Oxford Visual Perception Screen

Manual v2.1

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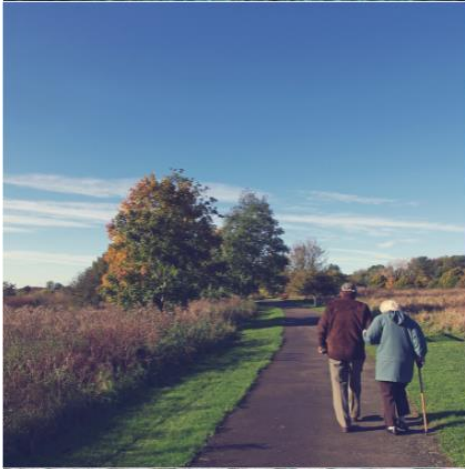
Introduction

The Oxford Visual Perception Screen or OxVPS is a 15-minute screening tool in paper format. OxVPS has a wide range of tests for object recognition, face recognition, reading, eye-hand coordination (visuo-constructive skills), and neglect of the left or right side. In ten tasks, patients are asked to recognise drawings of objects, recognise faces, read a short paragraph, or draw a geometrical figure. Except for the drawing and reading tasks, all tasks are multiple choice (overcoming communication issues), images are presented vertically (overcoming visual neglect), and patients can respond with broad gestures (overcoming hand weakness). The test results indicate which visual perceptual problems are likely present in a patient. A total score indicates the extent of the visual perceptual abilities. OxVPS is a screening tool. This means it is not able to diagnose visual perception problems. Instead, it provides pointers to what might need further investigation or referral.

Further training materials including a training video can be found on the OxVPS website: https://oxvps.webspace.durham.ac.uk

For more information, contact Dr Kathleen Vancleef at kathleen.vancleef@durham.ac.uk

Versions of OxVPS

Version	Date	Author	Description of changes
2.0	01/12/2023	Kathleen Vancleef	First published version
2.1	01/04/2024	Kathleen Vancleef	Normative data for people over 80 years old added to the sample. Disclaimer in the manual about use of OxVPS in patients above 80 years old was removed and total sample size update to 107. Cut-off scores were updated for Simple Feature perception (3 became 4), Face Recognition (2 became 4), Alexia (92 become 94), and Figure Copy (55 became 56) in manual and on examiner form to reflect expected performance in all age ranges. Error on expected total score for Anton-Babinsky syndrome and Blindsight adjusted in manual. Interpretation of Figure Copy score clarified in manual. Several typos in Table 3 of manual were corrected.

Glossary

Achromatopsia = "colour blindness", distorted colour perception. Patients can see everything in grayscale or might have difficulties telling similar colours apart.

Alexia = "word blindness", inability to comprehend written material. The patient's ability to write and spell can be intact, but they are unable to spontaneously read.

Akinetopsia = "motion blindness", difficulties with perceiving object in motion, severity might vary.

Anton-Babinsky syndrome = total loss of vision, although patient is convinced their vision is normal.

Apperceptive agnosia = inability to combine different features of an image (colour, shape, texture) into a coherent whole that is an object. While knowledge of the object is intact, people are unable to perceive the correct form of the object, and therefore find it difficult to recognize, draw, or copy an object based on visual information alone.

Associative agnosia = difficulty with understanding the meaning of what is seen. Although patients perceive an object's features like size, shape, or colour correctly and can describe it, they cannot link it to visual representations of objects in their memory. Patients can draw or copy but do not recognise what they have drawn.

Blindsight = the total or partial loss of conscious functional vision caused by damage to the brain's occipital cortex but preserved unconscious vision. Patients can use their unconscious vision in automated behaviours like avoiding obstacles. They will deny any functional vision difficulties but answer correctly more often than expected when forced to guess.

Cortical blindness = total or partial loss of conscious functional vision caused by damage to the brain's occipital cortex.

Global visual attention deficit = inability to attend to the global shape of an image and instead focusing on small details in the image which can hinder recognition of objects.

Neglect dyslexia = consistent letter omission, addition, and substitution errors on either the left or right side of a word when reading individual words.

Object-based neglect = visual inattention to either the left or right side of an object regardless of where the object is in space

Optic aphasia = inability to name visually presented objects without difficulties in naming those objects on tactile or auditory presentation.

Prosopagnosia = "face blindness", inability to recognize familiar faces, including sometimes one's own.

Simultanagnosia = inability to perceive more than one object at a time.

Space-based neglect = visual inattention to either the left or right side of space

Visuo-constructive deficit = difficulty in construction tasks relying on visual information, such as drawing or assembling the various parts of an object into a complete structure.

Administration of Oxford Visual Perception Screen

General instructions

- Ask patient to wear habitual correction for viewing distance of 30-40 cm. This will most likely be their reading glasses, vari- or bifocal glasses.
- Complete box at the top of the examiner form with Patient ID, Date, Experimenter name (initials are fine), Version of stimulus booklet, Times, Conditions of patient. There is no need to ask the patient again if you already know the answer.
- Adjust lighting to comfortable illumination for patient. Try to avoid glare on the pages.
- The patient can take as much time as he/she needs for each task, except for the reading and cancellation task.
- Possible instructions or encouragement:
    - o "Keep going",
    - o "Just guess",
    - o "Give it a try",
    - o "It's ok to make a mistake now and then",
    - o Etc.
- The patient is allowed to change their mind.
- Encourage them to choose an option even if unsure.
- Guide the patient through each test in the same order as the stimulus booklet and the examiner form. See examiner form for instructions for each task.

Self-Evaluation

This task records subjective visual complaints through three questions. The patient can reply verbally, via gesturing (e.g. nodding) or a communication chart. The three questions asked are:

a. Do you have difficulties seeing with your usual glasses?
b. Do you have difficulties seeing colour since your stroke?
c. Do you have difficulties seeing things moving since your stroke?

If unclear to the patient, you can specify that you would like to know about changes since their stroke, not pre-existing visual conditions. For instance, some stroke survivors might say their glasses no longer help because they are awaiting cataract surgery.

Picture Naming

In this task, the patient is shown a black and white line drawing (e.g. bear) at the top of the page and is asked what it is a picture of. Five possible answers are given underneath the line drawing. The answers are presented in a vertical column to accommodate patients with hemispatial neglect. One of the incorrect options is semantically related to the drawing but not visually (e.g. kangaroo), another is visually related but not semantically (e.g. table), another is visually and semantically related (e.g. dog), and the last one is unrelated (e.g. car). To facilitate responding by patients with aphasia, or dyspraxia, **patients can answer verbally or by pointing to the preferred option**. Synonyms or words for related objects that cannot be reasonably distinguished from the presented

object (e.g. "polar bear" for bear, "toadstool" for mushroom) are considered correct. If a patient gives a related word as an answer (e.g., "woods" for fields), they are asked to pick one of the listed options. Generalisations are not allowed (e.g. "animal", for bear, "insect" for butterfly, "plant" for mushroom, "cutlery" for spoon). **If the patient does not spontaneously choose one of the options within three seconds, read the options out to them while pointing at each option**. Four line drawings are presented.

Semantic Info

The patient is shown black and white line drawings of objects alongside five words and is asked which word goes best with the object. The words are all associated with each other but only one is strongly associated with the image. For instance, a drawing of a rabbit will be shown alongside the words "carrot", "pear", "onion", "tomato", "potato". All these are vegetables, but only one, "carrot", is strongly associated with a rabbit. The five options are given and presented in the same layout as the Picture Naming task. **The patient can answer verbally or by pointing to the preferred option. If the patient does not spontaneously choose one of the options within three seconds, read the options out to them while pointing at each option.** Four images are presented.

Global Shape Perception

In this task, a fragmented outline of an irregular shape is shown at the top of the page. Underneath, four other fragmented shapes are presented. Patients need to pick the shape that is most similar to the target shape at the top of the page. To ease the distinction between the target shape and the options to choose from, the target shape is made up of thicker line fragments. **The patient can answer verbally or by pointing to the preferred option.** Four sets of shapes are presented.

If patient is providing the answer by indicating the order in which it appears in the list (e.g., "Three" to say that shape no 3 is the most similar one to the one at the top), **ask for confirmation**. People count the shapes in different ways (e.g., starting from the bottom and not the top). The numbering on the examiner form skips the bold shape but starts from the top alternative (no 1) and goes down to the last alternative on the page (no 4).

Item Counting

In this task, patients are asked to count the number of stars presented on the page. Four options are given underneath the stimulus. Besides the correct number, the options include numbers in proximity to the correct number with at least one number smaller than the correct number. **The patient can answer verbally or by pointing to the preferred option. If the patient does not spontaneously choose one of the options within three seconds, read the options out to them while pointing at each option**. Four sets of stars are presented.

Simple Feature Perception

The patient is shown straight lines and asked if the line is tilted. If required, the question can be rephrased as "slanted" or as "neither perfectly horizontal or vertical". **The patient can answer**

verbally, by nodding their head, by using a communication chart, or an agreed sign for "yes" and "no". Four lines are presented.

Face Recognition

In this task, patients are shown five photographs of faces. One happy face at the top of the page and four neutral faces below. They are asked which of the four neutral face photographs is of the same person as the happy face photograph. All faces show a frontal view, have a white background, and cover a similar area in the image. All models wear a neutral black t-shirt and accessories such as jewellery were removed. **The patient can answer verbally or by pointing to the preferred option.** Four sets of faces are presented.

Reading

In the reading task, the patient is asked to read a short paragraph out loud. The paragraph consists of exactly 60 words including low frequency words (doughty, snappily), compound words (firefighters, overgrown, sunset, farmhouse, overnight), and a combination of low frequency and compound words (hitchhiker, woodshed, lean-to) evenly spread across the paragraph. The task is timed and any incorrect or omitted words are marked. This task might not be possible for patients with severe speech issues (see also page 10).

Before showing the text, tells the patient that you will ask them to read a text out loud. Turn the page when the patient is ready. **Start the timer as soon patient begins to read and stop the timer as soon as the patient finishes**. Score the task while the patient reads the text by

- Circling omitted words on the examiner form
- Crossing out incorrectly read words on the examiner form

Cancellation

In this task, the patient is presented with small hearts scattered over a page (Demeyere et al., 2015). Some hearts are complete, others have a gap on the left or right side. They are asked to mark off the complete hearts. **The page has to be presented at the body midline of the patient and cannot be moved (unless the patient moves their body midline).** Any salient visual cues on the left or the right side of the page such as a hand or the clip of a clipboard should be avoided. The pages are shown in LANDSCAPE mode for this task. Patients are given a pen or a pencil. A pencil can be easier to write with for patients using their non-dominant hand or when completing without the support of a table (you can use the stimulus booklet as a support). It is also allowed to let the patient point and you write.

The task is introduced with a practice sheet with just one column of hearts in the middle of the page. Say "Here you see some love hearts. Some hearts are complete, some hearts have a gap on one side. Please, tick off the complete hearts." If they solve the practice sheet correctly, proceed to the page with 90 hearts. If any mistakes are made on the practice sheet, repeat the instructions, and allow them another practise. The practice sheets are intended to explain the task, so you should make every effort to ensure the patient understands the task. You can rephrase the instructions and demonstrate to the patient what to do. It can be helpful to point to the hearts on the practice sheet

one be one and ask, "Does this one have a gap?" and after the patient's answer "So, what do we do with it?".

After a maximum of two practice sheets, the patient is shown a page in landscape mode with 90 hearts (30 complete hearts, 30 hearts with a left gap, 30 hearts with a right gap even spread across the page). Explain that the task is the same as before: "Here are more hearts. You just do the same as before: tick off (or point to) the complete hearts". No further instructions are given here. Start the timer as soon as patient starts searching. Make sure the centre of page is presented at body midline of patient by holding the page centrally at top or bottom. Move the page during task if the patient is moving. No prompts can be given. Patients are allowed to revisit areas of the page to correct mistakes or missed hearts. The time until completion is recorded. This includes time used for checking their answers. Scoring is completed after the session.

Figure Copy

Patients are asked to copy a complex geometric figure on a page. The figure shows a rectangle, divided in two halves, with smaller elements like star, circle or triangle placed at specific positions in the two halves. These is no time limit to this task. Give the patient a pen or pencil, show the figure to them and say, "Can you please copy this figure in the space below?" It may be worth specifying that "It does not need to be neat".

Scoring Oxford Visual Perception Screen

DISCLAIMER: Validation research is ongoing and currently sensitivity of 71% and specificity above 92% has been demonstrated in a sample of 50 stroke survivors. This document will be updated when more results of validation research will become available.

The cut-off scores for each task are based on data from 107 older volunteers without neurological or psychiatric conditions. The volunteers are of a similar age as stroke survivors: approximately 15% below 60 years old, 16% between 60 and 69 years old, 27% between 70 and 79 years old, 31% between 80 and 89 years old, and 11% above 90 years old. They completed all tasks of OxVPS. The distribution of scores of the healthy older volunteers gave an indication of what a 'normal' score is for each of the tasks. On most tasks the healthy older volunteers achieved the maximum score. Less than 5 percent of the healthy older volunteers had scores below the baseline or cut-off scores. **Therefore, if a patient scores below the cut-off score, this is an indication of an impairment on that task.**

Self-Evaluation

Scoring

Circle Yes or No for each question. Shade wedges of wheel on cover page for each "Yes" answer.

Interpretation

The first question assesses a patient's insight into their visual problems. If their answer contradicts performance on the subsequent tasks, this can be an indication of blindsight[1] (patient answers they cannot see anything, but their performance is above chance) or Anton-Babinsky syndrome[2] (patient denies having any difficulties while performance in tasks is lower than the cut-off for normal visual perception). People with achromatopsia[3] will likely be well aware that they no longer see colours and answer "Yes" to the second question. More subtle change in colour vision after stroke will not be picked up with this question. People with akinetopsia[4] will likely be well aware that they no longer see motion and answer "Yes" to the third question.

- If "No" on subjective complaints (question 1) and low total score → Anton-Babinsky syndrome
- If "Yes" on subjective complaints (question 1) and high total score → Blindsight

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[1] Blindsight = the total or partial loss of conscious functional vision caused by damage to the brain's occipital cortex but preserved unconscious vision. Patients can use their unconscious vision in automated behaviours like avoiding obstacles. They will deny any functional vision difficulties but answer correctly more often than expected when forced to guess.

[2] Anton-Babinsky syndrome = total loss of vision, although patient is convinced their vision is normal.

[3] Achromatopsia = "colour blindness", distorted colour perception. Patients can see everything in grayscale or might have difficulties telling similar colours apart.

[4] Akinetopsia = "motion blindness", difficulties with perceiving object in motion, severity might vary.

Picture Naming, Semantic Info, Global Shape Perception, Item Counting, Simple Feature Perception

Scoring

Total number correct for each task (max 4 for each task). Shade wedges of wheel on cover page for each task with a score below the cut-off.

For picture naming, additionally note the type of error:

- Semantically related
- Visually related
- Semantically and visually related
- Unrelated

Interpretation of pattern of scores (see also wheel on cover page)

Compare each score to the cut-off score for each task and mark which task the patient failed and which task they passed.

The cut-off scores for each of the tasks are:

- Picture Naming: a score below 3
- Semantic Info: a score below 3
- Global Shape perception: a score below 3
- Item Counting: a score below 4
- Simple Feature perception: a score below 4

To interpret their results check which profile in Table 1 best matches that of your patient. For instance, if they have failed the Picture Naming task and the Semantic Info task, but passed the Global Shape task, Item Counting, and Simple Feature Perception, this matches the profile in the column for associative agnosia. Instead of using the table, you can also use the wheel on the front cover of OxVPS. Shade the wedges corresponding to the tasks your patient failed. In the current example you would shade the wedge for Picture Naming and for Semantic Info. Then check which arrow corresponds to the wedges you have shaded on the right side of the wheel. In the example, the arrow for Associative Agnosia covers the two wedges you have shaded.

Table 1. Interpretation of object recognition tasks 2-6.

	No object recognition difficulties	Optic Aphasia[5]	Associative Agnosia[6]	Apperceptive Agnosia[7]	Cortical Blindness[8]	Simultan-agnosia[9]
2 Picture naming	PASS	FAIL	FAIL	FAIL	FAIL	PASS
3 Semantic info	PASS	PASS	FAIL	FAIL	FAIL	FAIL
4 Global Shape Perception	PASS	PASS	PASS	FAIL	FAIL	FAIL
5 Item counting	PASS	PASS	PASS	PASS	FAIL	FAIL
6 Simple feature perception	PASS	PASS	PASS	PASS	FAIL	PASS

Interpretation per task

Picture naming

In addition, attention should be paid to the type of errors made in the Picture Naming task. Patients with optic aphasia will not spontaneously know the name of the object, but will have access to semantic information of the object, for example, where to find it, how to use it, etc. They will likely make semantic errors (e.g. dog or kangaroo for bear image).

Patients with associative agnosia will recognise the shape but not the object. They will most likely make visually related errors (e.g. table or dog for the bear image) but are unlikely to choose an option that is visually distinctive from the target (e.g. kangaroo or car for the bear image).

Patients with apperceptive agnosia will not recognise the shape. They might also choose an option that is visually unrelated (e.g. car or kangaroo for the bear image) beside a visually related error (e.g.

[5] Optic aphasia = inability to name visually presented objects without difficulties in naming those objects on tactile or auditory presentation.

[6] Associative agnosia = difficulty with understanding the meaning of what is seen. Although patients perceive an object's features like size, shape, or colour correctly and can describe it, they cannot link it to visual representations of objects in their memory. Patients can draw or copy but do not recognise what they have drawn.

[7] Apperceptive agnosia = inability to combine different features of an image (colour, shape, texture) into a coherent whole that is an object. While knowledge of the object is intact, people are unable to perceive the correct form of the object, and therefore find it difficult to recognize, draw, or copy an object based on visual information alone.

[8] Cortical blindness = total or partial loss of conscious functional vision caused by damage to the brain's occipital cortex.

[9] Simultanagnosia = inability to perceive more than one object at a time.

table or dog for bear image). Patients with cortical blindness will not perceive the image and will make any type of error equally.

Semantic Info

People who will have difficulties with the Semantic Info might have associative agnosia (because they don't recognise the object), apperceptive agnosia (because they cannot build a coherent mental picture), or cortical blindness (because they cannot perceive the image). People with optic aphasia should not find this task too difficult because they still have access to semantic information of the object like where to find it, how to use it, etc.

Global Shape Perception

The Global Shape Perception task will likely be challenging for people with apperceptive agnosia or cortical blindness because they cannot mentally connect the lines (in case of apperceptive agnosia) or perceive the images (in case of cortical blindness). People with optic aphasia and associative agnosia should not find this task too difficult because they can still connect the lines into a global shape and distinguish shapes. People with simultanagnosia will find this task difficult because they cannot perceive all five shapes at the same time and find it difficult to distinguish the target from the options. People with cataract or macular degeneration will likely have difficulties with this task due to their low visual acuity.

Item Counting

People with apperceptive agnosia will likely be very slow in the Item Counting task. People with cortical blindness or simultanagnosia (because they cannot perceive all the stars at once) will likely have difficulties with this task. People with optic aphasia or associative agnosia should not find this task too difficult because it does not require object recognition. In other words, they do not have to recognise the stars as stars.

Simple Feature Perception

Nearly all people will find the Simple Feature Perception task easy even if they struggle with one of the above tasks because of optic aphasia, associative agnosia, apperceptive agnosia, or simultanagnosia. Only people with cortical blindness will likely find this task challenging.

Face recognition

Scoring

Total number of correctly identified faces (max 4). Shade wedge of wheel on cover page if score below the cut-off.

Interpretation

- If score is 3 or 4, patient shows no signs of prosopagnosia[10]
- If score is 0, 1 or 2 patient shows signs of prosopagnosia

A score below the cut-off score based on normative data can be an indication of prosopagnosia. People with cataract or macular degeneration will likely have difficulties with this task due to their low visual acuity.

Reading

Scoring

- Count the number of correctly read words (bold and normal words, maximum 60). This is the Accuracy score.
- Count the number of correctly read irregular words (bold words, maximum 10)
- Calculate reading speed = (60/ time taken in seconds) * Accuracy. In other words, divide 60 by the time it took them to read the text (in seconds). Then multiply the results with the number of words they read correctly. The final number is the number of words they can read per minute.

Interpretation

- If reading speed is less than 94 words per minute, the patient shows signs of alexia[11]
- If less than 9 of the irregular (bold) words were read correctly, patient shows signs of neglect dyslexia[12]

Beware that language impairments such as developmental dyslexia and speech communication issues (aphasia, dysarthria, or dyspraxia) will also result in poor performance. This task cannot differentiate between such language impairments and pure alexia. People with cataract or macular degeneration will likely have difficulties with this task due to low visual acuity. People with severe glaucoma might omit words on the edge of the page.

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[10] Prosopagnosia = "face blindness", inability to recognize familiar faces, including sometimes one's own.
[11] Alexia = "word blindness", inability to comprehend written material. The patient's ability to write and spell can be intact, but they are unable to spontaneously read.
[12] Neglect dyslexia = consistent letter omission, addition, and substitution errors on either the left or right side of a word when reading individual words.

Cancellation

Scoring

Divide the cancellation page in 10 boxes of equal size. Count the total of ticked off **complete** hearts in the four boxes on the left side (A) and the four boxes on the right side (B) of the page. Do not count the ticked off complete hearts in the middle two boxes. Count the total number of ticked off hearts with left gap (C) and right gap (D) anywhere on the page.

Calculate object-based asymmetry score (C-D) and space-based asymmetry score (B-A):

- The space-based asymmetry score is the total number of correctly marked hearts in the four right most boxes minus the total number of correctly marked hearts in the four left most boxes.
- The object asymmetry score is the total number of incorrectly marked hearts with a left gap minus the total number of incorrectly marked hearts with a right gap.

Interpretation

People with space-based (or ego-centric) neglect[13] will cross out more hearts on one side of the page. People with object-based (or allocentric) neglect[14] will systematically cross out more hearts with a gap on one side compared to hearts with a gap on the other side. People with cataract or macular degeneration might have difficulties with this task due to their low visual acuity. The size of the gap in the hearts is comparable to optotypes readable by a patient with a visual acuity of 1.0 logMAR or 6/60 Snellen at a distance of 32 cm. Although, the total score for people with a more severe visual impairment might be lower than the normative data, they will have asymmetry scores in the normal range. People with glaucoma might omit hearts on the edges of the page, this should have no effect on their asymmetry scores.

- If object asymmetry score > 0: left object-based neglect
- If object asymmetry score < 0: right object-based neglect
- If space asymmetry score > 2: left space-based neglect
- If space asymmetry score < -2: right space-based neglect
- Any other score: no signs of object or space-based neglect

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[13] Space-based neglect = visual inattention to either the left or right side of space
[14] Object-based neglect = visual inattention to either the left or right side of an object regardless of where the object is in space

Figure Copy

Scoring

For each of the 20 elements you will need to score manually the following three (one point for each)

- Presence: Is the element present anywhere in the drawing?
- Accuracy: Is the element drawn with reasonable accuracy? Small deviations due to imprecise movements are acceptable, especially when a patient is using their non-dominant hand. For example, a straight line can be a bit wobbly or rotated a few degrees off, but not curved or 60 degrees rotated. Attempts to correct inaccuracies (e.g. doubling up the line to straighten it up or correct the joining of two or more lines) are allowed. Only the final element is scored.
- Location: Is the element in the right location relative to its closest neighbours?

As much as possible each element and each accuracy and position should be scored independently. However, it is important to avoid double-penalising, such that if the accuracy/position of one element leads to another element not lining up, then the latter element should not be scored down.
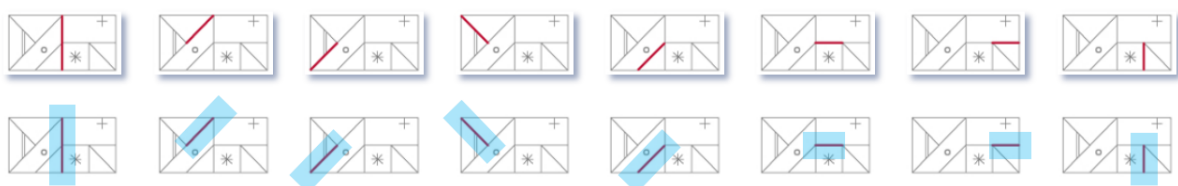
Container components:
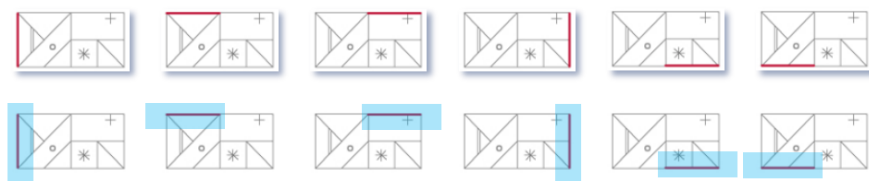
The container components are lines defining the edges of the enclosing rectangle. If no container component is present in the entire drawing, assume the individual used the bounds of the drawing area as the container, and therefore award the full 18 marks for the container components to favour the participant not penalize them.

ACCURACY criteria: The lines should be reasonably straight, and they should join cleanly at 90º angles. As stated in the general guidelines section, reasonable allowances should be made for slight inaccuracies that can be attributed to lack of drawing proficiency or stylus slippage.

POSITION criteria: The lines should be in the same position relative to their nearest neighbours as in the template drawing and within the blue bounds.
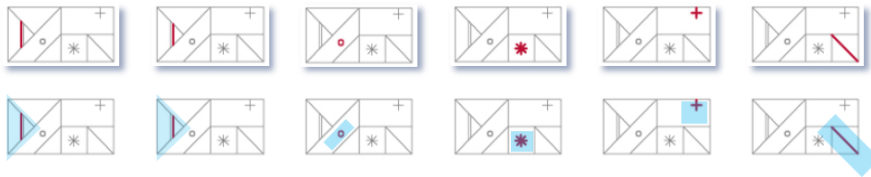
Divider components:

The divider components are lines that create partitions of the container component.

ACCURACY criteria: The lines should be reasonably straight, and they should join cleanly at the angles in the template drawing. As stated in the general guidelines section, reasonable allowances should be made for slight inaccuracies that can be attributed to lack of drawing proficiency or stylus slippage.

POSITION criteria: The lines should be in the same position relative to their nearest neighbours as in the template drawing. In addition, they should partition the container and its sub-partitions in proportions similar to the ones in the template drawing and within the blue bounds.

Details components:

Details components are distinct features inside partitions of the container component.

ACCURACY criteria: The shapes should be similar to the ones in the template drawing, even if diagonal is flipped, clearly recognizable and accurate.

POSITION criteria: The shapes should be in the same position and orientation as in the template drawing and within the blue bounds. No position point if diagonal detail is flipped.

Total score:

Maximum total score (20 elements * 3 scores) is 60.

Strategy score:

In addition, a binary global visual attention score is given for the drawing strategy: 1 is given if the large rectangle was drawn first, 0 if any other element was drawn first.

Were the lines of the outer rectangle drawn first? Yes (score 1) or No (score 0)

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Interpretation

Patients with simultanagnosia and apperceptive agnosia will likely present with a strategy score of 0 and a low number of elements in the correct location (although all elements might be present and accurately drawn).

Table 2. Interpretation of scores on Figure Copy task

Total score	Strategy score	Additional conditions	Indication of
≥ 56	1	None	No impairment
≥ 56	0	None	Global visual attention deficit[15]
< 56	1	No motor impairments or weakness in hand.	Visuo- constructive deficit[16]
< 56	0	Elements drawn are often in the wrong location.	Apperceptive agnosia or simultanagosia

Total score

= Number of subtests with a score at or above the baseline. In other words, the total number of tasks without a shaded wedge.

Table 3. Calculation of total score

Task	One point for
1 Self-Evaluation	"No" to all three questions
2 Picture naming	Score of 3 or 4
3 Semantic info	Score of 3 or 4
4 Global Shape Perception	Score of 3 or 4
5 Item counting	Score of 4
6 Simple Feature Perception	Score of 4
7 Face recognition	Score of 3 or 4
8 Cancellation	Score of 0 for object-based asymmetry AND score between -2 and 2 for space-based asymmetry (including -2 and 2).
9 Figure Copy	Score of 56 or above and started with the large rectangle
10 Reading	Reading speed of at least 94 words per minute and 9 or 10 of the bold words read correctly.

The total score is calculated as the total number of passed tasks (maximum 10) and gives an indication of the extent of the visual perceptual impairment of a patient. Total score ranges from 0-10 with **10 meaning no impairment and 0 meaning severe visual perception impairments.**

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[15] Global visual attention deficit = inability to attend to the global shape of an image and instead focusing on small details in the image which can hinder recognition of objects.
[16] Visuo-constructive deficit = difficulty in construction tasks relying on visual information, such as drawing or assembling the various parts of an object into a complete structure.

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How other conditions can influence the results on OxVPS

Aphasia

- Profile: They will likely fail the reading task, but not any of the other tasks.
- Total score: 9/10
- Similar profile and score as patients with alexia.

Cataract

- Profile: They might fail any or all of the following: Global Shape Perception, Face Recognition, and Reading. Cancellation might be difficult because patients can not see the gap. However, mistakes are equally likely on the left and right side, so the asymmetry scores will unlikely be affected.
- Total score: 7/10 or more
- Occasionally these patients might have a similar profile and scores as patients with combined alexia and prosopagnosia: they fail on Face Recognition and Reading, but do well on Semantic Info, Global Shape Perception, and other tasks.

Glaucoma

- Profile: They might omit hearts and words on the left and right side of the page in the cancellation and reading tasks. This will have no effect on asymmetry scores in cancellation task, but their reading speed might be a bit slower, and their neglect dyslexia score might be lower because they miss the bold words on the right side of the page.
- Total score: 9/10
- Similar profile and score as patients with alexia and neglect dyslexia.

Macular degeneration

- Profile: Patients might fail any or all of the following: Global Shape Perception, Face Recognition, and Reading. Global shape Perception will be particularly difficult. Cancellation might be difficult because patients cannot see the gap. However, mistakes are equally likely on the left and right side, so the asymmetry scores will unlikely be affected.
- Total score: 7/10 or more
- These patients will rarely have a similar profile and score as patients with combined alexia and prosopagnosia: they fail on Face Recognition and Reading, but do well on Semantic Info, Global Shape Perception, and other tasks. Instead, a patient with macular degeneration will very likely fail the Global Shape Perception task.

Be aware that visual perception deficits can also interact. For instance, a patient with object-based neglect might have difficulties recognising objects (Picture Naming) or reading (Reading) because they will not perceive the left or right side of the drawing/word. They will therefore show signs of associative agnosia and alexia on OxVPS.