Connect-the-Numbers Test

Psychodiagnostic procedure for quantitative detection
of (latent) portosystemic encephalopathy (PSE)

The Connect-the-Numbers Test provides good support for diagnosing (latent) portosystemic encephalopathy. In this test, numbers arranged in an arbitrary sequence and have to be connected with one another as quickly as possible in their correct sequence by using a pencil to draw a line between them. The test is structured in such a way that a healthy individual will always be able to perform this task in less than 30 seconds. If the test person requires more than 30 seconds however, it is highly probable that there is portosystemic encephalopathy.

If the test is to be used to document the course of an illness or treatment, then the four different versions of the test given here should be given in sequence for that purpose.

Performing the Number Connection Test:

1. Always carry out the test at the same time of day as far as circumstances allow.

2. Before each test, check for the completeness of the testing documents and have a stopwatch ready.

3. Make sure that the patient is able to assume a relaxed writing position, is furnished with a suitable surface to write on and that the illumination is sufficiently bright and free of glare.

4. Explain the task to be accomplished to the patient by using the demonstration test sheet, always using the same wording as much as possible; for example as follows:
On this page you see the numbers from 1 - 10. They have been all scattered about. Your task is to order the numbers by drawing a line between them with the pencil, starting with the smallest one. You start with the number 1 and draw a straight line from there to 2, then to 3, etc. Do this as fast as you can.

5. Now let the patient connect the numbers on the practice sheet. If the patient makes any mistakes, correct them for him or her until you are sure that the subject has understood the task at hand.

6. Now place the second test sheet in front of the patient with the numbers from 1 to 25. This is the first part of the test for which the time is recorded. Fill out the top of the sheet and have the patient sign it with his or her full name (handwriting sample). Now explain to the patient that you will stop the time, for example as follows:
Scattered across this sheet you see the numbers from 1 to 25. Now I would like you to do the same as you just did on the practice sheet - as quickly as you can, connect the numbers with each other in their correct order, starting from the smallest one. Place your pencil on the number 1. When I give you a signal, begin.

7. Start the stopwatch at the same time as you give the signal. Make sure that the patient proceeds as directed. If he or she skips a number, draw his or her attention to the error, for example as follows:
You forgot the 7! Place your pencil on the 6 and connect it with the 7 and then on to the 8.

The time needed to give the correction and to carry it out is included in the recorded testing time! As soon as the patient has correctly reached the 25, press the stopwatch once again and enter the time measured into the field designated for that purpose.

8. If the patient requires more than two minutes for the task, stop the test after 120 seconds and note the last number he or she had arrived at the time the test was interrupted.

9. As a general principle, there is a strong indication of the presence of (latent) PSE in cases where the patient requires more than 30 seconds to perform the test correctly.

Evaluating the test:

Time required	Stage of PSE
up to 30 sec.	no PSE
31 to 50 sec.	0 – I
51 to 80 sec.	I – II
81 to 120 sec.	II – III
Forced termination	I I I

Duphalac®

Connect-the-Numbers Test
Test sheet (demonstrations only)

1

6

9

2

8

3

10

7

4

5
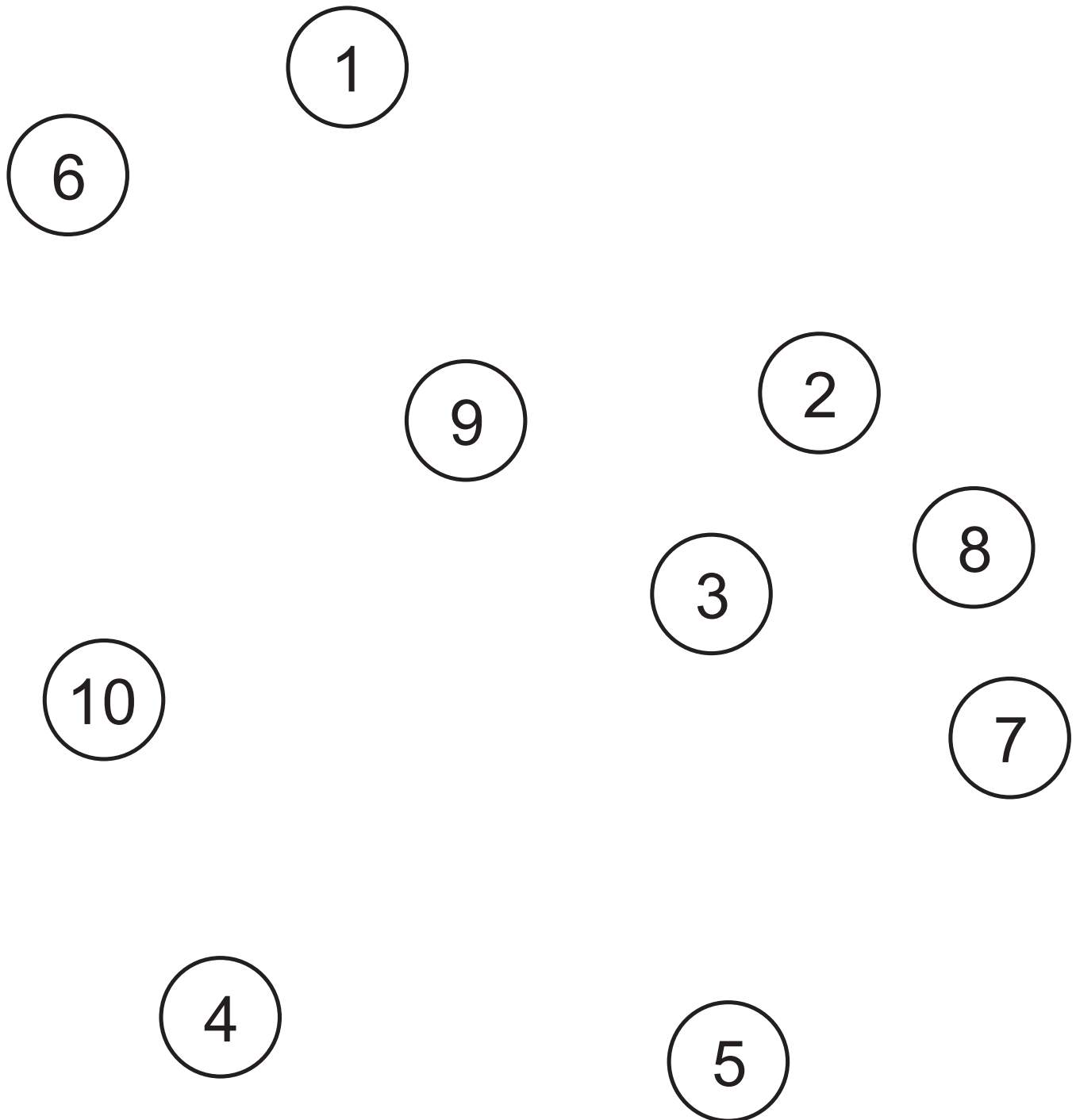
Connect-the-Numbers Test 1

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SOLVAY

Patient family name, first name _____ Date of birth _____

Date _____ Time of day _____ Initials of the tester _____

Testing period (seconds) _____

Signature of patient, first and family names _____

FINISH

25
10
6
4
9
23
7
START
1
11
5
14
24
8
3
2
13
12
17
22
16
15
21
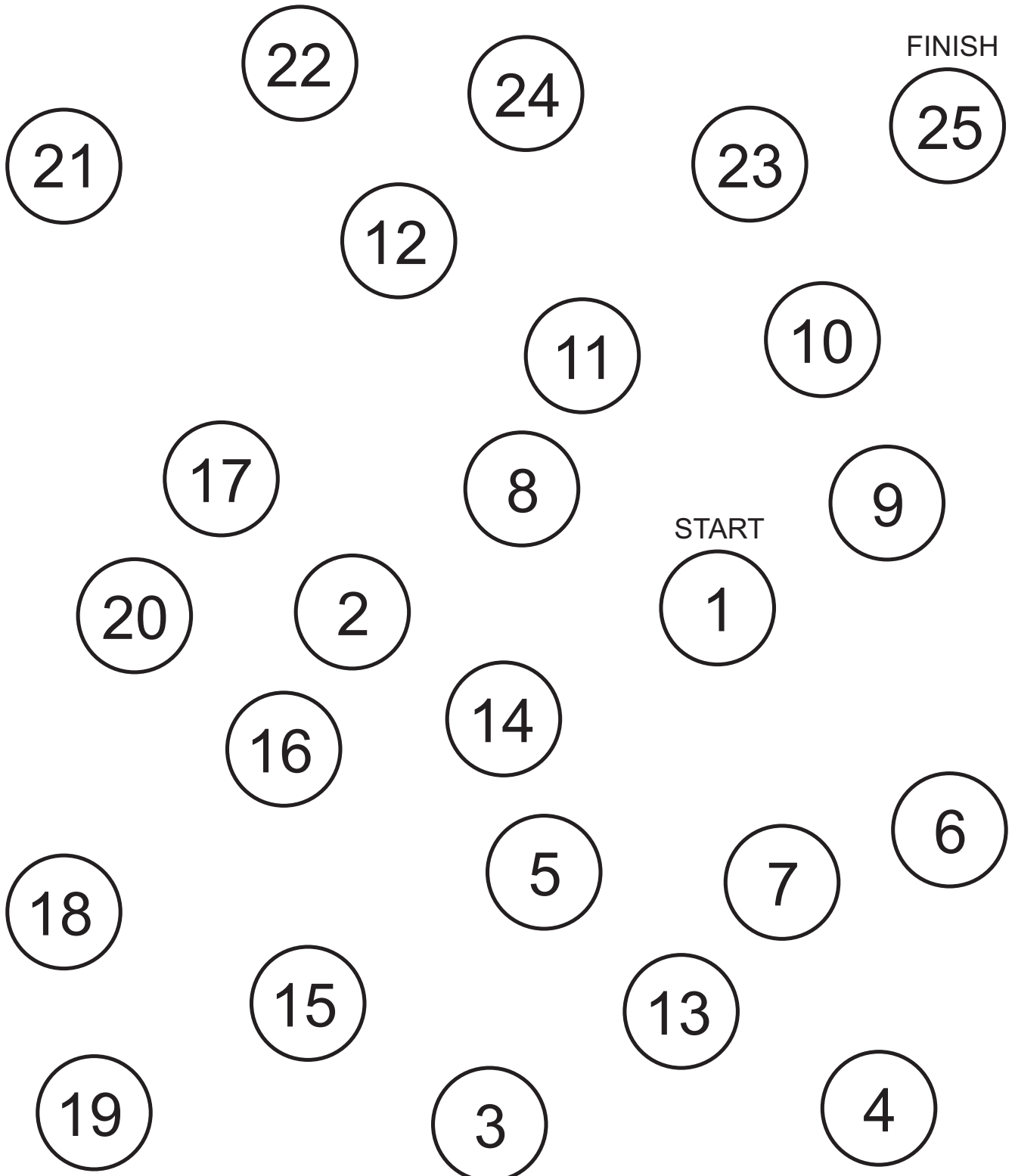18
20
19

Connect-the-Numbers Test **2**

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Patient family name, first name _____ Date of birth _____

Date _____ Time of day _____ Initials of the tester _____

Testing period (seconds) _____

Signature of patient, first and family names _____

FINISH

22

24

25

21

23

12

10

11

17

8

9

START

20

2

1

14

16

18

5

7

6

15

13

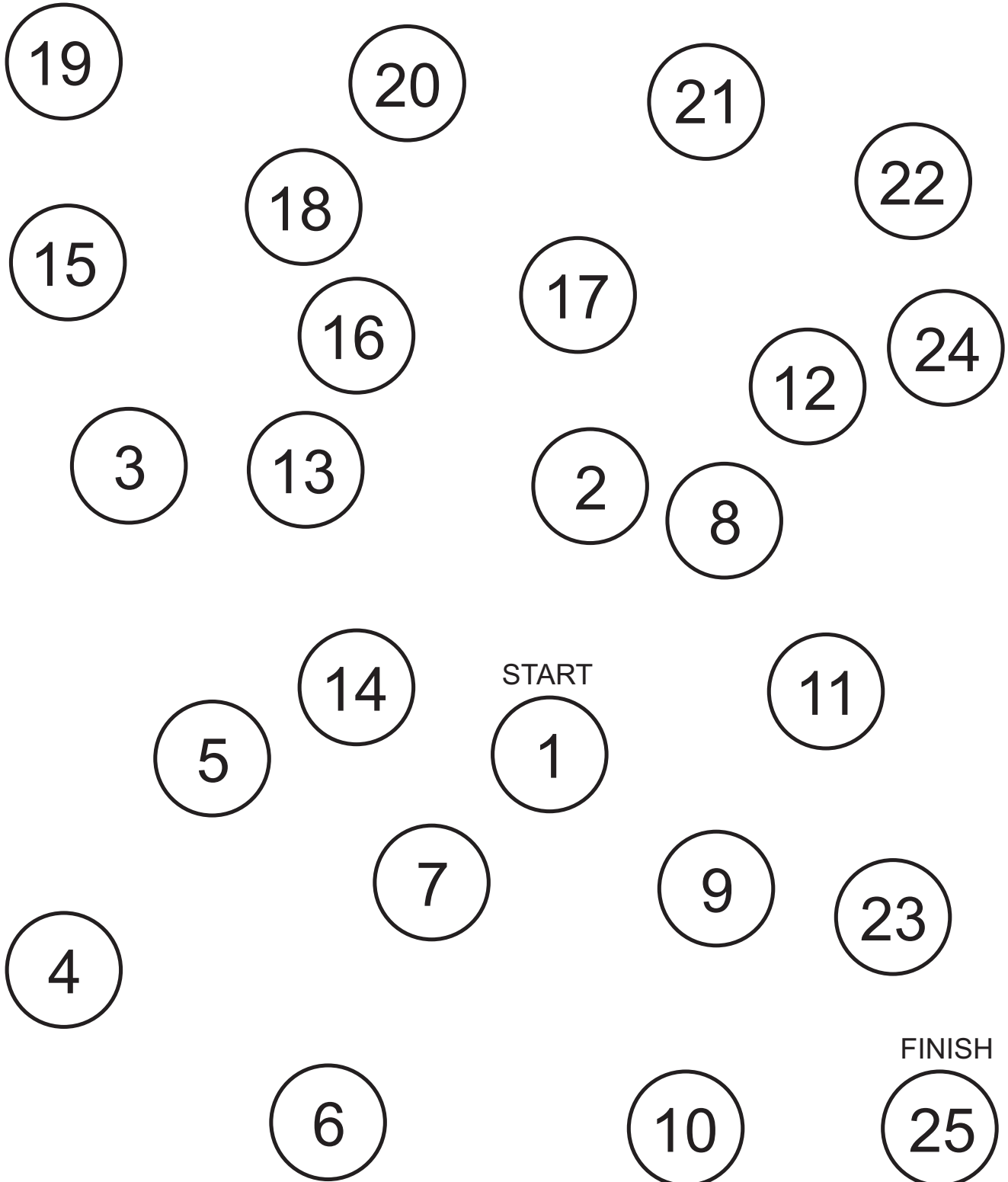19

3

4

Connect-the-Numbers Test **3**

Duphalac®

Patient family name, first name _____ Date of birth _____

Date _____ Time of day _____ Initials of the tester _____

Testing period (seconds) _____

Signature of patient, first and family names _____

19

20

21

22

18

15

17

16

12

24

3

13

2

8

14

START

11

5

1

7

9

23

4

FINISH

6

10

25

Connect-the-Numbers Test **4**

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SOLVAY

Patient family name, first name _____ Date of birth _____

Date _____ Time of day _____ Initials of the tester _____

Testing period (seconds) _____

Signature of patient, first and family names _____

(4) (5) (15) (19)

(18)

(7)

(14)

(3)

(6) (2) (16) (20)

START

(17) (13)

(9) (1)

(8)

(10) (21)

(11)

FINISH

(23) (12)

(25) (24) (22)