

Kinesthetic and Visual Imagery Questionnaire (KVIQ)

Administration procedures

The aim of this questionnaire is to determine the extent to which individuals are able to visualize and feel imagined movements. There is no right or wrong answer. This questionnaire is **NOT** self-administered; it was developed to be administered to persons with reduced mobility or with physical disabilities. All movements are assessed from a sitting position. The questionnaire includes a visual imagery scale and a kinesthetic imagery scale.

The long version (KVIQ-20) comprises 20 items (10 movements for each scale) and the short version includes 10 items (5 movements for each scale). The examiner informs the subjects that for each item he will proceed as follows. «First, I will ask you to assume the start position. Second, you will be asked to perform a movement from your seated position, once only, following my instructions (*repeat that the movement must only be performed once; the subjects tend to perform the movement while the examiner does the demonstration and then repeats it*). Third, you will return to the start position and imagine performing the movement that you just executed. Do not actually perform the movement, imagine it only once. Finally, you will be asked to rate, on a 5-point ordinal scale, the clarity of the visual image (*Items VI to V10*) or the intensity of the sensations associated with the imagined movement (*Items KI to K10*)».

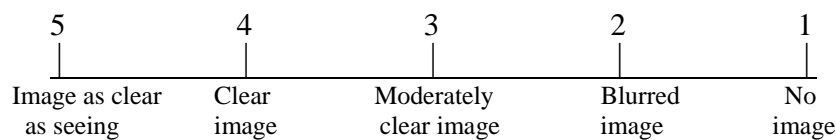
The rating scale should be presented verbally using the descriptors and not the numbers. In some cases (persons with communication problems), the scale can be presented visually, but always use the descriptors (hide the numbers). The subject should imagine the movement from the first-person perspective or internal perspective (as if he/she is executing the movement). To make sure of this, ask the subject to describe what he/she sees or feels. For example, with item #4 (elbow flexion), the subject should mention for instance that he/she sees the inside or palmar face of the hand. If in doubt, repeat this type of question with other movements. When subjects are unable to perform physically the required movement on one side (e.g., affected limb of a person with stroke), ask them to perform it with the other side; then instruct them to simulate the movement with their affected limb. Note on your recording sheet the items assessed with the latter procedure (i.e., physical execution on one side and simulation on the other side). The movement should be performed over a comfortable range and should not induce pain (e.g., shoulder elevation in persons with stroke). When no movement is possible on either side (e.g., paraplegia, tetraplegia), the verbal description of the movement together with the visual demonstration by the examiner is suggested. To promote the first-person perspective, the demonstration could be done with the examiner sitting side by side instead of facing the subject being tested.

The items should be presented following the order of the questionnaire and according to the subject's hand or foot dominance. However, do not use the terms dominant and non-dominant; instead in the description of movements substitute «right side» or «left side» as appropriate. Note that in persons post-stroke, the dominance is determined with respect to their pre-stroke status. Be sure to specify the dominant side and the affected side on your recording sheet. In the validation process of the KVIQ, the visual imagery scale was always presented first, followed by the kinesthetic imagery scale (Malouin et al. 2007).

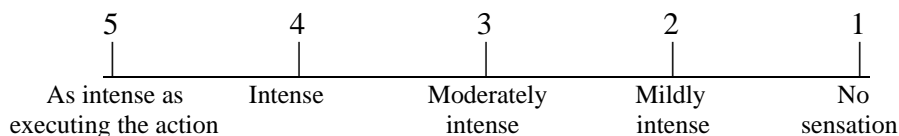
N.B. Testing should alternate between the dominant and non-dominant sides. However, if you wish to compare sides, items relative to the upper and lower limbs (*visual imagery scale: 3V, 4V, V5 and 7V, 8V, 9V, 10V and kinesthetic imagery scale: 3K, 4K, 5K and 7K, 8K, 9K, 10K*) can be tested bilaterally as follows. Assess items #3, #4, #5 as indicated and after item #5 repeat the movements corresponding to items #3, #4, #5 on the other side; likewise, after items #7, #8, #9, #10, repeat them on the other side. This procedure is used to avoid repeating the same movement twice.

Motor imagery descriptors and scales

Visual imagery scale



Kinesthetic imagery scale



<u>KVIQ-20</u>		<u>Movements</u>	<u>KVIQ-10</u>	
1V	1K	Neck flexion/extension		
2V	2K	Shoulder shrugging		
3Vnd	3Knd	Forward shoulder flexion	3Vnd	3Knd
4Vd	4Kd	Elbow flexion		
5Vd	5Kd	Thumb to finger tips	5Vd	5Kd
<i>*Repeat #3, #4, #5 on the other side</i>				
6V	6K	Forward trunk flexion	6V	6K
7Vnd	7Knd	Knee extension		
8Vd	8Kd	Hip abduction	8Vd	8Kd
9Vnd	9Knd	Foot tapping	9Vnd	9Knd
10Vd	10Kd	Foot external rotation		
<i>* Repeat #7, #8, #9, #10 on the other side</i>				

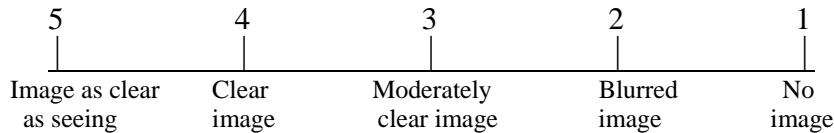
d: dominant nd: non-dominant

** For bilateral assessment of limb movements*

Reference: Malouin F, Richards CL, Jackson PL, Lafleur MF, Durand A, Doyon J. The Kinesthetic and Visual Imagery Questionnaire (KVIQ) for Assessing Motor Imagery in Persons with Physical Disabilities: A reliability and Construct Validity Study. *Journal of Neurologic Physical Therapy* 2007; 31:20-29.

Kinesthetic and Visual Imagery Questionnaire

Visual imagery scale



Item 1V. Neck flexion/extension

1. Sit upright with the head straight and hands resting on your thighs
2. Bend your head as far as possible, first forward and then backward
3. Return to the start position. Now imagine the movement, concentrate on the clarity of the image
4. Indicate on the scale the quality of the imagined movement

Item 2V. Shoulder shrugging

1. Sit upright with the head straight and hands resting on your thighs
2. Raise both shoulders as high as possible without moving your head
3. Return to the start position. Now imagine the movement, concentrate on the clarity of the image
4. Indicate on the scale the quality of the imagined movement

Item 3Vnd. Forward shoulder flexion

1. Sit upright with the head straight and hands resting on your thighs
2. Lift your non-dominant arm straight out in front of you and keep lifting until it is straight up high
3. Return to the start position. Now imagine the movement, concentrate on the clarity of the image
4. Indicate on the scale the quality of the imagined movement

Item 4Vd. Elbow flexion

1. Sit upright with the head straight and with your dominant arm straight out in front of you with your hand open and palm up
2. Bend the elbow on your dominant side as though you were going to touch your shoulder on the same side
3. Return to the start position. Now imagine the movement, concentrate on the clarity of the image
4. Indicate on the scale the quality of the imagined movement

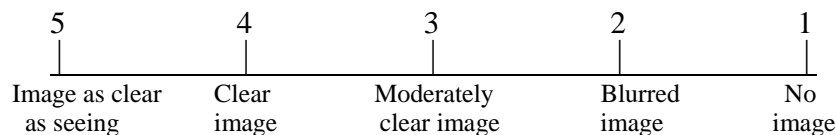
Item 5Vd. Thumb to finger tips

1. Sit upright with the head straight and hands resting on your thighs with your palms up
2. With your dominant hand, touch the tip of each finger with your thumb, start with the index finger and move along the fingers at the rate of about one finger/second
3. Return to the start position. Now imagine the movement, concentrate on the clarity of the image
4. Indicate on the scale the quality of the imagined movement

****Repeat #3, #4, #5 on the other side***

Kinesthetic and Visual Imagery Questionnaire

Visual imagery scale



Item 6V. Forward trunk flexion

1. Sit upright with the head straight and hands resting on your thighs
2. Bend at the waist moving your trunk forward as far as possible then straighten up again
3. Return to the start position. Now imagine the movement, concentrate on the clarity of the image
4. Indicate on the scale the quality of the imagined movement

Item 7Vnd. Knee extension

1. Sit upright with the head straight and hands resting on your thighs
2. Extend your knee to raise the lower leg of your non-dominant side as close as possible to the horizontal then lower it
3. Return to the start position. Now imagine the movement, concentrate on the clarity of the image
4. Indicate on the scale the quality of the imagined movement

Item 8Vd. Hip abduction

1. Sit upright with the head straight and hands resting on your thighs
2. Move the foot on your dominant side sideways about 30 cm (12 inches) then bring it back
3. Return to the start position. Now imagine the movement, concentrate on the clarity of the image
4. Indicate on the scale the quality of the imagined movement

Item 9Vnd. Foot tapping

1. Sit upright with the head straight and hands resting on your thighs
2. With your non-dominant leg tap your forefoot on the floor three times; about once/second while keeping your heel on the floor
3. Return to the start position. Now imagine the movement, concentrate on the clarity of the image
4. Indicate on the scale the quality of the imagined movement

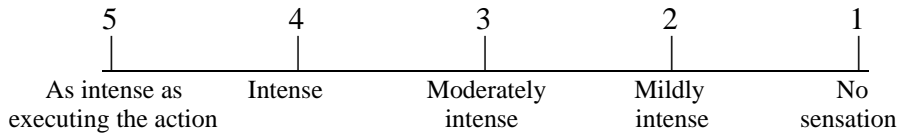
Item 10Vd. Foot external rotation

1. Sit upright with the head straight and hands resting on your thighs
2. With your dominant leg, turn your forefoot out to the side as far as possible without moving your heel
3. Return to the start position. Now imagine the movement, concentrate on the clarity of the image
4. Indicate on the scale the quality of the imagined movement

*** Repeat #7, #8, #9, #10 on the other side**

Kinesthetic and Visual Imagery Questionnaire

Kinesthetic imagery scale



Item 1K. Neck flexion/extension

1. Sit upright with the head straight and hands resting on your thighs
2. Bend your head as far as possible, first forward and then backward
3. Return to the start position. Now imagine the movement, concentrate on the intensity of the sensations
4. Indicate on the scale the quality of the imagined movement

Item 2K. Shoulder shrugging

1. Sit upright with the head straight and hands resting on your thighs
2. Raise both shoulders as high as possible without moving your head
3. Return to the start position. Now imagine the movement, concentrate on the intensity of the sensations
4. Indicate on the scale the quality of the imagined movement

Item 3Knd. Forward shoulder flexion

1. Sit upright with the head straight and hands resting on your thighs
2. Lift your non-dominant arm straight out in front of you and keep lifting until it is straight up high
3. Return to the start position. Now imagine the movement, concentrate on the intensity of the sensations
4. Indicate on the scale the quality of the imagined movement

Item 4Kd. Elbow flexion

1. Sit upright with the head straight and with your dominant arm straight out in front of you with your hand open and palm up
2. Bend the elbow on your dominant side as though you were going to touch your shoulder on the same side
3. Return to the start position. Now imagine the movement, concentrate on the intensity of the sensations
4. Indicate on the scale the quality of the imagined movement

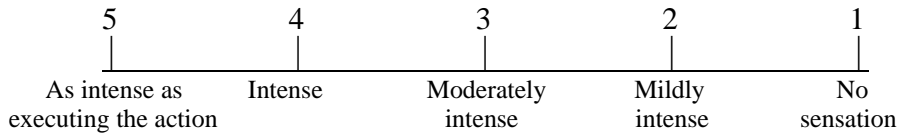
Item 5Kd. Thumb to finger tips

1. Sit upright with the head straight and hands resting on your thighs with your palms up
2. With your dominant hand, touch the tip of each finger with your thumb, start with the index finger and move along the fingers at the rate of about one finger/second
3. Return to the start position. Now imagine the movement, concentrate on the intensity of the sensations
4. Indicate on the scale the quality of the imagined movement

****Repeat #3, #4, #5 on the other side***

Kinesthetic and Visual Imagery Questionnaire

Kinesthetic imagery scale



Item 6K. Forward trunk flexion

1. Sit upright with the head straight and hands resting on your thighs
2. Bend at the waist, moving your trunk forward as far as possible then straighten up again
3. Return to the start position. Now imagine the movement, concentrate on the intensity of the sensations
4. Indicate on the scale the quality of the imagined movement

Item 7Knd. Knee extension

1. Sit upright with the head straight and hands resting on your thighs
2. Extend your knee to raise the lower leg of your non-dominant side as close as possible to the horizontal then lower it
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1. Sit upright with the head straight and hands resting on your thighs
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1. Sit upright with the head straight and hands resting on your thighs
2. With your non-dominant leg tap your forefoot on the floor three times; about once/second while keeping your heel on the floor
3. Return to the start position. Now imagine the movement, concentrate on the intensity of the sensations
4. Indicate on the scale the quality of the imagined movement

Item 10Kd. Foot external rotation

1. Sit upright with the head straight and hands resting on your thighs
2. With your dominant leg, turn your forefoot out to the side as far as possible without moving your heel
3. Return to the start position. Now imagine the movement, concentrate on the intensity of the sensations
4. Indicate on the scale the quality of the imagined movement

** Repeat #7, #8, #9, #10 on the other side*