



UFOV Assessment Manual

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Introduction

This manual describes the development, operation, and utility of the Useful Field of View (UFOV) test. It is a computer-administered and computer-scored test of functional vision and visual attention, which can be predictive of ability to perform many everyday activities, such as driving a vehicle. The test can be administered in about 15 minutes and is recommended for use as a screening measure in conjunction with a clinical examination of cognitive functioning or fitness to drive. It is recommended for people who are age 55 years old or older, who have suffered health problems that can cause deficits in thinking abilities (e.g., stroke, Alzheimer's Disease, head injury), who are concerned about their driving ability, and who have had multiple vehicle crashes.

UFOV consists of three subtests, or parts, which assess speed of visual processing under increasingly complex task demands. Using both eyes, the examinee must detect, identify, and localize briefly presented targets. In the first subtest, the examinee identifies a target presented in a centrally located fixation box that is presented for varying lengths of time. In the second subtest, the examinee identifies a target, but must also localize a simultaneously presented target displayed on in the periphery of the computer monitor. The third subtest is identical to the second, except that the target displayed on in the periphery is embedded in distractors, making the examinee's task more difficult.

An interpretive report provides scores for each part of UFOV and assigns the examinee to one of five levels, or categories, of risk.

Computer requirements

The computer must be connected to the internet for this assessment to work. It does not work offline.

The software uses HTML5 and WebGL and modern browsers are required to run it properly. We require one of the following:

- Windows: Windows 10 using latest version of Google Chrome, Firefox, or Microsoft Edge

- Mac: OS X 10.10 or later using Google Chrome, Firefox, or Safari

We recommend Google Chrome.

The software may work reasonably well on earlier operating systems and other browsers (but not Internet Explorer). However, the number of rejected presentations is likely to increase, which will decrease the validity of the assessment (see [Presentation time tolerance](#)). A computer that shows unresponsiveness or technical problems should never be used with the UFOV.

Tablets are not recommended for this assessment, because they do not offer a sufficiently large screen to test peripheral vision.

Recommended Users

The UFOV assessment is designed to evaluate important cognitive skills required to drive safely. UFOV should be viewed as one source of information that may aid in forming opinions about an examinee's ability to drive safely. Information other than UFOV, such as driving habits, driving record, medical conditions, and other relevant factors, should always be taken into account before determining an individual's ability to drive safely.

Health Care Professionals

UFOV may be used to aid in making professional judgments about individuals' fitness to drive. UFOV may also be used as part of a battery of cognitive tests for purposes of assessing cognitive functioning.

Employers

UFOV may be used to assess potential or current employees' driving skills. UFOV is also sensitive to temporary conditions, such as medication side effects, and may assist employers in determining fitness to drive.

Departments of Motor Vehicles

UFOV may serve as a measure for screening applicants for driver's licenses.

Insurers

UFOV may aid in measuring automobile crash risk.

Group Portal

The Group portal allows an administrator to:

- Add users
- Monitor usage

The group portal URL is: <https://portal.brainhq.com>

In order to access the group portal each group administrator must have a BrainHQ account. At <https://portal.brainhq.com> administrator can either log in to their existing accounts or sign up for a new account and create a new group.

Licenses

Currently UFOV Assessment licenses are only purchasable through contacting Posit Science and requesting an invoice. The self-serve license cart in the BrainHQ group portal is from accessing BrainHQ training exercises only.

Group administrators may monitor the number of purchased assessments that have been used on the group portal page. A csv report with monthly usage may be downloaded by clicking the "download usage summary" link.

The license column in the group portal is for licensing access to BrainHQ training, not the UFOV assessment. Unless a group member would like to also train on BrainHQ this column can be ignored.

Adding users

To add a user click on  . In the prompt, fill out the new group member's name, email address, and a password. The email address and password entered in this form will be what the member uses to log into BrainHQ to do the UFOV assessment. If you receive an error message then the email address may already be in use for a previously created BrainHQ account. In the case, please contact our Customer Delight team to add the member to the group for you--to do this, click the "help" link on the page.

Monitoring Usage

In the user details table there is a complete list of group members, the email addresses they registered with and when they last logged in and completed an assessment. Since each assessment is composed of three parts, a complete assessment will show three levels complete in the levels complete column.

Running the UFOV Assessment

Use the login/password created in the portal to log into the assessment application:
<https://ufov.brainhq.com>

The application will run through the three subtests in sequence:

- Subtest 1: Processing Speed
- Subtest 2: Divided Attention
- Subtest 3: Selective Attention

Each part starts with two tutorials trials with the correct responses highlighted. The user then must successfully complete 4 practice trials before proceeding to each part of the assessment.

Each assessment must be completed in order for the results to be saved and reported. If an assessment must be ended early, clearing browser history (cache and cookies) will reset the UFOV assessment webpage.

Results and Reports

If a maximum score of 500 milliseconds (ms) is reached on any subtest prior to task 3, Selective Attention, following subtests are not presented. The incomplete subtests will be marked as N/A because they were not required. The reason for this is that the subtests build upon each other and if at any point an examinee cannot perform better than the maximum display time of 500 ms there is no purpose in making the examinee demonstrate this on progressively harder subtests.

After all three tasks have been completed a quality check is performed. Since the tasks are progressively more difficult, the scores should increase in value. If a client performs better a more difficult task than on an easier task, the better score is also assigned to the easier task. The logic is that the poor performance on the easier task reflects a lack of understanding of the requirements of the task.

The results and risk score is shown at the end of the assessment. The results page also shows the number of presentations rejected due to being outside the tolerances.

Optimal Testing Conditions

The examinee will be viewing displays that are presented very rapidly. It is crucial that the viewing conditions be as ideal as possible.

Viewing distance

The optimal viewing distance depends on the height of the display area of the monitor used.

Minimum viewing distance:	1.8 * measured screen height
Optimal viewing distance:	2.1 * measured screen height
Maximum viewing distance:	2.4* measured screen height

Example: For a monitor with a display height of 10 inches, the user should view the display at distance between 18 and 24 inches, with the optimal distance at 21 inches.

Experience has shown that some examinees are reluctant to sit close to the monitor and tend to back away from the screen. Monitor the examinee's viewing distance during testing and correct at each stopping point, if necessary.

Testing room

The testing room should be dark. If lighting is necessary, ensure that glare on the screen is minimized. Test results may be skewed if glare interferes with the screen.

The room should be as quiet as possible. Ensure that any extraneous and/or background noise is minimized. The examiner should avoid speaking to the examinee during the test, as this will distract many examinees. Remember that although

background noise will not affect the test results of all individuals, it will have the most negative effect on those individuals already having difficulty with the test.

The computer should be setup in a comfortable, ergonomic, position for the examinee can comfortably reach the mouse or touch screen. Even though the assessment doesn't measure reaction time, it is important that examinees can respond easily.

Test Examiner Demeanor

To make testing as pleasant as possible for both examiner and examinee, follow these simple guidelines:

1. Make sure the examinee is seated comfortably.
2. The examinee must be informed of the purpose of the test; this is often termed “informed consent.” It is not fair or ethical to test an examinee without informing him or her of the purpose of the exam. For example, if the test is used as part of a determination of driving risk or ability to drive, the examinee should be so informed. Any refusal to begin or finish UFOV must be honored, and the examinee should never feel coerced. The examinee should be encouraged to complete UFOV in its entirety, but should be informed prior to starting the test that he or she has the right to choose to discontinue participation at any point during testing. Professionals, such as health care professionals, must follow codes of ethical conduct mandated by the professional organizations to which they belong. However, all examiners are strongly recommended to provide thorough informed consent to all examinees.
3. Inform the examinee that the test will take about 15 minutes to complete.
4. Inform the examinee that reaction time is not measured by the assessment and they should not feel rushed to respond before they are sure of their response.
5. Make sure that the examinee understands all instructions. Instructions may be repeated during testing, as necessary.

Wearing Glasses

Suggest to the examinee that glasses be worn if the examinee typically wears glasses for viewing information at similar distances. If the glasses are very dirty or smudged, suggest they be cleaned before starting the test. Fortunately, UFOV results are not seriously affected by even a substantial degree of blurred vision. If the examinee chooses not to wear glasses or expresses concern about the degree to which test results might be impacted by blurring, inform him or her that the computer will first

determine whether he or she can see well enough to take all portions of the test and, if not, will automatically conclude the test after the first part is finished. In such a case, an eye exam will be recommended.

Examinee issues

Frustration

UFOV is challenging and some examinees may become frustrated with their performances and wish to discontinue the test. Reassure the examinee as needed and praise effort made thus far.

Reminding examinees of the of the opening instructions is allowed at any time (e.g., sometimes the information presented on the screen is shown for very short periods of time, and most people reach a point where they cannot identify it). Since the assessment uses an adaptive algorithm, it may be important to inform the examinee that one can make errors and yet do well on the test, and that it is difficult for examinees to estimate how well they're doing during the test. He or she may be doing better than than they think they are.

Reluctant to Guess

Many examinees may be reluctant to respond when not absolutely sure of a correct answer. Encourage a best guess, and remind them that an accurate response, whether accurate or inaccurate, is correct - the computer is using all of their responses - correct and incorrect - as part of the assessment.

Wants to "Back Away" from the screen

Many older adults may wish to consciously or unconsciously increase the viewing distance, or move away from the screen, in an attempt to make the targets presented on in the periphery appear within their field of central vision. This defeats the purpose of Subtests 2 and 3. Try to discourage backing away, and many examiners find saying something like the following to be of help: "The rules of the test require that you sit close to the screen, like this." Demonstrate or ask the examinee to move or lean forward to reach the correct distance (e.g., 24 inches).

Technical Properties

Presentation time tolerance

The UFOV assessment uses the computer's internal clock to make sure that the images are presented accurately. Any trial that is outside the display tolerance is repeated until it meets the tolerance limitations.

Tolerances:

- Presentation ≤ 50 ms: ± 1 ms
- Presentation > 50 ms: ± 3.33 ms

The number of trials rejected due to being outside the tolerance range is shown at the end of each test and at the end of the assessment. If more than 25% are rejected for any test the results should be ignored and the test need to be retaken. (see [Computer requirements](#) above).

If an assessment reaches the rejection threshold, some basic troubleshooting may fix the problem. The most common causes are that the browser is having a problem or the computer is doing something else in the background. Here are some things to do to troubleshoot.

- Close the browser and reopen it
- Only have one browser window open with the UFOV assessment
- Close all other programs
- Check to see if a back-up or automatic update is running and cancel it so that runs later
- If all else fails, restart the computer

If you need additional advice, please contact our [Support](#) team.

Adaptive staircase algorithm

The assessments use a two-step size staircase algorithm to estimate thresholds. A "step" refers to a change in difficulty by either making the trial display time longer or shorter. To increase the difficulty the display time is decreased and to decrease

difficulty, display time is increased. The algorithm starts at a 50 millisecond (ms) step size and switches to 16.66 ms on the first error. The first response is ignored if it is an incorrect response.

The assessment ends early if there are three consecutive trials at fastest (16.67 ms) or at slowest (500 ms) presentation times. To allow a greater chance for poor performers to be able to perform the tasks, the algorithm only exits early if at least 10 trials have been done.

Interpreting Results

Subtest scores

The result in milliseconds (ms) for each part of the assessment is shown after completion. Lower scores are better. The range is 17 to 500 ms.

Subtest 1 - Processing Speed

> 0 & ≤ 30	Normal central vision and processing speed
> 30 & ≤ 60	Normal central vision but somewhat slowed processing speed
> 60 & < 350	Central vision loss and/or slowed processing speed
≥ 350 & ≤ 500	Severe Central vision loss and/or very slowed processing speed

Subtest 2 - Divided Attention

> 0 & < 100	Normal divided attention ability
≥ 100 & < 350	Some difficulty with divided attention
≥ 350 & ≤ 500	Severe difficulty with divided attention

Subtest 3 - Selective Attention

> 0 & < 350	Normal selective attention ability
≥ 350 & < 500:	Difficulty with selective attention
500	Severe difficulty with selective attention

Risk Score

When all three parts are complete a summary of the scores is shown together with an overall risk score.

Risk scores:

- 1: Very Low
- 2: Low
- 3: Low to Moderate
- 4: Moderate to High
- 5: High

Can UFOV be improved?

Research shows that 8 to 10 hours of UFOV training improves performance on the task and can substantially reduce crash risk (Ball et al, 2010). BrainHQ includes the latest version of UFOV training. Please contact our support team for further information.

Support

If you have a question or problem, please contact us by:

- Phone: 877-573-7059
- Email: ufovsupport@brainhq.com
- Clicking "help" on the website