programs can be selected and a training plan compiled. Both the programs and the training plan focus specifically on the dimension in which the tests have identified deficits.

At the end of the training plan, the effectiveness of the training scheme is evaluated by re-testing the client with the Vienna Test System NEURO. Depending on the outcome, training can then be continued or terminated.

Read more

... about CogniPlus in the COGNIPLUS catalog.
## Training

1. **Test**

   - **VIENNA TEST SYSTEM**
     - Psychological assessment

2. **Train**

   - **COGNIPLUS**
     - Cognitive training

3. **Evaluate the success of training**

### Table: Specific Functions and Training Tools

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Specific Function</th>
<th>Vienna Test System</th>
<th>CogniPlus</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attention</strong></td>
<td>Alertness</td>
<td>WAFA</td>
<td>ALERT</td>
</tr>
<tr>
<td></td>
<td>Vigilance</td>
<td>WAFV</td>
<td>VIG</td>
</tr>
<tr>
<td></td>
<td>Selective</td>
<td>WAIS</td>
<td>SELECT</td>
</tr>
<tr>
<td></td>
<td>Focused</td>
<td>WAFF</td>
<td>FOCUS</td>
</tr>
<tr>
<td></td>
<td>Divided</td>
<td>WAFF</td>
<td>DIVID</td>
</tr>
<tr>
<td><strong>Neglect/visual field training</strong></td>
<td>Visuo-spatial attention</td>
<td>WAFF</td>
<td>SPAC</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>Visuo-spatial</td>
<td>CORSI</td>
<td>VISP</td>
</tr>
<tr>
<td></td>
<td>Spatial encoding</td>
<td>CORSI</td>
<td>CODING</td>
</tr>
<tr>
<td></td>
<td>Updating – visual</td>
<td>NBN*</td>
<td>NBACK</td>
</tr>
<tr>
<td></td>
<td>Updating – spatial</td>
<td>CORSI</td>
<td>DATEUP</td>
</tr>
<tr>
<td></td>
<td>Learning of face-name associations</td>
<td>FNA*</td>
<td>NAMES</td>
</tr>
<tr>
<td><strong>Executive functions</strong></td>
<td>Response inhibition</td>
<td>INHIB</td>
<td>HIBIT*</td>
</tr>
<tr>
<td></td>
<td>Planning and action skills</td>
<td>PAD*</td>
<td>PLAND</td>
</tr>
<tr>
<td><strong>Spatial processing</strong></td>
<td>Mental rotation</td>
<td>3D</td>
<td>ROTATE</td>
</tr>
<tr>
<td><strong>Visuomotor skills</strong></td>
<td>Visuomotor coordination</td>
<td>2HAND</td>
<td>VISMO</td>
</tr>
</tbody>
</table>

* in implementation
Therapeutic intervention with Biofeedback

With Biofeedback 2000®-pert, the biofeedback system from SCHUHFRIED, skin conductance, temperature, pulse, motility, muscle tension (EMG), breathing, EEG and heart rate variability can be measured, displayed and trained.

Biofeedback is used to influence psychophysiological processes by altering specific physiological parameters. This drug-free and highly effective method is used in the following areas:

- Pain therapy and treatment of psychosomatic disorders
- Health management (stress prevention and reduction)
- Psychotherapy
- Rehabilitation of neuromuscular impairments

The modular design of Biofeedback 2000®-pert

The basic module of Biofeedback 2000®-pert contains the management software with numerous additional functions together with five training programs.

Management software

- The user interface is clearly laid out and easy to understand.
- An extensive library of background pictures and music enables training sessions to be adapted to the individual user.
- The evaluation is well structured and designed with clarity in mind.

Training programs

The basic software module contains the following basic training programs:

- Line feedback
- RESP relaxation exercises
- Threshold training
- Volume feedback
- Audio feedback

A wide range of treatments can therefore be carried out using the basic module alone. For additional applications, special training programs can be added to the basic module. All the software and hardware modules of von Biofeedback 2000®-pert can be used in any combination. The system can thus be personalized and is highly flexible. If you extend the scope of your activities, additional modules can be quickly and easily added to the existing system to suit the new requirements.

Use in a wide range of settings thanks to Bluetooth®

In Biofeedback 2000®-pert the readings are transmitted to the computer via Bluetooth®, which means that no cable is needed. This ensures that the client has maximum freedom of movement and finds the experience relaxing. The measurement sensors used by the radio modules are highly sensitive yet also highly stable against artifacts. All the sensors are easy to use: color-coded jack plugs and quick-connect components make the system quick and easy to set up. The sensors can be used with all commonly used disposable electrodes.

Verified quality

Biofeedback 2000®-pert meets the requirements of the German Medical Products Act and is registered with the FDA. The SCHUHFRIED company has ISO 9001 certification.
Selected Biofeedback 2000®-pert programs (in alphabetical order)

**BFBEL – Tolerance test**
- psychosomatic disorders
  The aim of the program is to identify how the client reacts in an active stress situation.

**BFEEG – Electroencephalography**
- ADS/ADHD therapy
  The feedback in this form of training enables the client to consciously influence brain activity in various frequency ranges.

**BFHRV – Heart rate variability**
- stress reduction, stress prevention
  The training aims to achieve coherence of breathing, pulse and blood pressure. Three different training programs are available; they provide information about current stress levels and the client’s ability to relax.

**BFEMG – EMG relaxation exercises**
- pain therapy, chronic pain
  The client attempts to deliberately relax tense muscles. Either line feedback or threshold training can be used. For cervical syndrome and back pain readings can be taken from the left and right side of the back simultaneously. The program displays the readings on the same axis so that the two muscle tensions can be directly compared.

**BFKON and BFVID – Confrontation training with picture sequences or video**
- anxiety disorders
  The system automatically shows a picture sequence that induces anxiety or arousal. The client learns to influence how the autonomic nervous system responds, thus controlling his anxiety. Because of its responsiveness, skin conductance level is a suitable indicator of anxiety or internal tension. However, as the various vegetative systems respond differently in different clients, a range of different parameters should be monitored.

**BFMUSK – Neuromuscular rehabilitation**
- muscle building, incontinence training
  During rehabilitation the client trains specific muscle groups with the aid of a target graph. The aim is to increase the degree of control over muscle tension and to gradually develop the strength of the muscles involved.

**BFREC – Voice and video recorder**
- illustrating psychophysiological relationships
  The voice and video recorder can be used during a therapeutic conversation to record the conversation itself in words and images at the same time as physiological parameters. In the review after the session, conspicuous responses in the autonomic nervous system can be matched precisely to the topics being discussed. Signals from up to seven radio modules can be transmitted simultaneously. This enables the physiological parameters of a number of people to be monitored in a group setting if required.

**BFRESP – Breathing exercises**
- relaxation
  This procedure uses the display of an ideal respiration curve to help the client learn an efficient and relaxing style of breathing. The program first analyzes the client’s breathing pattern. It uses this to calculate an ideal respiration curve. The client then attempts to match his breathing to the curve.
The Test Sets

Combinations of tests for complex assessment issues

Since a complex assessment issue cannot be handled satisfactorily by using just one test, several tests or test dimensions need to be combined. The new test sets in the Vienna Test System meet this need and ensure appropriate correlation between assessment issue and test results.

The dimensions for the test sets have been selected on the basis of validation studies or legal requirements. The assignment of tests to the dimensions has been carefully carried out by experts working in both theoretical and practical fields. The criteria used in selecting suitable tests were testing time, appropriateness of the test material to the assessment issue, appropriateness of the test material to the person being tested, and appropriateness for international use.

For each test set there is a manual, a profile evaluation (if appropriate) and a report in which the results on all the dimensions are summarized in verbal and graphic form. 14 test sets for use in the fields of HR, Neuro, Traffic and Sport are available.

Read more
On page 58 you can find a list of all 15 test sets. More details can be found in the main catalog of the Vienna Test System.
**COGBAT Cognitive Basic Assessment**

The COGBAT test set is used to clarify the cognitive status of patients with neurological and/or mental disorders. The aim is to measure cognitive status both as broadly and as time economically as possible. Using carefully selected and in some cases specially adapted tests, the test set measures subdimensions in the areas of attention, memory, executive functions and processing speed. COGBAT thus identifies cognitive areas in which a deficit may be present. These areas can then be investigated in depth with specific tests. COGBAT has been normed on a cross-test basis – i.e. as an overall package – and has been validated on various patient groups. An easily understood evaluation provides a rapid overview of impaired and unimpaired dimensions.

**DRIVESC Fitness to Drive Screening**

The DRIVESC test set assesses the three main factors of driving ability: resilience, reaction time and obtaining an overview. It provides an efficient means of screening people with neurological and/or mental disorders for fitness to drive. The validity of the DRIVESC test set has been repeatedly proven in multi-center studies of healthy drivers and individuals with brain injuries. The test set is simple to use and the instructions are easy to understand.
COGBAT

Cognitive Basic Assessment

The test set COGBAT Cognitive Basic Assessment is an economical tool for investigating important neuropsychological dimensions (attention, memory, executive functions) in patients with neurological and/or mental disorders, whatever their specific diagnosis. In areas in which the test results reveal an impairment, further and more detailed investigation of the dimension or disability is indicated.

COGBAT contains a number of established and well-known tests and concepts, including the Trail Making Test (TMT-L), the Tower of London (TOL-F) and tests from the perception and attention battery WAF. The sequence of the tests within the test set is fixed; this ensures that the administration requirements of particular tests (e.g. incorporating test repetitions when testing memory) are taken into account. The test administrator is free to administer the dimensions flexibly.

A personalized written results report, containing a profile diagram of the test results and a written description of the person’s results, is automatically produced for each respondent. It can be used as the basis for drawing up a diagnostic report or expert opinion, or for the feedback of results to the patient.

If the test results indicate impairments in a particular ability area, other subfunctions of this ability area should be investigated. The COGBAT results report refers to appropriate, more detailed tests that are available in the Vienna Test System NEURO. The Vienna Test System NEURO is therefore the ideal instrument to use in any situation in which a neuropsychological assessment is required. As well as making reference to more detailed tests, the report includes links to the relevant cognitive training modules that are available in the CogniPlus training program.

In practice COGBAT is used mainly in the following contexts:
- for initial neuropsychological assessment
- for screening for post-operative cognitive impairments
- in psychiatry for a neuropsychological checkup, e.g. for patients with schizophrenia, depression or ADHD
- in neurological and psychosomatic clinics for a neuropsychological checkup, e.g. for patients with alcohol problems, eating disorders, craniocerebral trauma or multiple sclerosis.

Efficiency

Since COGBAT is a neuropsychological screening battery, saving time is an important criterion. However, even in the context of screening it is important that the need to save time is not taken so far that assessment is imprecise and inadequate. The features that distinguish COGBAT from existing screening tools include:
- Differentiated description of cognitive functions
- Standardized norming of all subtests and profile interpretation
- True to the concept
- Meets all test quality criteria (such as up-to-date norm data, reliability, validity, fairness, scoring objectivity and administration objectivity)

Read more ... about CogniPlus and the concept of "Test – Train – Evaluate" starting on page 43
Overview of the COGBAT Cognitive Basic Assessment

### Authors

### Application
The test set COGBAT Cognitive Basic Assessment contains a compilation of important neuropsychological dimensions for clarifying the cognitive status of patients suffering from neurological and/or mental disorders. The test set can be used with respondents aged 16 and over.

### Theoretical background
Many patients suffering from a neurological or mental disorder report cognitive impairments – in other words, they experience difficulties in areas such as attention, memory and action planning. There is now extensive evidence that these limitations have a major impact on sufferers’ everyday lives and represent an obstacle when attempting to hold down a job. COGBAT has therefore been developed to provide practitioners with a tool that can be used quickly and across a wide range of disorders to assess those cognitive dimensions that are frequently impaired and that are of significant relevance in everyday life. The results can be used to identify the need for further dimension- or disorder-specific investigation or further training.

### Administration
In the COGBAT test set a defined sequence of tests is suggested. This takes account of the administration conditions of individual tests (e.g. incorporating test repetitions when testing memory).

### Scoring
The main variables of the tests are reported both in a table showing the raw score and percentile rank norm score and in a profile. In addition, the table uses a simple color scheme to provide a rapid overview of clinically impaired and unimpaired dimensions. Optionally, recommendations for further testing or cognitive training can be provided on the basis of the results.

### Special features
A special feature of the COGBAT test set is the fact that it is normed as an overall package. All the tests in the COGBAT test set are currently being normed on a special sample in the SCHUHFRIED research laboratory. This has the advantage of enabling test results to be compared with a sample that is consistent in terms of size, quality and culture. In addition, norming the test battery in the designated test order means that possible sequence and fatigue effects are taken into account when test results are compared with the norm sample.

### Dimensions
The COGBAT test set comprises the following dimensions and tests:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Test</th>
<th>Test form/subtest</th>
<th>Reliability</th>
<th>Length in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alertness</td>
<td>WAFA</td>
<td>S2 Intrinsisc (visual)</td>
<td>0,86</td>
<td>approx. 4</td>
</tr>
<tr>
<td>Divided attention</td>
<td>WAFG</td>
<td>S2 (crossmodal)</td>
<td>0,89</td>
<td>approx. 6</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Figural long-term memory: learning ability</td>
<td>FGT</td>
<td>S11</td>
<td>0,90</td>
<td></td>
</tr>
<tr>
<td>Figural long-term memory: short-term</td>
<td></td>
<td></td>
<td>0,71</td>
<td>approx. 16</td>
</tr>
<tr>
<td>Figural long-term memory: long-term</td>
<td></td>
<td></td>
<td>0,70</td>
<td></td>
</tr>
<tr>
<td>Figural long-term memory: recognition</td>
<td></td>
<td></td>
<td>0,68</td>
<td></td>
</tr>
<tr>
<td>Working memory, verbal</td>
<td>NBV</td>
<td>S1</td>
<td>0,84</td>
<td>approx. 8</td>
</tr>
<tr>
<td><strong>Executive functions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive flexibility</td>
<td>TMT-L Part B</td>
<td>S1</td>
<td>0,81</td>
<td>approx. 1</td>
</tr>
<tr>
<td>Planning ability</td>
<td>TOL-F</td>
<td>S1</td>
<td>0,57</td>
<td>approx. 16</td>
</tr>
<tr>
<td>Response inhibition</td>
<td>INHIB</td>
<td>S13</td>
<td>0,71</td>
<td>approx. 7</td>
</tr>
<tr>
<td><strong>Information processing speed</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information processing speed</td>
<td>TMT-L Part A</td>
<td>S1</td>
<td>0,92</td>
<td>approx. 1</td>
</tr>
</tbody>
</table>

**Total length** approx. 59

In addition, the following additional tests are available for optional use to investigate the respondent’s ability to use the computer mouse and possible impairments of the visual field (neglect):

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Test</th>
<th>Test form/subtest</th>
<th>Reliability</th>
<th>Length in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neglect/visual field</td>
<td>WAFR</td>
<td>S5</td>
<td>0,92</td>
<td>approx. 6</td>
</tr>
<tr>
<td>Mouse use</td>
<td>MOUSE</td>
<td>S1</td>
<td>0,84</td>
<td>approx. 2</td>
</tr>
</tbody>
</table>
A look behind the scenes: 
the development of the COGBAT Test Set

Milestones
Selecting cognitive dimensions and reducing them to those that are important and clinically relevant
Assigning established scientific paradigms to the selected dimensions
Developing and integrating short test forms in a multi-stage empirical analysis while ensuring that reliability and validity criteria are met
Standardized norming of all subtests, making profile interpretation possible
Checking fitness for practical use under scientific supervision at eight clinical institutions
Optimizing the test set, in particular with regard to the efficient use of time
Validating COGBAT in seven clinical institutions

Optional additions
When using COGBAT, additional specific ability areas can be tested to ensure that the test set can be reliably used.
- If (residual) neglect is suspected, it is recommended that this is investigated using the Neglect subtest of the WAFF test.
- For patients who lack confidence in using the computer mouse, the MOUSE test can be used to ensure that testing with COGBAT is valid. The test checks whether the test can be administered using the mouse as the input device.

Partnership between research and practice
COGBAT has been developed in close cooperation with the SRH Klinikum Karlsbad-Langensteinbach (Germany) and the University of Heidelberg (Germany). COGBAT reflects the appropriate practical implementation of scientific expertise. To ensure that the test set was extensively checked, partnerships were set up with seven other clinics in which COGBAT was used under scientific supervision. This led to further optimization of the test set, especially from the point of view of efficient use of time.
Background
A patient in cardiac rehabilitation after a heart attack complains of a variety of symptoms: he is very restless and anxious, has difficulty sleeping, cannot relax, and his thoughts are racing, as is his heart. He says he can no longer concentrate on anything and forgets what he has read. In particular, his memory is much worse than it used to be.

Issue to be investigated
Is there any evidence of cognitive disabilities, or are his symptoms an expression of an adaptation disorder with increased self-awareness, tendency to complain and anxiety?

Testing with COGBAT

<table>
<thead>
<tr>
<th>Test variable</th>
<th>Test</th>
<th>Variable</th>
<th>PR</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attention</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alertness</td>
<td>WAFA</td>
<td>Mean reaction time</td>
<td>36</td>
<td>Unimpaired</td>
</tr>
<tr>
<td>Divided attention</td>
<td>WAFG</td>
<td>Mean reaction time</td>
<td>55</td>
<td>Impaired</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of missed reactions</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working memory, verbal</td>
<td>NBV</td>
<td>Correct</td>
<td>10</td>
<td>Impaired</td>
</tr>
<tr>
<td>Long-term memory, figural –</td>
<td>FGT</td>
<td>Learning sum</td>
<td>4</td>
<td>Impaired</td>
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<tr>
<td>short-term</td>
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<td>FGT</td>
<td>Delayed free recall I</td>
<td>9</td>
<td>Impaired</td>
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<td>FGT</td>
<td>Delayed free recall II</td>
<td>6</td>
<td>Impaired</td>
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<tr>
<td>recognition</td>
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<td></td>
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</tr>
<tr>
<td>Executive functions</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive flexibility</td>
<td>TMT-L</td>
<td>Working time Part B</td>
<td>12</td>
<td>Impaired</td>
</tr>
<tr>
<td>Planning ability</td>
<td>TOL-F</td>
<td>Planning ability</td>
<td>14</td>
<td>Impaired</td>
</tr>
<tr>
<td>Response inhibition</td>
<td>INHIB</td>
<td>Number of commission errors</td>
<td>17</td>
<td>Possibly impaired</td>
</tr>
<tr>
<td>Processing speed</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Information processing speed</td>
<td>TMT-L</td>
<td>Working time Part A</td>
<td>26</td>
<td>Unimpaired</td>
</tr>
</tbody>
</table>

Results
The patient has a clearly below-average performance profile on attention, memory and executive functions.

Conclusion
A more comprehensive and detailed neuropsychological, psychopathological and brain-organic assessment is indicated in order to clarify whether his poor cognitive performance is the result of a brain injury (e.g. damage to the hippocampus as a result of lack of oxygen) or of difficulties in utilizing his potential capacity caused by the psychopathology.
DRIVESC
Fitness to Drive Screening

The test set DRIVESC Fitness to Drive Screening is used to clarify whether individuals whose driving ability may be impaired as a result of a neurological or mental disorder are fit to drive. In everyday clinical and neuropsychological practice, the sensomotor, cognitive and affective deficits that accompany such disorders often raise the question of whether patients are fit to take the wheel of a motor vehicle.

Short testing time, exact measurement
The DRIVESC test set is based on cognitive dimensions that the legislature regards as relevant to the assessment of fitness to drive. Using validation studies, those ability dimensions have been selected for the test set that have been found to be most informative in evaluating fitness to drive, especially with clinical patients. Testing time has been kept as short as meaningfully possible, thus optimizing the relationship between length of testing and the usefulness of the results. Administration of the tests on a computer enables time-critical responses to be measured with a high level of precision. Standardized instructions, practice phases and error-free scoring underpin the assessment process.

Client-friendly test administration
The robust and ergonomic Response Panel simplifies testing for the client – as does the facility to administer the test set in 13 different languages. Straightforward instructions make administration easy, while practice phases ensure that the client understands the task. Varied and motivatingly designed tests make the experience enjoyable.

Validation
The tests used in the DRIVESC test set meet the latest scientific standards and have all been validated from the point of view of road safety.

Adding to the DRIVESC test set
Supplementing the DRIVESC test set, SCHUHFRIED offer additional tests to assess driving-related personality characteristics such as readiness to take risks when driving, sense of responsibility, aggressive behavior in traffic and the risk of driving under the influence of alcohol. Assessing driving-related aspects of personality is particularly appropriate if the client shows signs of a lack of insight and critical ability, a false estimate of his own ability, reduced ability to cope with stressful situations or depressive or euphoric tendencies.

Goal-directed therapy of cognitive impairments with CogniPlus
The functionally oriented neuropsychological therapy for fitness to drive focuses on training skills such as attention, perception and motor ability. Training programs from CogniPlus can be used for this type of therapy.
Overview of the DRIVESC Fitness to Drive Screening

Author
SCHUHFRIED GmbH

Application
The test set DRIVESC Fitness to Drive Screening assesses the most important ability dimensions that have a bearing on an individual’s ability to drive safely. It is designed to be used for screening purposes in a clinical context. The test set can be used with respondents aged 16 and over.

Theoretical background
Many patients suffering from a neurological or mental disorder report cognitive impairments that may in some circumstances affect their fitness to drive. The DRIVESC test set covers three key determinants of driving ability. It is a quick and efficient tool for testing for possible driving-related performance deficits in individuals affected by neurological or mental disorders. In studies it was found that the tests for measuring reactive stress tolerance, reaction time and skill in obtaining an overview were good predictors of fitness to drive as assessed by means of a standardized driving test; they were therefore combined into a screening battery. The validity of the DRIVESC test set has been demonstrated in multi-center studies involving healthy drivers and patients with brain damage. In the sample of healthy older drivers a validity coefficient of 0.41 was obtained by means of additive logistic regression, while in a clinical sample of stroke patients the corresponding validity coefficient was 0.48.

Administration
Administration of the test set is flexible and can be adapted to the requirements of the specific setting. Dimensions can be removed from the test set and breaks can be inserted.

Scoring
The test variables are reported both in a table showing the raw score and a percentile rank norm score and in a profile. The profile view enables the individual’s impaired and unimpaired dimensions of fitness to drive to be taken in at a glance, thereby providing a rapid overview of the patient’s possible performance deficits.

Dimensions
The DRIVESC test set comprises the following dimensions and tests for verifying an individual’s ability to drive safely:

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Subdimension</th>
<th>Test</th>
<th>Test form/subtest</th>
<th>Reliability</th>
<th>Length in minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stress tolerance, reactive</td>
<td>DT</td>
<td>S1</td>
<td></td>
<td>0.99</td>
<td>approx. 6</td>
</tr>
<tr>
<td>Reaction time</td>
<td>Simple, reaction speed</td>
<td>RT</td>
<td>S3</td>
<td>0.94</td>
<td>approx. 6</td>
</tr>
<tr>
<td></td>
<td>Simple, motor speed</td>
<td>RT</td>
<td>S3</td>
<td>0.98</td>
<td>approx. 6</td>
</tr>
<tr>
<td>Obtaining an overview – traffic</td>
<td>right-hand traffic</td>
<td>ATAVT</td>
<td>S1 S2</td>
<td>0.8*</td>
<td>approx. 14</td>
</tr>
<tr>
<td></td>
<td>left-hand traffic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total length</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>approx. 26</strong></td>
</tr>
</tbody>
</table>

* The quoted value is the minimum reliability specified for the adaptive algorithm; the test is continued until this limit value is exceeded.

Read more
... in the comprehensive manual for the DRIVESC test set. Just ask us for a copy.
THE DIMENSIONS IN THE VIENNA TEST SYSTEM NEURO
plus the tests with which these dimensions can be measured and the training programs that can be used to train the dimension

› ATTENTION
› MEMORY
› EXECUTIVE FUNCTIONS
› SPATIAL PROCESSING
› LANGUAGE AND NUMBER COMPREHENSION
› INFORMATION PROCESSING SPEED
› REACTIVE BEHAVIOR & VISUAL FUNCTIONS
› BASIC PERCEPTION FUNCTIONS
› SENSOMOTOR FUNCTIONS
› OTHER DIMENSIONS
Dimensions

Attention

Attention describes a person’s ability to pursue a task with sufficient care and persistence while ignoring matters that are irrelevant. Attention involves mental effort and normally lapses with time. Attention also forms the basis for higher cognitive abilities.

In line with the taxonomy of attention dimensions, the Vienna Test System NEURO enables the following aspects of attention to be assessed:
- Alertness
- Sustained attention
- Focused attention
- Divided attention
- Neglect
- Spatial attention
- Selective attention
- Vigilance

Alertness

The concept of alertness encompasses both the state of general wakefulness (tonic alertness) and the ability to increase one’s general level of attention for a short period in response to a cue (phasic alertness). Alertness is usually assessed by means of simple visual or auditory reaction tasks. If the stimuli are presented without a cue, as in the Vienna Test System NEURO, this is termed “intrinsic alertness”. Unlike phasic alertness, which is controlled by external stimuli, intrinsic alertness involves a self-generated increase in arousal level. Alertness can be measured both visually and aurally.

Test

Alertness can be measured by the WAFA test (Perception and Attention Functions: Alertness) both visually [Subtest: Intrinsic (visual)] and aurally [Subtest: Intrinsic (auditory)]. These tests measure reaction time in response to simple visual or auditory stimuli, which are presented without a cue.

Training

The CogniPlus training program ALERT (Attention: Alertness) trains the Alertness dimension of attention – the ability to temporarily increase and sustain the intensity of attention.

Setting and task: A motorcycle is driven along a winding road. The client’s task is to carefully observe the stretch of road in front of him and to press the reaction key as quickly as possible when obstacles appear.

ALERT comprises two training forms: the S1 training form trains phasic alertness, while the S2 training form trains intrinsic alertness. Each of the two training forms contains 18 difficulty levels. The degree of challenge is increased by shortening the maximum permitted reaction time.
Sustained attention

Sustained attention is the ability to focus attention persistently over lengthy periods of time on one or more sources of information, in order to detect and respond to small changes in the information received. The relevant stimuli typically occur only at irregular intervals and at moderately high frequency among a large number of irrelevant stimuli. Sustained attention can be measured both visually and aurally.

**Test**

Sustained attention is measured by the WAFV test (Perception and Attention Functions: Vigilance) using subtests S6 (visual) and S8 (auditory). In this test the respondent is presented with visual or auditory stimuli that sometimes diminish somewhat in intensity. The task is to react to these relatively rare stimuli, which constitute about 30% of the total.

**Training**

The CogniPlus training program VIG (Attention: Vigilance) trains the Vigilance dimension of attention — the ability to sustain attention over a lengthy period of time under monotonous stimulus conditions.

Setting and task: The client is driving along a straight highway. At irregular intervals other vehicles come towards him on the opposite carriageway or overtake him. The client’s task is to react by pressing a button when an overtaking vehicle suddenly brakes in front of him.

VIG uses 30 difficulty levels. A decreasing stimulus frequency makes it more and more difficult for the client to sustain his attention: he is overtaken by other cars increasingly rarely, the surroundings become more monotonous as darkness falls and the number of sudden braking maneuvers from overtaking vehicles decreases. In addition, the intensity of the feedback on delayed and omitted reactions becomes weaker as the difficulty level increases. The challenge therefore changes gradually from a sustained attention task to one requiring real vigilance.
Dimensions

Attention

Focused attention

Focused attention describes the ability to isolate a segment of reality in order to be able to focus on it more closely. Key to this is the ability to maintain this focus even in the face of distractions. Focused attention can be measured both visually and aurally.

Test

Focused attention can be measured by the WAFF test (Perception and Attention Functions: Focused Attention) on a modality-specific basic – i.e. either visually [Subtest: Unimodal (visual)] or aurally [Subtest: Unimodal (visual)]. The respondent is presented – depending on the subtest – with relevant visual or auditory stimuli against a background of distracting stimuli. His task is to respond when two previously defined changes in relevant stimuli occur consecutively; he is to ignore all other stimuli.

Training

The CogniPlus training program FOCUS (Attention: Focused) trains focused attention – the ability to respond only to relevant stimuli amid a high density of distracting stimuli. Setting and task: A boat travels through a lush African landscape. The client is confronted with a wide range of different stimuli: screeching birds, flying dragonflies, a ruin on the banks of a river, a waterfall etc. His task is to respond to predefined relevant stimuli without letting himself be distracted by the large number of other stimuli.

FOCUS comprises three training forms, each of which has ten difficulty levels. The difficulty structure adapts to the amount that the client can take in. Thus a client of weak ability will be presented with a low-stimulus environment, while a client of strong ability will be confronted with a large number of distractor stimuli.
Divided attention

Divided attention is the ability to direct one’s attention towards several information channels. For example, division of attention is required in “dual tasks” in which two information channels must be monitored simultaneously. If a relevant event occurs in one or both channels, the respondent must react as quickly as possible.

Test

Divided attention can be measured using the WAFG test (Perception and Attention Functions: Divided Attention) cross-modally by subtest S1. In this test the respondent receives stimuli on one visual and one auditory channel. The task is to constantly monitor both channels to determine whether one of the stimuli changes twice in succession.

Training

The CogniPlus training program DIVID (Attention: Divided) trains divided attention – the ability to perform different tasks simultaneously.

Setting and task: The client assumes the role of a security guard at an airport. He has to simultaneously observe both a range of scenes on several control monitors (sliding doors at the entrance, ticket counter, luggage conveyor) and announcements made over the loudspeaker system. His task is to deal with problems that occur by pressing the response key.

DIVID has 15 difficulty levels. The difficulty levels vary in terms of the number of channels that the client has to monitor, the frequency of breakdowns, the minimum interval between two breakdowns and the maximum time allowed for noticing a breakdown.
Neglect is a behavioral disorder typically caused by brain lesions in the right hemisphere, as a result of which the sufferer fails to process stimuli on the side contralateral to the lesion. Patients with visual neglect pay little or no attention to objects or people on the affected side; their visual exploration is transferred to the intact side.

Test

Neglect/extinction or neglect hypotheses can be investigated using subtest S5 of the WAFR test (Perception and Attention Functions: Spatial Attention). In the neglect test stimuli are presented at various positions in the right or left visual field or simultaneously in equivalent positions in both halves of the field of vision.

Training

The CogniPlus training program SPACE (Neglect/visual field training: Visuospatial attention) was created for patients with hemineglect but it can also be used successfully with patients who have an impairment of the visual field. It improves the visuospatial directing of attention and is intended to train the specific ability to direct attention to stimuli on the contralesional side of the field of vision.

Setting and task: The client assumes the role of a photographer. His task is to observe various scenes such as a market place, airport, office, children’s playground etc. The camera viewfinder moves towards a particular point in the area under observation. The task is to take a "photo" by pressing the reaction key as soon the viewfinder stops and has "captured" an object. There are ten different difficulty levels, each of which displays a different interesting scene on the screen. The level of difficulty is increased by varying the way in which the viewfinder moves (continuous movement, jumping movement, with and without a return to the center) and the complexity of the scene.

Worth knowing

The instructions for the SPACE training program are displayed on only one side of the screen and are therefore easily read by patients with neglect or visual field impairment.
Spatial attention

Spatial attention involves the ability to shift one’s visual attention focus spatially. The shift of the attention focus may be automatic or controlled. In an automatic shift, the person “automatically” turns his head or his gaze towards an object or event when the attention his caught by these external stimuli. In a controlled shift the shift of attention is cognitively controlled and is the result of internal factors, such as the expectation of a particular stimulus, or the requirements of a particular task. In the Vienna Test System NEURO the controlled shift of attention is measured by using cues in the center of the visual field.

Test

The spatial shift of attention is measured using subtest $S1$ of the WAFR test (Perception and Attention Functions: Spatial Attention). In the test, black triangles, pointing outwards, are shown on the screen in four stimulus positions. Sometimes the triangles light up. The respondent’s task is to react as quickly as possible when this happens. Sometimes the lighting up is preceded by a central cue (arrow in the center of the screen) that points either in the correct direction or a wrong one.

Training

The CogniPlus training program SPACE (Neglect/visual field training: Visuospatial attention) was created for patients with hemineglect but it can also be used successfully with patients who have an impairment of the visual field. It improves the visuospatial directing of attention and is intended to train the specific ability to direct attention to stimuli on the contralesional side of the field of vision.
Attention

Selective attention

Selective attention is the ability to focus one’s attention on particular features of a task and inhibit reactions to irrelevant features. In focused attention tasks the emphasis is on distractibility; selective attention tasks, by contrast, involve differentiating between relevant and irrelevant stimuli while also inhibiting reactions to competing irrelevant stimuli. Selective attention can be assessed on a modality-specific basis.

Test

Selective attention can be measured using the WAFS test (Perception and Attention Functions: Selective Attention) either visually [Subtest: Unimodal (visual)] or aurally [Subtest: Unimodal (visual)]. In the WAFS the respondent receives relevant and irrelevant stimuli in the auditory or visual modality, depending on the subtest used. His task is to react to changes in the relevant stimuli while ignoring the irrelevant ones.

Training

The CogniPlus training program SELECT (Attention: Selective) trains selective attention – the ability to respond quickly to relevant stimuli and to suppress inappropriate responses.

Setting and task: The client travels through a tunnel in a small mine car. Relevant and irrelevant stimuli (optical, acoustic or crossmodal) suddenly emerge from the darkness. The client’s task is to respond only to relevant stimuli.

SELECT comprises three training forms:
1. The S1 training form trains selective attention in the visual modality (figures appear in the tunnel).
2. S2 is the acoustic training form, in which the client’s task is to respond to relevant sounds.
3. In the S3 training form the client is instructed to respond to specific stimulus combinations (figures that make particular noises).

There are 15 difficulty levels for each training form. SELECT adapts to the client’s ability level in two ways. Firstly, the number of relevant or irrelevant stimuli increases or decreases. Secondly, at each difficulty level the maximum permitted reaction time adapts to the speed of the client’s reactions.
Vigilance

Vigilance is the ability to focus attention persistently over lengthy periods of time on one or more sources of information, in order to detect and respond to small changes in the information received. The relevant stimuli typically occur only at very irregular intervals and at very low frequency among a large number of irrelevant stimuli. In the Vienna Test System NEURO vigilance can be assessed on a modality-specific basis.

Test

Sustained attention is measured by the WAFV test (Perception and Attention Functions: Vigilance) using subtests S2 (visual) and S4 (auditory). In this test the respondent is presented with visual or auditory stimuli that occasionally diminish somewhat in intensity. The task is to react in these occasional cases, which constitute about 5% of the stimuli.

Training

The CogniPlus training program VIG (Attention: Vigilance) trains the Vigilance dimension of attention – the ability to sustain attention over a lengthy period of time under monotonous stimulus conditions.
Setting and task: The client is driving along a straight highway. At irregular intervals other vehicles come towards him on the opposite carriageway or overtake him. The client's task is to react by pressing a button when an overtaking vehicle suddenly brakes in front of him.
VIG uses 30 difficulty levels. A decreasing stimulus frequency makes it more and more difficult for the client to sustain his attention: he is overtaken by other cars increasingly rarely, the surroundings become more monotonous as darkness falls and the number of sudden braking maneuvers from overtaking vehicles decreases. In addition, the intensity of the feedback on delayed and omitted reactions becomes weaker as the difficulty level increases. The challenge therefore changes gradually from a sustained attention task to one requiring real vigilance.
Memory

Memory is the ability to retain, organize and later retrieve perceived information. Memory involves various function areas and processes that can be specifically impaired as a result of brain injury. Since memory impairments can be modality-specific and can depend on the length of the retention interval (short-term or long-term), assessment needs to involve both different time intervals and different material (verbal, figural).

Working memory¹

Working memory comprises the ability to process memory contents in the mind in order to carry out tasks and achieve goals. Working memory can therefore be regarded as the ability to retain and process information that has been briefly presented and that is relevant to solving a task that is currently in hand. Working memory is an essential component of many basic abilities, such as arithmetic and reading.

The tests in the Vienna Test System NEURO that are designed to assess working memory require mainly the updating, retention and processing of memory contents; they thus involve primarily the central executive functions of working memory.

Tests

Spatial working memory is assessed using the CORSI (Corsi Block-Tapping Test), Form S5. In this test nine blocks are shown on the screen. Each item involves a hand icon that moves about the screen, tapping on a certain number of blocks in a particular order. Afterwards the respondent must tap the blocks in reverse order (backwards).

Like the NBN, the NBV test (NBack verbal), Form S1, also uses an n-back paradigm to assess verbal working memory. Here letter sequences are presented in the visual mode. The respondent must state whether the letter currently displayed is identical to the last-but-one one shown.

Training

The CogniPlus training software contains several programs for training working memory that enable training to be designed on a varied and interesting basis using a range of different tasks. The NBACK training program uses pictorial material and, like the NBN test, involves n-back tasks. In addition, the “VISP”, “CODING” and “DATEUP” training programs in CogniPlus can be used to train spatial working memory; each program focuses on a specific aspect of working memory.

¹ In the literature working memory is also described as part of executive functions.
Dimensions

Setting and task: In the NBACK training program the client sees a representation of a digital picture frame on his screen. A succession of photographs appears in the frame; the photos have different subject matter (animals, landscapes, colors etc.). The client’s task is to decide whether the current photograph matches the one that was shown one, two or three places back (the number of places varies with the level).
NBACK has 15 difficulty levels.

The CogniPlus training program DATEUP (Working memory: Updating – spatial) trains the executive updating function of spatial working memory. Updating is the ability to renew memory contents in a controlled and goal-oriented manner.
Setting and task: The client watches butterflies in a natural setting as they fly over flower meadows and sandy ground. From time to time one butterfly lands and another starts its flight etc. until eventually, at irregular intervals, the client is asked a question.
The DATEUP training program has 25 difficulty levels.

CODING (Working memory: spatial coding) is a CogniPlus program for training monitoring processes and spatial coding in visuospatial working memory.
Setting and task: The client observes vehicles driving onto a bridge (memorizing phase). While driving over the bridge the vehicles disappear from the client’s view (rehearsal phase). When they reappear at the end of the bridge, one of the vehicles may have changed its position in the spatial arrangement.
CODING has 21 difficulty levels. At the different difficulty levels different storage and retrieval strategies are required.

VIISP (Working memory: visuospatial) is a CogniPlus training program for improving active rehearsal (repetition) in spatial working memory.
Setting and task: In VIISP the client has a bird’s-eye view of a number of ships on the ocean. Some of the ships are indicated in turn (e.g. they are illuminated or disappear). This is the memorizing phase. In the rehearsal phase that follows, the client is encouraged in various ways to practice rehearsal. He must subsequently reproduce the sequence in which the ships were indicated (recall phase).
The VIISP training program has 18 difficulty levels. The demands on visuospatial working memory are varied in a number of ways. At some levels the ships move, while at others they remain motionless at anchor.

Short-term memory, spatial

Short-term memory is the ability to retain information temporarily and reproduce it correctly. With the help of short-term memory information can be kept mentally available for periods ranging from several seconds to a few minutes.

Test

Short-term memory is assessed by the CORSI (Corsi Block-Tapping Test), using Form S1 to measure the immediate spatial block span. Nine blocks are shown on the screen. Each item involves a hand icon that moves about the screen, tapping on a certain number of blocks in a particular order. Afterwards the respondent must tap the blocks in the same order. The length of the sequences to be tapped increases in the course of the test. It starts with a sequence of three.
Dimensions

**Memory**

### Long-term memory

The subdimension of long-term memory describes the ability to retain information in the relatively long term, integrate it into one’s own knowledge base and retrieve it correctly. Memory disorders are characterized by the fact that intact and disordered memory processes can be identified. The learning process involves the stages of encoding, consolidation and recall.

### Tests

Long-term memory is assessed in the Vienna Test System NEURO material-specifically, using verbal material, figural material and photographic material consisting of pictures of people.

The FGT (Figural Memory Test) is used to assess figural long-term memory. In the S1 form that is used here the item material consists of different figures composed of individual lines. The test implements a learning paradigm with five learning runs and briefly delayed (5-minute break) and moderately delayed (30-minute break) recall. The figures must be freely reproduced immediately after each learning run and after the brief and moderate delays. A recognition run is also included.

### Training

The CogniPlus training program NAMES (Long-term memory: Learning faces and names) can be used to develop and practice effective strategies for learning people’s names and associating them with faces.

**Setting and task:** In NAMES the client is instructed to remember the names of individuals. The names must then be recalled when pictures of the individuals are displayed. In the course of training the client is taught strategies to assist learning and recall. The difficulty of the tasks is varied systematically in the course of the program.

**Worth knowing**

The training program provides helpful tips on strategies to improve performance and enables the individual’s own memory aids to be entered.
Executive functions

The term “executive functions” covers a number of regulatory and control mechanisms that make goal-directed and situation-adapted action possible. Executive functions play a key role in enabling the individual to cope successfully with everyday life. Disorders of the executive functions frequently occur after damage to the prefrontal cortex, for example as a result of craniocerebral trauma, tumors or cerebral infarction, or after damage to the cerebellum.

Executive functions can be regarded as a generic term for the regulation of various cognitive, social and emotional functions. The following components of the executive functions can be assessed using the Vienna Test System NEURO:

- Interference
- Cognitive flexibility
- Perseveration
- Aiming ability
- Response inhibition
- Logical reasoning
- Task switching

Interference

The ability to control cognitive interference is usually assessed by means of tasks involving at least two competing information-processing pathways. The task usually requires the respondent to use the less dominant information-processing pathway in the face of interference from the dominant pathway. The Vienna Test System NEURO uses a classical interference test (Stroop) that measures the respondent’s speed at reading words and naming colors and then his speed under color/word interference conditions.

Test

The ability to control cognitive interference is assessed by Form S7 of the STROOP (Stroop Test). In a baseline condition an information-processing task is presented; here the respondent must first name the color of a colored bar and then give the meaning of a color word in grey script. This is followed by the interference condition. Here the task is to read color words written in different colors; the respondent must react to the color of the script or to the color named by the word and in each case ignore the other information-processing pathway. By comparing performance without color/word interference with performance on the associated interference tasks it is possible to make statements about the respondent’s interference tendency.

Cognitive flexibility

Cognitive flexibility is the ability to shift at will between different reference systems when necessary. A test that is often used to assess cognitive flexibility is Part B of the well-known Trail-Making Test. This has been found to be sensitive to neurocognitive deficits, for example in neurological disorders and in mental patients.

Test

Cognitive flexibility is assessed by Part B of the TMT-L (Trail-Making Test – Langensteinbach Version). The respondent’s task is to link circles containing the numbers 1 to 13 and the letters A to L alternately in ascending order.

Worth knowing

Since completion of the TMT-L requires the respondent to be familiar with the use of the mouse, skill in using the mouse can if necessary be tested first using a special pre-test.
Executive functions

Perseveration

Perseveration is an inappropriate persistence of cognitive processes and modes of behavior. Motor perseveration or stereotyping is characterized by frequent inappropriate repetition of certain behavior sequences. Perseveration is characteristic of limited flexibility.

Test

Perseveration is assessed by the PERSEV (Perseveration Test). In this test nine large circles are shown on the screen. In addition, about 64 beeps per minute are heard. Using a touch screen, the respondent’s task is to press the circles on the screen in random order in time with the beeps.

Planning ability

Planning can be regarded as a form of problem-solving. It involves mental simulation and evaluation of action sequences and the resulting consequences. The ability to devise plans and realize them through appropriate action is one of the most complex cognitive abilities of human beings.

Test

Planning ability is assessed by Form S1 of the TOL-F test (Tower of London – Freiburg Version). In this test, which is based on the original Tower of London design by Shallice (1982), a wooden object made up of three rods is depicted on the screen. Three differently colored balls are arranged in different configurations on the rods, depending on the test task. As in the original, the left-hand rod can hold three balls, the center rod holds two balls and the right-hand one ball. The respondent’s task is to move the balls so that they correspond to a defined target state, using as few moves as possible.

Also available by beginning of 2013:
PAD (Plan-a-Day-Test)

Training

In the CogniPlus training program PLAND action and planning skills are trained through the presentation of realistic planning tasks.

Setting and task: In the PLAND (Plan a Day) training program, the client is given the task of deciding on the best order in which to carry out the day’s activities. The starting point is a list of things that need to be done and a virtual street plan on which various buildings and the client’s current position are marked. In accordance with the planning task the client must devise a strategy for deciding the order in which the different components of the task will be tackled and hence the order in which the buildings will be visited. The number of errands to be completed increases across the difficulty levels. Depending on the training form, other difficulty parameters may be added as the difficulty level increases (e.g. an increase in overlapping appointments).
Response inhibition

Response inhibition is the ability to suppress unwanted reactions. This ability is an essential requirement for flexible and appropriate behavior. Impairments of response inhibition occur in many neurological and psychiatric disorders and have a considerable impact on the sufferer's ability to carry out everyday activities. Response inhibition is distinguished from interference (Stroop test) by the fact that response inhibition requires the suppression of a motor response, while the Stroop test involves the control of cognitive interference.

Test

Response inhibition is assessed by Form S3 of the INHIB (Response Inhibition) test, which uses a go/no-go paradigm. The go/no-go task requires the client to distinguish whether a stimulus requires a response or an inhibition. In addition, a dominant reaction tendency is built up from frequent identical responses. In the INHIB test a sequence of circles and triangles is shown on the screen. The client must press a button only in response to triangles: the reaction to the circles must be inhibited.

Training

The CogniPlus training program HIBIT (Executive functions: Response inhibition) trains response inhibition – the ability to suppress unwanted reactions.

Setting and task: In the HIBIT training program the client assumes the role of a post-office employee who must sort letters and packages as quickly and accurately as possible by pressing a button. He must look out for specific features (e.g. the presence of a stamp) that indicate when he must react and when he must not react. Four different scenarios (Go-Nogo, Stop-Signal Task, Cued Go-Nogo, Behavioral Shift) make different demands on the client's ability to suppress a reaction.

The difficulty levels of HIBIT vary systematically in the demands they make on response inhibition. The inhibition of responses is made more difficult across the difficulty levels by a reduction in the number of no-go stimuli, shorter presentation time of the letters and packages and an increasing number of discriminators (several stamps, additional inscriptions on a package).
Executive functions

Reasoning
Reasoning is also termed fluid intelligence; it involves the ability to recognize regularities, understand the implications of statements and draw logical conclusions.

Test
Reasoning can be assessed using Form S1 of the SPM test (Raven’s Standard Progressive Matrices). In this test a 3x3 matrix with graphic elements, constructed according to logical rules, is shown on the screen. One element in the matrix is missing and must be filled in by the client, who must select the right answer from eight options that are presented.

Task switching
Task switching is the ability to switch to and fro between different tasks. In everyday life there are many situations in which persisting with a particular action may be dysfunctional and fail to bring the actor any closer to his goal. In such situations it is appropriate and necessary to interrupt an action and switch to another.

Test
Task switching is assessed in the Vienna Test System by Form S1 of the SWITCH (Task Switching) test, which uses a stay/switch paradigm. In contrast to Part B of the TMT-L, SWITCH enables possible impairments of task-switching ability to be assessed independently of other cognitive influences, such as verbal ability or processing speed. In the SWITCH test circles and triangles in either light grey or dark grey are presented in sequence on the screen. The respondent must attend either to their shape (circle or triangle) or brightness (light or dark). The aspect that needs to be attended to changes constantly in the course of the test, so that the client must switch repeatedly between processing the stimuli on the basis of shape and processing them on the basis of color.
Spatial processing

Spatial processing is the ability to picture objects in one’s mind and if necessary manipulate them mentally (e.g. rotate them). It thus involves being able to mentally convert objects shown in two dimensions into three-dimensional ones and to switch between different views of them.

Spatial-cognitive: Mental rotation

Spatial-cognitive functions involve mental spatial operations. A key spatial-cognitive function is mental rotation. This is the ability to form an accurate mental representation of an object and then rotate it mentally.

Test

The spatial-cognitive aspect of spatial processing is assessed using Form S2 of the 3D (Spatial Orientation) test. In the 3D the screen shows a figure composed of several blocks. An arrow on the screen points to the figure from a particular direction. The client must state what the figure would look like from the indicated direction.

Training

The CogniPlus training program **ROTATE** (Spatial processing: Mental rotation) trains the ability to form a three-dimensional mental image of an object depicted in two dimensions and to manipulate the image through a change of perspective or rotation (mental rotation).

Setting and task: In ROTATE the client is shown 3D objects that he must compare with reference pictures. Difficulty is varied across the various levels mainly by changing the figural complexity of the objects, the direction and angle of rotation, the object’s positional complexity and the complexity of the implied coordinate system.

The training program uses objects of various different types (e.g. cartoon figures, buildings). The aim of using a wide range of practice material is to improve the client’s motivation to train and to ensure that the cognitive skill that is developed can be generalized effectively.
Language & number comprehension

After brain injury various components and modalities of language comprehension are frequently impaired. These acquired combinations of language disorders that occur after language acquisition has been completed are classed as aspects of aphasia.

Number processing also involves complex cognitive mechanisms that may be impaired in various ways as a result of brain injury. There are two main aspects of dealing with numbers: number processing (i.e. comprehension of numbers, reading numbers, the ability to write numbers, the ability to arrange numbers in sequence) and calculating using arithmetical signs.

The following aspects of language & number processing can be assessed using the Vienna Test System NEURO:

- Language comprehension (focusing on semantic comprehension and semantic long-term memory)
- Number comprehension (focusing on calculating ability and logical reasoning)

Language comprehension

Verbal comprehension in general involves knowledge of words and their meaning and the ability to use them appropriately in conversation. Acquired knowledge of words and language rules are referred to as semantic long-term memory.

Test

The following items each contain one sentence in which one or more words are replaced by dots. Select the answer from the five possibilities which correctly completes the sentence.

For example:
A green plant cannot survive without ....

- soil
- fertilizer
- care
- pollination
- light

The correct completion of this sentence is "light". Therefore you should select "light" and "Next".

Number comprehension

Number comprehension is operationalized in the form of the use of simple arithmetical operations and their application to solve practical arithmetical problems.

Test

Numerical intelligence functions can be assessed in the Vienna Test system NEURO using Subtest S2 of the IBF test (Basic Intelligence Functions). The test uses two types of task. Items of the first type all consist of a series of 7 numbers. The resulting mathematical sequence can be defined by a logical rule. The task is to identify this rule and then apply it. The second type of task assesses calculating ability. The tasks consist of problems covering a wide range of topics which are described in words and which involve the solving of simple practical problems. The main challenge is to find the right way of tackling the problem by using the relationship between the given numbers to solve the question that is posed.
Information processing speed

Information processing speed is a complex construct that is related to a number of neuropsychological ability dimensions, including attention and executive functions.

Test

A fundamental measure of information processing speed can be obtained using Part A of the TMT-L (Trail-Making Test – Langensteinbach Version) The task involves a number of circles that are presented simultaneously on the screen and that contain the numbers from 1 to 25. These must be linked in ascending order as quickly as possible. The test measures both the speed of item processing and the number of errors.

Worth knowing

Since completion of the TMT-L requires the respondent to be familiar with the use of the mouse, skill in using the mouse can if necessary be tested first using a special pre-test.
Reactive behavior & visual functions

In the Vienna Test System NEURO, reactive behavior is regarded as involving both the resilience of reactive behavior, in other words what is known as reactive stress tolerance, and the ability to react per se. The ability to react can in turn be divided into the subdimensions of simple reactive ability and complex reactive ability. Visual functions are assessed partly by a test that measures “flicker-fusion frequency” and partly – especially for investigations of possible impairments of fitness to drive – by means of the test Obtaining an Overview – Traffic.

Arousal

Arousal is in general a state of diffuse cortical activation that follows sensory stimulation. An indicator that is used to measure this arousal of the central nervous system is what is known as “flicker-fusion frequency”. If the eye is stimulated with intermittent light stimuli, the stimuli are perceived individually if they are presented in sufficiently slow sequence. As the speed of stimulus presentation increases, the impression of flickering is produced; at a certain point this is perceived as constant brightness. The frequency that still produces a flickering frequency is termed the “flicker frequency”. In neuropsychology the measurement of flicker-fusion frequency can be used as a parameter in, for example, drug-induced sedation. The flicker frequency thus provides information about the patient’s current state of fatigue.

Test

Arousal of the central nervous system is assessed using Form S1 of the FLIM test (Flicker-Fusion Frequency), which measures two variables. Flicker frequency is assessed by means of an ascending measurement technique – i.e. the frequency of a flickering light is increased until a steady light is perceived. Fusion frequency is measured by means of a descending technique – i.e. the frequency of a high-frequency light, that is perceived by the respondent as a steady light, is reduced until it is seen as flickering. In both cases the respondent presses a button at the point at which the change in perception occurs.

Stress tolerance, reactive

Reactive stress tolerance is the individual’s ability to react quickly and accurately when under stress. To place the person in a stressful situation, an appropriately high signal frequency must be used in the test.

Test

Reactive stress tolerance is measured by the DT (Determination Test, S1). The test uses five optical stimuli of different colors, two different acoustic stimuli and two signals for the foot-operated keys. To all of these the respondent must react as quickly as possible by pressing the corresponding button on the Response Panel or the corresponding foot pedal. The program adapts to the respondent’s ability level by varying the speed of stimulus presentation.
Ability to react

Ability to react involves the ability to react to one or more stimuli as quickly and accurately as possible. A distinction is made between the two subdimensions:

- **Simple reaction ability**: The motor action is triggered by a simple signal. This signal is followed by a pre-defined sequence of movements. The signal may be delivered acoustically, visually or kinesthetically.

- **Complex reaction ability**: This involves the ability to respond to several different signals. It makes greater demands on cognitive processes than simple reaction ability.

In addition, in the case of both simple and complex reaction ability a distinction is made between reaction speed and motor speed.

**Tests**

Simple reaction ability is measured by the RT (Reaction Test, S3). In this test the respondent must press a particular button as quickly as possible as soon as the required stimulus appears. The Response Panel is needed for administration of this test.

Complex reaction ability is measured by the MDT (Movement Detection Test, S2). In this test the client must respond to optical movement signals with the motor reactions assigned to them.

**Obtaining an overview – traffic**

Obtaining an overview is generally understood to be the ability to rapidly identify objects and visual patterns. A quick and accurate grasp of complex visual situations is particularly important when driving.

**Test**

Obtaining an overview when driving is measured by the ATAVT (Adaptive Tachistoscopic Traffic Perception Test, S1). Pictures of traffic situations are shown briefly to the respondent. After seeing each picture, he is asked to state what was in it, choosing from five answer options that are given.
Basic perception functions

Impairments of perceptual functions often severely restrict the sufferer’s everyday activities. They also make neuropsychological tests difficult to conduct, since such tests usually involve the visual or auditory modality. To ensure that perceptual impairments do not affect the investigation, steps should be taken before the tests are administered to verify that the respondent has the necessary perceptual ability to work them.

The following basic auditory and visual functions can be checked using the Vienna Test System NEURO:
- Auditory differentiation
- Distinguishing loudness
- Distinguishing tonepitch
- Distinguishing shapes
- Distinguishing brightness

Auditory differentiation

Auditory differentiation is the ability to recognize changes of tone against a background of noise.

Test
Auditory differentiation is assessed using Form S4 of the WAFW test (Perception and Attention Functions: Pre-tests for Perception Functions). Via headphones the patient hears a babble of voices as a background noise. At the same time a tone is sounded that either becomes quieter or remains constant. The patient must identify the change in loudness.

Distinguishing loudness

Distinguishing loudness is the ability to detect changes in the loudness of tones.

Test
Distinguishing loudness is assessed by Form S6 of the WAFW test (Perception and Attention Functions: Pre-tests for Perception Functions). Via headphones the patient hears tones that either become louder or quieter or do not change in volume. The patient must identify a change in loudness.

Distinguishing pitch

Distinguishing tonepitch is the ability to detect changes in the pitch of tones.

Test
Distinguishing tonepitch is assessed by Form S5 of the WAFW test (Perception and Attention Functions: Pre-tests for Perception Functions). Via headphones the patient hears tones that either become higher or lower or do not change their frequency. The patient must identify a change in tonepitch.

Distinguishing shape

Distinguishing shapes is the ability to recognize different shapes and distinguish between them.

Test
Distinguishing shapes is assessed by Form S3 of the WAFW test (Perception and Attention Functions: Pre-tests for Perception Functions). The patient must compare the shape of two figures that are shown on the screen. For each pair of figures he must state whether or not the figures are identical.

Distinguishing brightness

Distinguishing brightness is the ability to recognize and distinguish contrasts between light and dark.

Test
Distinguishing brightness is assessed by Form S2 of the WAFW test (Perception and Attention Functions: Pre-tests for Perception Functions). On the screen the patient is shown a figure that either changes in brightness or remains the same. The patient must identify a change in brightness.
Sensomotor functions

Sensomotor functions involve interaction between sensory and motor abilities – in other words, the direct control of movements on the basis of sensory feedback. There is a direct connection between the perception of a stimulus by a sensory organ and the appropriate motor behavior; these processes operate in parallel, as for example in the perception of a stimulus via the eye and the deliberate control of arm movements.

Eye-hand coordination

The dimension of eye-hand coordination tests how well someone can convert visual information into hand movements – in other words, how well they can coordinate eye and hand in making fine, small-scale movements. In the Vienna Test System NEURO a distinction is made between two-dimensional and three-dimensional eye-hand coordination.

Tests

Two-dimensional eye-hand coordination is measured by the 2HAND test (Two-hand Coordination). The test focuses on two components of ability:
1. Sensomotor coordination of eye and hand
2. Coordination between left and right hand

Three-dimensional eye-hand coordination is measured by the SMK test (Sensomotor Coordination). The task is to move a yellow circle segment that is displayed in three-dimensional space into a desired position. The screen displays a space containing a target (green cross) and a steerable object (yellow circle segment). The circle segment, which is standing on its tip, starts to make three different movements in unpredictable directions. The respondent’s task is to use the joystick synchronously to counteract these movements in such a way that the circle segment stands vertically with its tip touching the intersection of the green bars that form the cross and occupies the height of the vertical bar.
The CogniPlus training program VISMO (Visuomotoric coordination) trains visuomotor coordination – the ability to coordinate hand and arm movements in response to visual stimuli.

Setting and task: In the VISMO training program the client is instructed to observe the sky through a telescope. His task is to keep a particular object – a satellite, planet or spaceship – within the telescope’s finder (a green circle on the screen). Since the object is moving across the sky as it is being watched, the client must actively track it with the finder. The aim is not to lose the object from the finder. The longer the finder remains on the object, the more points the client accumulates.

The VISMO training program has 22 difficulty levels. Training adapts to the client’s performance level in four ways. As the difficulty level increases the path along which the target object travels becomes invisible and increasingly difficult to follow, the speed of the target object increases and the number of distracting objects in the scene also increases.

Fine motor skills

Fine motor skills describe a person’s ability to carry out hand, arm and finger movements in a controlled and coordinated manner. The following subdimensions are assessed, separately for each hand (based on Fleishman, 1972):

- The subdimension of Steadiness measures a person’s ability to adopt a particular arm/hand position and maintain it with as little change as possible for a relatively long period of time.
- The subdimension of Accuracy of movement measures a person’s ability to hit a specified series of small targets in quick succession.
- The subdimension of Precision of arm-hand movement measures a person’s ability to carry out prescribed arm-hand movements precisely.
- The subdimension of Wrist-finger speed measures a person’s ability to carry out repeated movements from the wrist in situations in which only limited precision is required.
- The subdimension of Hand and finger dexterity measures a person’s ability to manipulate small objects quickly and accurately with the fingers.

Test

Fine motor skills are measured by the MLS test (Motor Performance Series). Administration of the MLS requires the MLS Work Panel.
Other dimensions

Suicide risk

More than half of all people who attempt suicide have a mental illness. Depression, substance misuse and schizophrenia are all closely linked to suicide risk. This renders the identification of suicide risk particularly relevant in the clinical and neuropsychological field.

Test

In the Vienna Test System NEURO a client’s suicidal/depressive status can be assessed using the **FBS (Suicide Risk Questionnaire)**. Fifty-two statements are presented in turn on the screen; the client must rate them as true or false.

I tend to be rather nervous, restless, and fidgety.

[correct] [incorrect]

Next
# Overview of all available Test Sets and Tests at SCHUHFRIED

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## THE TESTS

### Intelligence Test Batteries

- IBF Basic Intelligence Functions
- INSBAT Intelligence Structure Battery
- INSSV Intelligence Structure Battery – short form

### Special Intelligence Tests

- 2D Visualization
- 3D Spatial Orientation
- A3DW Adaptive Spatial Ability Test
- AMT Adaptive Matrices Test
- ANF Adaptive Numerical Flexibility Test
- APM Raven’s Advanced Progressive Matrices
- CPM Raven’s Coloured Progressive Matrices
- FOLO Inductive Reasoning
- HCTA Halpern Critical Thinking Assessment
- MIP Mathematics in Practice
- PST Pilot’s Spatial Test
- SPM Raven’s Standard Progressive Matrices
- SPMPLS Raven’s Standard Progressive Matrices Plus
- VISGED Visual Memory Test

### Special Ability Tests

- 2HAND Two-Hand Coordination
- ALS Work Performance Series
- ATAVT Adaptive Tachistoscopic Traffic Perception Test
- B19 Double Labyrinth Test
- COG Cognitrone
- CORSI Corsi Block-Tapping-Test
- DAKT Differential Attention Test
- DAUF Sustained Attention
- DT Determination Test
- DTKI Determination Test for Children
- FGT Figural Memory Test
- ELST English Language Skills Test
- FLIM Flicker/Fusion Frequency
- FVW Continuous Visual Recognition Task
- GESTA Gestalt Perception Test
- INHIB Response Inhibition
- LVT Visual Pursuit Test
- MDT Movement Detection Test
- MLS Motor Performance Series
- MTA Mechanical/Technical Comprehension
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**Personality Structure Inventories**
- BFSI: Big Five Structure Inventory
- EPP6: Eysenck Personality Profiler V6

**Special Personality Tests**
- AGDIA: Aggression Assessment Method
- AVEM: Work-related Behaviour and Experience Patterns
- AVIS: Aggressive Driving Behaviour
- DSI: Differential Stress Inventory
- DSIHR: Differential Stress Inventory HR
- EBF: Recovery-Stress Questionnaire
- IPS: Inventory for Personality Assessment in Situations
- IVPE: Inventory of Driving-related Personality Traits
- MMG: Multi Motive Grid
- SBUSB: Scales for the Assessment of Subjective Occupational Stress and Dissatisfaction
- SKASUK: Customer Service and Orientation Scales

**Objective Personality Tests**
- AHA: Attitudes to Work
- BACO: Resilience Assessment
- OLMT: Objective Achievement Motivation Test
- RISIKO: Risk Choice
- WRBTV: Vienna Risk-Taking Test Traffic

**Attitude and Interest Tests**
- AISTR: General Interest Structure Test
- MOI: Multi-method Objective Interests Test Battery

**Clinical Tests**
- ATV: Identification of Alcohol Risk
- FBS: Suicide Risk Evaluation Questionnaire
- FFT: Questionnaire Functional Drinking
- FSV: Questionnaire on Reaction to Pain

**Test Creation Program**
- TG: Test Generator

Descriptions of all tests and test sets can be found in the main catalog of the VIENNA TEST SYSTEM or at www.schuhfried.com.
Our service to you
Don’t throw in the towel – reach for the telephone!

Free services

Demo version
Take a look at the Vienna Test System NEURO, on DVD or online via a link. We shall be happy to send you either – please contact us.

Online presentation
A SCHUHFRIED colleague will be happy to take you through the Vienna Test System NEURO online and answer your questions on computerized psychological assessment. All you need is a telephone and a computer with internet connection.

Help desk
Our Help Desk is happy to assist with installation and technical queries.
Telephone +43 2236 42315-60 or email support@schuhfried.at.

Updates and service contracts

Software updates enable you to benefit from improvements such as:
- New test forms (e.g. expansion of the parallel test forms)
- New norms
- New languages
- Updated test items
- New auxiliary functions
- Compatibility with updated operating systems and PC hardware

Single update
Single update for the administration software and all tests.

Update contract
With an Update Contract your Vienna Test System NEURO is always fully up to date. Updates are provided twice a year.

Update and service contract – Standard
As well as twice-yearly updates to your test system, this contract includes additional services, such as
- Places on training courses and seminars
- On-site installation and training
- Low-cost equipment loan in the event of capacity shortages or repairs

Update and service contract – Premium
The Premium contract guarantees you full support for all aspects of the psychological process. For example, in addition to the twice-yearly software update it includes:
- Quota of consulting services
- Replacement of the Response Panels every five years
- Free equipment loan
Consulting
Do you need a test that doesn’t yet exist? Or perhaps you need advice on identifying appropriate personnel development measures from test results? The following services are available to help you:

Psychological services
- Advice on all aspects of psychological suitability assessment
- Test-specific advice
- Training in test use and scoring and contract testing
- Planning ways of improving test results
- Adaptation of test batteries through evaluation

Technical services
- Integrating the Vienna Test System NEURO into other systems
- Integrating external information and data into the Vienna Test System NEURO

Consulting

Opportunities for using tests in organizations and resulting benefits
A psychiatric clinic that specializes in affective disorders wishes to provide training in areas of cognitive deficit for patients with unipolar depression. This means that it is first necessary to identify patients’ cognitive status, using appropriate tests. We provide comprehensive advice on the dimensions that should be investigated, the tests to be used, and possible intervention measures.

Defining relevant dimensions for particular disorders
As a first step we use literature research and expert interviews to define the cognitive deficits that are to be expected in patients affected by this disorder.

Selecting tests on the basis of relevant dimensions
We then select the tests in the Vienna Test System that measure these dimensions.

Creating customized tests
At the customer’s request we not only draw on cognitive ability tests but also integrate into the Vienna Test System a depression questionnaire devised by the customer.

Integrating other instruments
As a result of consultation with the client, it is also agreed that testing to establish the diagnosis will be preceded by a structured clinical interview (SCID) as previously used. Testing serves to identify deficits in the patient’s functional ability level and suitable interventions. It is recommended that where the tests reveal deficits, the corresponding CogniPlus training programs should be used. On the basis of the test results, training can be targeted at possible cognitive deficits.

Creating a customized report
In addition a report template is drawn up that can be used to provide an automatic written summary of each patient’s results.

Training and use
The clinic staff are trained in the use of the tests and training programs and given comprehensive advice. For example, they are recommended to start with the attention training program, to use each training program for at least 20 minutes, to use approximately three training programs in each session and in general to make training suitably varied in order to maintain motivation.

Designing and conducting a validation study
In addition the clinic’s directors wish to conduct a validation study to test whether the training programs are achieving the desired results with the patients. Working with the customer we design a validation scheme that will involve treating half the patients by the previously used method, while the other half will in addition use the CogniPlus training programs. Both groups undergo pre/post measurement of cognitive ability, general level of functioning and the patients’ subjective wellbeing, thereby enabling the impact of the CogniPlus training to be analysed. Since the CogniPlus training is found to have a positive effect, it is introduced throughout the clinic.
Scientifically validated quality

All the tests in the Vienna Test System NEURO are scientifically validated and in tune with the most up-to-date research.

Meeting the main quality criteria of psychometric assessment tests

Objectivity
The tests in the Vienna Test System NEURO guarantee maximum objectivity in
1. administration (independent of the test administrator and the physical setup)
2. scoring (statistics-based and valid overall assessment) and
3. interpretation (the same test scores are interpreted in the same way).

Reliability
The tests of the Vienna Test System NEURO have high reliability – that is, they measure the given dimension accurately.

Validity
The tests in the Vienna Test System NEURO are valid – that is, they measure the dimensions that they are intended to measure.

Meeting the secondary quality criteria of psychometric assessment tests

Norming (reference values)
All tests have sufficiently large, representative and up-to-date norms to enable test results to be compared with those of a representative sample. The norms are revised at least every eight years. Many of the tests in the Vienna Test System NEURO have been normed on groups that include elderly people.

Test tips in the manual
The manual available for each test explains the theoretical background, documents the process of test development and evaluates the test’s quality criteria. In addition the manual contains instructions on administering and interpreting the test.

Test security and data protection
The Vienna Test System NEURO incorporates four security levels. Each level can be protected by a password. All data (personal details, test results and test data) is encrypted at file level, making it impossible for it to be read by an external program. In addition, all a respondent’s data is coded with the serial number of the test system that was used, which means that it can only be accessed via the test system that was used to save it. The Vienna Test System NEURO makes subsequent modification and falsification of test results impossible.

Research laboratory
The SCHUHFRIED research laboratory has 13 test stations, supervised by up to five psychologists and psychologists in training. Here norming and validation studies are carried out on representative samples. In addition, mobile test systems are available for research projects involving children, older people or people with disabilities.
Tested in practical settings and underpinned by research

The Vienna Test System NEURO has been tried and tested in practical settings while also being theory-led. All the specialist standards that ensure the quality of clinical neuropsychological assessment for the most important function areas have been taken into account in the development of the Vienna Test System NEURO.

Quality management system

SCHUHFRIED has a quality management system that complies with EN ISO 13485:2003, which is a version of EN ISO 9001:2000 adapted to medical products. Products of SCHUHFRIED GmbH are developed and produced in accordance with EU Directive 93/42/EEG. They comply with the Medical Products Act and therefore carry the CE mark. The development and production guidelines which have been drawn up as part of our quality management system ensure that SCHUHFRIED products are durable, highly reliable and fault-free.

State award

“Quality by competence” has been SCHUHFRIED’s motto for many years. As a result the company is entitled to bear the Austrian coat of arms. This is the highest award granted in Austria and is only awarded to businesses that can demonstrate a high level of exports, a first-class credit rating, innovative ability, good quality management and significant investment in research and development.
Your virtual shopping mall: www.schuhfried.com

Buy and extend licenses, tailor your test portfolio to your immediate needs by buying single-use licenses and use the Web Direct Testing system to test without administration software – you can do all this in the SCHUHFRIED webshop!

Worth knowing
To purchase and extend licenses in the webshop you need a new Vienna Test System (Version 7.00 or above).

Worth knowing
Single-use licenses and small order quantities are particularly worthwhile if you need to extend your portfolio occasionally – for example, if you need special tests to produce a report.

With its clear organization and easy-to-use functions the SCHUHFRIED webshop provides the perfect opportunity to shop around the clock. A comprehensive product range from the application areas of HR, Neuro, Traffic and Sport awaits you. You can extend licenses and purchase tests or test sets. Any test or test set can be licensed in the Vienna Test System NEURO, irrespective of the application area it is assigned to. Select the tests and test sets relevant to the issue you want to assess and integrate them into your Vienna Test System NEURO.

And online shopping has all these advantages:

**Instant delivery**
As soon as you have placed your order you will receive an email containing all the files needed to install or extend your licenses. Import these into your Vienna Test System NEURO. You can now start testing right away.

**Minimum order quantity: 1 test administration**
In addition to the ordering options “7-year flat rate” and “50 test administrations” the webshop includes a new feature that enables you to buy test administrations on a sliding scale. The minimum order quantity is one test administration.

**24-hour shopping basket**
All the items you put in your shopping basket will stay there for 24 hours.
For the first time ever, tests and test sets can now be presented without administration software. This Web Direct Testing is carried out via the SCHUHFRIED webshop: it enables you to use tests flexibly without needing to buy or install the administration software. Web Direct Testing is particularly suitable for decentral testing – that is, when the test administrator and the testee are in different places.

Here’s how it works:

1) Log on to the SCHUHFRIED webshop with your user details.

2) Select a test or test set, then go to the checkout and pay.

3) You will receive a code via which the test can be started. Pass this code on your testee.

4) As soon as the testee has completed the test session, you will be emailed a pdf with the results.
Introducing SCHUHFRIED

7 reasons for SCHUHFRIED

1. SCHUHFRIED combines tradition and innovation

The SCHUHFRIED company, founded as a family business in 1947, has 65 years’ experience behind it. Today the company leads the world in computer-based psychological assessment. Each year SCHUHFRIED’s Vienna Test System is used to conduct some 12.5 million test sessions.

2. SCHUHFRIED operates globally

41 international distributors and the SCHUHFRIED headquarters (in Vienna, Austria) support customers all over the world. The Vienna Test System is currently used in 67 countries and is available in 27 languages.

3. SCHUHFRIED wins awards for excellence

"Quality by competence" has been SCHUHFRIED’s motto for many years. That is why the company has had ISO 9001 certification since 2003 and has been awarded the Austrian coat of arms. This is the highest award granted in Austria and is only awarded to businesses that can demonstrate a high level of exports, a first-class credit rating, innovative ability, good quality management and significant investment in research and development.

4. SCHUHFRIED has good contacts

SCHUHFRIED works with experienced experts – scientists, computer specialists and marketing gurus. At congresses, symposiums and specialist events SCHUHFRIED networks with the other major players in the sector, so that it is always in touch with the latest trends. Or setting the trend itself.

5. SCHUHFRIED specializes in computer-based psychology

The success of SCHUHFRIED products is built on the unique interplay between the three strands of psychology, hardware and software. All its products are developed in-house, produced in Vienna, closely coordinated and continuously improved. Each year SCHUHFRIED invests 25 percent of its turnover in research and development.

6. SCHUHFRIED systems are simple and user-friendly

Using new technology can be a daunting prospect. Why not continue with the old familiar methods, such as paper-and-pencil tests? SCHUHFRIED makes new ventures simple. The systems are easy to use and have many advantages. For example, the results of tests and training programs are available immediately – they are generated automatically and hence bound to be accurate. Because time is money!

7. SCHUHFRIED is a strong partner

SCHUHFRIED goes the extra mile for its clients. The sales team is the first point of contact and can turn many questions asked into questions answered. The Help Desk assists with technical issues. Psychologists advise on all matters in their field. This is appreciated by the users of systems in many businesses and organizations, including:

- 2,600 clinics, hospitals and rehabilitation centers
- 2,350 systems in use with private companies and recruitment agencies
- 1,400 self-employed users
- 1,350 systems at traffic examination centers
- 650 systems used by railway customers
- 530 universities
- 250 systems in airlines and flight training centers
- 110 users in the field of sport psychology
- 13 military institutions
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SCHUHFRIED
passion for psychology

SCHUHFRIED GmbH
Hyrtlstrasse 45
2340 Moedling
Austria
Tel: +43 2236 42315
Fax: +43 2236 46597
Email: info@schuhfried.at