

Instructions for the administration of the CRIq

The CRIq questionnaire evaluates the cognitive reserve of an individual by means of the compilation of information relating to his or her entire adult life. The CRIq has been design and implemented on the basis of the sense of cognitive reserve proposed by Yackob Stern (2009). For further information, refer to: Nucci, M., Mapelli, D., & Mondini, S. (2012) The cognitive Reserve Questionnaire (CRIq): a new instrument for measuring the cognitive reserve. *Aging clinical and experimental research*, 24, 218-26.

The main instructions for the administration of the CRIq are summarised within the protocol, at the beginning of each section. In this document, we will explain in greater detail the rules of administration and we will address the questions that arise most frequently concerning the classification of a response, with a view to arriving at a form of labelling that is as consistent as possible across the various administrators.

The interview

The compilation of the CRIq requires the capacity to conduct a semi-structured interview. Those administering the CRIq must have access to the tools to guide and actively manage a targeted conversation. As for all neuropsychological interviews, it is essential that the professional takes a respectful attitude – one of sharing, understanding and empathy – towards what the interviewee is saying, and that the professional is able to facilitate the effective gathering of information. Moreover, it is important to be able to deal with the abundant verbalisation and the emotional charge that the recovery of many memories often produces.

The administration of the CRIq in a clinical environment requires that the interviewee is cognitively healthy. In the event that the interviewee has cognitive deficits in terms of memory or attention (even if only suspected deficits), it is preferable that the questions are asked of a family member. Clearly, it is important to ensure that the family member is sufficiently

well-informed about the past and present habits of the patient. A child, for example, may not be aware of the frequency with which the parent carried out certain activities as a youngster, and the same could apply to a second spouse. It is legitimate to verify suspect information or to integrate what the patient says with other sources. In any case, at the end of the questionnaire it is stated whether the information was collected by interviewing the interested party or a family member.

The questionnaire

The first part of the questionnaire involves the simple recording of certain details identifying the interested party. The questionnaire is divided into 3 sections: *CRI-Education*, *CRI-WorkingActivity*, *CRI-LeisureTime*.

CRI-Education: this section records the level of education reached by an individual during his/her life. For each school year successfully completed, 1 point is assigned, whereas 0.5 points are assigned for each year that the individual was forced to repeat.

For example, a person who has completed 7 years of primary school will be assigned 7 points. A person who has also completed 6 years of secondary school and 2 years of a university course will be assigned 15 points (7 years at primary school, 6 years at secondary school and 2 years at university = 15 years in total). Last of all, a person who has a PhD will be assigned 21 points: (7 years at primary school, 6 years at secondary school, 5 years as an undergraduate student and 3 years as a post-graduate student = 21 years in total).

Training courses lasting at least 6 months are assigned 0.5 points for each 6 months of the course.

If for example an individual takes an language course for two years, 2 points are assigned (0.5×4).

In contrast, attendance at a chess course lasting 3 months is not counted because the course is too short. Courses are considered valid if they are intended to provide training (for example: a computing course, a photography course, an English course, etc.); the presence of a teacher is an absolutely essential condition, and one that can be used to resolve cases that are difficult to evaluate.

CRI-WorkingActivity: this section records the type and number of years of work carried out by an individual. It is important to underline that reference is made exclusively to remunerated positions lasting for at least one year. Five distinct levels of employment have been identified, which are differentiated essentially on the basis of the cognitive input required and the level of responsibility taken on:

1. Unskilled labour, farm work, gardener, waiter, driver, mechanic, plumber, electrician, call centre operator, caregiver, babysitter, housemaid, etc.
2. Craftsperson or skilled labourer, cook, store clerk, tailor, nurse, serviceman/servicewoman (entry level), hairdresser, representative, etc.
3. Business owner, white-collar employee, sales agent, estate agent, musician, nun/monk/priest/minister/theologian, nursery school teacher, etc.
4. Managing director of a small company, qualified freelance professional, serviceman/servicewoman (high level), teacher, entrepreneur, doctor, lawyer, psychologist, engineer, etc.
5. Managing director of a large company, senior manager, politician, highly specialised intellectual or scientific professional, university professor, university lecturer, magistrate, surgeon, researcher, etc.

In the section, as stated above, all of the remunerated positions lasting for at least a year must be counted.

For example, in the case of a person having been an unskilled labourer for 30 years before being promoted to skilled labourer for another 15 years, 30 years at level 1 will be assigned, along with 15 years at level 2.

First and second jobs carried out simultaneously are both counted.

For example, in the case of a person having worked as a skilled labourer for 45 years (level 2, for 45 years) and also, for 15 years, having worked in parallel as a painter and decorator (level 1 for 15 years), both jobs would be indicated.

In the case of the second (parallel) job being in the same category as the first, the years must be added together and expressed as a single figure.

If the person was employed as an unskilled labourer for 45 years (level 1 for 45 years) and for 15 years he or she also worked regularly and in parallel as a painter and decorator (level 1 for 15 years), the figure would be expressed as level 1, 60 years.

It is important to underline that the second job is to be taken into account only if carried out regularly and for a period of at least 1 year. The year count is rounded up to the nearest 5-year period.

If for example someone has worked for 12 years, it is necessary to state 15, whereas if someone has worked for 17 years it is necessary to state 20, and so on.

In relation to less common jobs, it is important to bear in mind the sequence of the five levels of employment and to evaluate the cognitive input required and the level of responsibility taken on. An effort will be made to find the best match. It is always important to use common sense; for example, a woman who works at her husband's company without a contract or a fixed wage must, in any case, be considered an employee to all intents and purposes.

CRI-LeisureTime: this section refers to all of those activities that are normally carried out before or after the person concerned goes to work or school. During this time, a person may engage in cognitively stimulating activities; even though this is referred to as "leisure time", the activities in question are not necessarily carried out for fun or pleasure. Indeed, the definition encompasses not just activities such as going to the cinema or to concerts, but also to driving a car or managing a current account. This section is sub-divided into four parts, which are differentiated on the basis of the frequency with which the activities referred to are usually carried out – i.e. weekly, monthly, annually or at a fixed frequency.

The items included indicate the activity for which it is necessary to estimate the frequency within the given time interval. Two possible responses are envisaged: "Never/Rarely", which corresponds to a frequency less than or equal to 2 times (per week, per month or per year, respectively) or "Often/Always", which corresponds to a frequency equal to or greater than 3 times (per week, per month or per year, respectively). Only in cases where the frequency with which an activity has been carried out is "Often/Always" for at least 1 year is it essential to state for how many years it has been carried out. If, on the other hand, the activity has been carried out intensively for less than 1 year or for many years but only "Rarely", then the number of years for which it has been carried out must not be counted. So, it is important to know if an activity has been carried out "Often/Always" for more than 1 year over the

course of the person's life: only in this case is the number of years stated, rounding up to the nearest 5-year period.

NB: the years for which the frequency is to be stated are those of the person's whole adult life – i.e. from the age of 18 to the present.

For example, for a person aged 50 who has driven a vehicle “Often/Always” for 30 years, the “Often/Always” box will be ticked, stating a period of 30 years.

In contrast, for a person aged 50 who drove “Often/Always” between the ages of 20 and 40 but since then, perhaps because he/she changed job, has driven “Never/Rarely”, the box “Often/Always” should be ticked, stating only the period for which the frequency was “Often/Always” – i.e. in this case $40 - 20 = 20$ years.

If a person has driven for 30 years but only occasionally – i.e. less than twice a week – the “Never/Rarely” box should be ticked (as if the person had never driven) and the number of years is not stated.

Activities with a fixed frequency are considered independently of precise references to the timescale involved; if the person has carried out said activities, regardless of the frequency, the number of years must be stated.

Activities with Weekly Frequency:

- 1. Reading newspapers and weekly magazines:** this refers above all to newspapers or periodicals with a high frequency of publication, regardless of their content.
- 2. Domestic chores:** all of those activities associated with looking after one's own home, particularly housekeeping and cleaning – i.e. cooking, washing dishes, washing clothes, ironing, cleaning the home, grocery shopping, ordinary maintenance, etc.
- 3. Driving:** driving a car, motorbike, scooter and, in general, any means of transport for which the driver/rider requires a driving licence. Bicycles are, therefore, not included.
- 4. Leisure activities:** recreational activities such as all types of sport, gymnastics, yoga, hunting, fishing, all types of dancing, playing cards, bowling, snooker/pool, chess, crosswords, parlour games, puzzles, hobbies such as stamp collecting, coin collecting, etc.

5. **Use of new technologies:** learning and using computers, smartphones (not simple mobile phones), any tool used to browse the web, digital cameras, satellite navigation devices, etc.

Activities with Monthly Frequency

1. **Social activities:** activities that involve social interaction, including having dinner with friends, being part of groups, associations, political parties, recreational clubs, local promotion organisations, parish councils, etc.
2. **Cinema or theatre:** going to see films at the cinema or plays at the theatre.
3. **Gardening, DIY, knitting, embroidery:** managing domestic gardens and vegetable patches, all small-scale home maintenance operations, such as knitting, embroidery, crocheting, sewing, etc.
4. **Looking after grandchildren/nieces/nephews or elderly parents:** being responsible for grandchildren/nieces/nephews or elderly parents.
5. **Voluntary work:** all work done free of charge, carried out individually or through organised associations, for a range of different purposes (solidarity, social justice, philanthropy, etc.).
6. **Artistic activities:** any artistic activity (music, singing, drawing, painting, sculpture, writing, performance, photography, découpage, etc.) carried out individually or in groups.

Activities with Annual Frequency

1. **Exhibitions, concerts, conferences:** participation in any organised cultural event.
2. **Journeys lasting several days:** leisure travel lasting more than one day.
3. **Reading books:** reading books of all types (rather than newspapers or magazines).

Activities with a Fixed Frequency

1. **Children:** number of children.
2. **Caring for pets:** looking after pets at home.
3. **Managing one's current account:** the activity of managing one's current account by visiting the bank branch, cashing cheques, using ATMs, etc.

Finally, it is important to state whether or not the questionnaire has been administered directly to the interested party, or to the accompanying family member (in this instance, specify the identity of the family member).