

## Italian standardization of the dynamic version of the Logical Operations and Conservation test (LOC-DV)

Renzo Vianello<sup>1</sup>, Silvia Lanfranchi<sup>2</sup>, Francesca Pulina<sup>3</sup>,  
& Sara Bidinost<sup>4</sup>

### Abstract

*In the present paper we propose a standardization of the dynamic version of the LOC test (Logical Operations and Conservation) elaborated by Vianello and Marin (1997). The dynamic assessment, compared with the traditional assessment, provides us with more information about the development of logical thinking, because it also measures potential abilities that can be perfected and will consolidate if the person is placed in optimal learning conditions. The LOC-DV test, standardized on a sample of 550 Italian children with typical development ages between 4 and 8 years (110 per age; 280 males and 270 females), results a highly reliable instrument ( $r = .91$ ; split-half). The high regression coefficient (.85) between participants' scores and age guarantees a satisfactory progression of the developmental score parallel to the growth of age. The comparison between males and females performance reveals the absence of any significant differences. We present also the conversion tables of scores in mental age, deviation IQ and ratio IQ, giving reasons for the opportunity to prefer, in the age of development, at least at a clinical level, the utilization of the mental age and of IQ ratio rather than the deviation IQ.*

Received: March 26, 2012, Revised: April 15, 2012, Accepted: May 12, 2012.

© 2012 Associazione Oasi Maria SS. - IRCCS / Città Aperta Edizioni

<sup>1</sup> Department of Development and Socialization Psychology, University of Padua. E-mail: renzo.vianello@unipd.it

<sup>2</sup> Department of Development and Socialization Psychology, University of Padua. E-mail: silvia.lanfranchi@unipd.it

<sup>3</sup> Department of Development and Socialization Psychology, University of Padua. E-mail: francescapulina@libero.it

<sup>4</sup> Department of Development and Socialization Psychology, University of Padua. E-mail: sara.bidinost87@gmail.com

*We advise the use of the LOC-DV test above all when the performances at the traditional tests result inferior than the potentiality, particularly in cases of socio-cultural disadvantages, intellectual disabilities, and borderline cognitive functioning with negative interferences at environmental and motivational levels.*

**Keywords:** Dynamic testing, Cognitive development, Logical thinking, Piagetian Tests

## 1. Introduction

The aim of the present paper is to propose a first attempt at formulating a standardization of the dynamic version of the Logical Operations and Conservation test (LOC-DV), an instrument created by Vianello and Marin (1997) for the evaluation of intelligence, and in particular for the level of development of logical thinking, which is considered a crucial step, even if not an exclusive one, in intelligence development<sup>5</sup>.

The basic tasks of the test are the same used by Piaget, together with Szeminska and Inhelder (Piaget & Szeminska, 1941; Piaget & Inhelder, 1959, 1962). In some cases they have been simplified: a development test requires difficulty-graduated tasks. For example, the classic task of seriation must be executed with 10 houses in series and the insertion of another 9 houses. The LOC test presents also seriation with 5+4 small houses (in two dimensions, paper made) and 5+4 rods. However, some concepts grounding the building of the test only partially agree with the piagetian theory, and others result even in contrast with it. We would like to highlight the crucial ones.

- The passage from intuitive thinking to concrete operational thinking (to use the Piagetian terminology) is slower and patchier than that hypothesized by Piaget.
- A fundamental role was played by:
  - familiarity with the material;
  - verbal and visuospatial short term memory capacity;
  - complexity of the mental actions required at working memory level (central executive).

<sup>5</sup> Several collaborators contributed to the data collections. Special thanks to Maddalena Baroni, Annalisa Catzeddu, Ilaria Ferrarese, Gloria Gelain, Fernanda Pappalardo, Sara Roman and Elena Savoia.

- The development of logical thinking is more crucial in the adolescent period of growth between 4 and 8 years old, rather than before or after.

The theoretical background encompasses not only references to Piagetian theory but also to the post-Piagetian (for example Case, 1985) and cognitivist references (for example Baddeley, 1986 and Sternberg, 1988).

The dynamic version of the test intends to assess more than the base test (which is conceived to avoid rigidity, in the spirit of the Piagetian approach, and is conceived to enhance the participant's complete comprehension, spirit of initiative and activity of the participant; see also Inhelder, Sinclair, & Bovet, 1974) not only in the achieved abilities, but also in the abilities in construction, which are the ones that can be perfected at the moment in which the tasks are faced, thanks to the mediation of the proposer. The main theoretical references are Vygotskij (see his definition of Zone of Potential Development, also said Zone of Proximal Development; Vygotskij, 1935), and the synthesis about the dynamic evaluation elaborated by Sternberg and Grigorenko (2002).

Over many years of research, the LOC test has demonstrated to be a valid and reliable instrument (Vianello & Marin, 1997). The new version's aim is to provide more information than the previous version, not only about the level of development reached by the child, but also about his potential for development.

The importance of a "dynamic" assessment of intelligence, able to catch the hidden abilities of individuals, is supported by many authors in literature. First of all, by Vygotskij, who underlines the importance of cooperation and interaction with more expert individuals in order to promote learning and development.

Many authors, particularly in the last decades, starting from Vygotskij's conceptualizations, expressed the necessity to bring some changes into the field of assessment and gave their contribution to the development of dynamic testing (Sternberg & Grigorenko, 2002). This is in large part due to the changes in the concept and definition of intelligence and its meaning that is now conceived also as the capacity to utilize information and apply it to different contexts (Resnik, 1976; Campione, Brown, & Bryant, 1985). So intelligence is not a stable attribute, but an ability in constant development, influenced by the life contexts of the individual.

Sternberg and Grigorenko (2002) claim the importance of juxtaposing the dynamic tests to static testing, because the dynamic tests aim to assess also the learning potentials, which represent the hidden abilities. The authors believe that individuals' abilities are the result of a continuous process of acquisition and consolidation of abilities required for a certain area of demonstrated performance (developing expertise).

Also Feuerstein (see Feuerstein, Rand, & Hoffman, 1979; Feuerstein, Rand, Hoffman, & Miller, 1980; Feuerstein, Rand, Jensen, Kaniel, & Tzurriel, 1987)

expressed the necessity of a dynamic evaluation, claiming that the abilities reached by the individual at a certain moment in his process of development are not fixed and unchangeable, but that intelligence is rather an auto-regulation dynamic process, exposed to the influence of the external environment.

The contributions to dynamic testing are more in number than the ones that we have quoted. Many other authors have proposed new and different approaches to dynamic assessment (Carlson & Wiedl, 1978, 1979, 1980; Budoff, 1987a, 1987b; Campione & Brown, 1987; Swanson, 1995a, 1995b; Guthke, 1992; Guthke & Wiedl, 1996; Guthke & Beckman, 2000; ecc.).

The dynamic version of the LOC test originates in this context. This version, acting in particular on the Zone of Proximal Development (Vygotskij, 1935), is aimed at investigating the development and learning potentialities in the child. Differently from the static version of the test, the dynamic alternative provides the presentation of aids and more instructions to the participant, following a modality called *cake format* (Sternberg & Grigorenko, 2002): for each item there are some possible suggestions for the child in case that he/she shows perplexity and difficulty in the resolution of the task. The aim of the “aids” is to stimulate the reasoning of the child in order to facilitate the comprehension of the task, however without giving him/her the solution. In this way the interaction between the experimenter and the child becomes interactive and bidirectional.

Therefore, the score obtained becomes indicative also of the potential abilities of the child, of what he/she will acquire and consolidate, if well supported and stimulated. We think that information about the potential of development is always fundamental, but in particular for those children who are at risk to be at being undervalued because of disabilities (sensory, physical, intellectual or other), borderline cognitive functioning, learning disabilities, socio-cultural disadvantages, communicative or social difficulties; for instance, the subject’s belonging to another mother tongue or culture.

At an introductory level we also claim the importance of another important element. We think that every test can be more or less static or dynamic. We prefer considering in terms of a continuum in which the most static test (characterized by maximum equality in the presentation of the instructions, as happens through the computer, and by any adaptation in the participant's reactions) is located at one extreme, while the most dynamic test (characterized by maximum adaptation to the participant's actions, and maximum help) is located in the other extreme. Proposing a test personally is a social relationship, and for that reason it has always something of a dynamic characteristic. The critical point concerns the choice of how much flexibility can be permitted.

Our dynamic version of the LOC test is sensitive to preserving a prudent flexibility while totally ensuring an interrelated comparison between the individual's performances and the ones of the normative group. Our "aids" have been standardized and presented attempting to avoid any "suggested" answer. Vice versa we have looked for "provoked" answers, as they are called by Piaget (1926), that represent the child's original own behaviour, even if triggered by our proposed "situation"; as Vygotskij would say, the typical behaviour in the child's zone of proximal development.

We acted prudently in order to ensure the normative comparison. However, we don't exclude, in the future, another version of the LOC test in an advanced dynamic version (of course with its new standardization), more proximal to the dynamic extreme of the continuum that we referred to before. In any case, we won't ever give in to the temptation of supplying aids that would only be passively absorbed by the child, because this could result in only a temporary and superficial effect on the child's learning process.

## 2. Characteristics of the LOC-DV test

As LOC, LOC-DV consists of 24 items, regarding the areas of Logical Operations and Conservation.

From a structural point of view, what mainly distinguishes the test from the previous version are the tasks relating to the area of conservation. In some cases, in the past, it seemed that the instructions were not interpreted correctly by the children.

For each task 1 point is assigned in case of success and 0 points in case of failure, so the minimum score was 0 and the maximum was 24.

For each area quite difficult tasks are provided together with easier ones; tasks are inspired by traditional Piagetian tasks, but by changing the contents in order to highlight different levels in the acquisition of logical thinking.

The new version of LOC is characterized by presence of "aids" for each task, which have the purpose of guiding the child's reasoning toward the resolution of the tasks, in order to assess not only the actual level of development, but also the potential development of the child.

However, it seems important to emphasize that also in the traditional LOC some cues were provided, but only for specific tasks. For this reason, the previous test was collocated at a not extreme level in the static-dynamic continuum that we mentioned in the introduction.

Table 1, 2, 3, 4 (see Appendix) show each tasks for both "static" and "dynamic" tests, in order to facilitate demonstration of the comparisons.

### 3. Means of the scores at each age, table of conversion of score in mental age, reliability, deviation and ratio IQ, differences between males and females.

We currently have data from several research projects carried out in recent years in different regions of Italy that concerns the administration of LOC-DV to 550 Italian children aged from 4;0 to 8;11, evenly divided in five age groups (4, 5, 6, 7 and 8 years old).

The table 5 (Appendix) shows results distinguished according to the age. At age 4 children already gain a high score. This result was expected as some tasks are very easy even for younger children and have above all an introductory function, in order to favor the understanding of the following tasks.

Between age 4 and 7 years there is a strong increase in performances, while between 7 and 8 years differences are much smaller.

In all age groups the mean scores are higher than those obtained through the administration of the test in the static version (see Vianello & Marin, 1997, p. 41). The biggest difference is present at 6 years of age (means 19.05 vs 15.35). This finding could suggest a greater efficacy of the dynamic test in the middle age group, or when the child's abilities are developing, but not yet fully developed and acquired (see Inhelder, Sinclair & Bovet, 1974; Doise & Mugny, 1981).

In order to verify the relationship between age and scores in LOC-DV, we carried out on our data a regression analysis. Through linear regression we obtained the following equation:

$$\text{Mental age} = 32.47 + 2.69 \times \text{LOC-DV score}$$

This equation allows us to express the LOC-DV score in terms of mental age. Specifically, starting from a mental age of about 32 months, each success at LOC-DV tasks increases mental age of 2.69 months.

The linear regression analysis showed a high coefficient ( $r = .85; p < .001$ ). It indicates that there is a good relationship between increasing age and LOC-DV score.

Using scores obtained by regression equation and considering the means of the scores, it was possible to build a table of conversion of scores in mental age (Appendix, table 6), which is crucial for understanding and interpreting the performance. Since some tasks are very easy, we take the score into account only if it is equal to or greater than 7.

The table shows that LOC-DV is too difficult for those who totalize from 1 to

6 points and it's too easy for whoever reaches 22 points or more.

LOC-DV is particularly adequate for children with mental age from 4 to 7 years and 6 months.

Comparing the present table with the table shown in the LOC manual (Vianello & Marin, 1997, p. 43), we can see that the dynamic version anticipates the age of resolution of tasks (on mean about 6 months). In other words, LOC-DV allows the child to achieve levels of performance of children of about 6 months older assessed with the original test.

As LOC test, LOC-DV has demonstrated good psychometric properties. As regards reliability, by using the split-half procedure, we obtained a coefficient of .91,  $p < .001$  (24 tasks). It is higher than that of the static version, that is .87,  $p < .001$ . Regarding test validity, it is possible to state that it does not deviate from the validity of the original version of the test (Vianello & Marin, 1997, pp. 48-53); indeed the correlation between the two versions (LOC and LOC-DV) is very high (.91,  $p < .001$ ).

The analysis of variance showed no difference between male (280) and female (270) performance ( $F_{(1,548)} = 1.64, p = .202$ ). This result confirms results obtained about static version of LOC.

The tables 7 and 8 (Appendix) present both ratio IQs and deviation IQs, derived from age scores analysis.

As will be easy to see, ratio and deviation IQs are not equivalent and provide different information.

Deviation IQ is a measure of how far one may deviate from the mean IQ; in other word, it compares people of the same age.

Ratio IQ shows the relationship between a child or boy's real performances (Mental Age) and what is typical of his chronological age. Depending on the aims, either one can give a better result.

The deviation IQ is certainly more useful for people older than 18 and for comparisons within typical development. This isn't our case.

We think that ratio IQ may be more meaningful with lower than 18 years old people, and, above all, with individuals with atypical development (in particular, with intellectual disabilities and borderline cognitive functioning). Concerning this we must point out the tendency, very widespread and often erroneous in believing that - also in cases of people with atypical development - the deviation IQ can be used as if it were an IQ ratio. For example, if we have a eighteen - years - old boy with Down Syndrome, who has a deviation IQ of 50, this information doesn't permit us to say that "it is as if he was 4 years old of mental age". On the basis of our tables, we can say that this affirmation is not true.

In the table of the deviation IQs for a 8-years-old child, a deviation IQ of <55



corresponds to exceeded 16 tasks. In the table of the ratio IQs for an 8 - years - old child, if the tasks solved are 16, we have a ratio IQ of 75. The difference is huge. This means that a deviation IQ of 50 doesn't correspond to a mental age of 48 months (4 years), but of 72 months (6 years).

Unfortunately a deviation IQ of <55 provides poor information about our 8 years old child with Down Syndrome, or rather that, compared to 100 peers, it shows the worst performance (among the 2 or 3 worst out of 1000 peers). In fact <55 means a position in more than three standard deviations from the mean, and under three standard deviations from the mean there is less of one individual out of 100.

We believe that the use of the IQ ratio may be, in clinical developmental psychology, more informative and less misleading than the deviation IQ. We invite the reader to make a comparison between the two tables of IQ. He/she can find considerable differences so as to strengthen the belief that deviation and ratio IQs aren't equivalent, and that the practice should be abandoned that uses the deviation IQs as if they were ratio IQs.

The ratio IQ has been calculated for a population sample of children with chronological ages from 4 to 13 years. Such a choice is related to the possible use of the test for young people with atypical development. With increasing age a precise attribution of IQ appears poorly informative. For this reason in the table below the 55 points of IQ, the precise values were not included. For ages above 14 years, also with the solution of 21 tasks, the ratio IQ is less than 55. In these cases, the mental age gives much more useful information.

Similarly, we considered appropriate not to specify the scores above 145. As stated above, it is also valid with regard to the deviation IQs.

## 4. Discussion

Each test measures "its" intelligence. For that reason David Wechsler offered evidence to the fact that his tests measured not only intelligence, but also other cognitive non-intellectual aspects. At the same time, however, Wechsler ascertained the presence of good communicative, verbal, and social adaptation ability.

The LOC test, both in his original and dynamic versions, evaluates a particular aspect of intelligence: the development of logical thinking. This is an important aspect in the ages between 4 and 8 years, but probably less important in the first four years (in which sensory-motor intelligence and symbolic thinking seem to be crucial), and then in the adult age (in which there seem to be many competences and abilities that contribute to the definition of intelligence; and the relative importance of logical thinking decreases).



With the passing of time, as claims Sternberg (1981, 1984), the “contents” (or better the factors) of intelligence change.

As anticipated, the perceptive and motor factors are crucial in the first years of life. From 2 to 4 years of age, the symbolic factors acquire much importance. From 4 years of age, the reasoning ability, without logical mistakes, tends to reveal its importance. The LOC test presumes to evaluate this aspect.

So we think that one of the merits of the LOC test is due to the evaluation of a crucial factor of intelligence in the period between 4 and 8 years of life.

Other merits are of a psychometric order: solid theoretical foundations, good reliability, high regression coefficient between test scores and chronological age (which allows the table of conversion of scores in mental age).

In our opinion, the absence of differences between males and females is also a positive result. It seems to us that this could be interpreted in the sense that social stereotypes have not yet acted significantly at this level, and that the test itself is able to evaluate basic abilities.

The LOC test doesn't want to substitute other tests, some offering more informative data and whose utilization is already professionally consolidated. In normal practice, the LOC test should be used with appropriately complementary aims. However, we think that the fact that the correlation coefficient between LOC and Wechsler Scales results over .60 (Vianello & Marin, 1997) is a positive aspect, most of all if we consider that the administration of the LOC test requires on average less than 30 minutes, and that the verbal component is much reduced.

The dynamic version of the LOC test seems promising. We hope that future research will highlight its utility in situations where there is risk that static tests can lead some persons to lower performances than their actual potential showed.

We are talking about children with socio-cultural disadvantages, intellectual inhibition, relational difficulties. We are also talking about children and adolescents with intellectual disabilities or borderline cognitive functioning.

In our opinion, there are clear limits to the LOC test.

First of all, the fact that in persons with typical intellectual development the test cannot be applied at a longitudinal level (apart from the period, in each case very important, from the subject's attendance in the last 2 years of infancy school to the first two years of attendance in primary school), that means also before and after 4-8 years of age. The most evident way to highlight this limit is comparing the LOC test with the Wechsler Scales, which “accompany” the subjects from infancy school age through a complete lifetime to old age and senility.

Another limit is the relative scarcity of research data: there are just about a few tens (of these just a few are diffused at an international level, and just indirectly, when the use of the test is quoted) and of course not about a hundred, as the most famous intelligence tests.

The version in Italian language was till now the only one currently available. Consequently, there was only limited distribution. We know that the LOC test is widely used in Norway, but in this case there is not yet a standardization as in Italy. We hope that the distribution of the test in the English language through the Journal that hosts this article will favour standardization in other languages.

## References

- Baddeley, A. D. (1986). *Working Memory*. Oxford, Clarendon Press.
- Budoff, M. (1987a). The validity of learning potential assessment. In C. S. Lidz (Ed.), *Dynamic assessment: An interactional approach to evaluating learning potential* (pp. 52-81). New York: The Guilford Press.
- Budoff, M. (1987b). Measures for assessing learning potential. In C. S. Lidz (Ed.), *Dynamic assessment: An interactional approach to evaluating learning potential* (pp. 173-195). New York: The Guilford Press.
- Campione, J. C., Brown, A., & Bryant, N. (1985). Individual differences in learning and memory. In R. J. Sternberg (Ed.), *Human abilities: An information-processing approach* (pp. 103-126). New York: Freeman.
- Campione, J. C., Brown, A. (1987). Linking dynamic testing with schoolachievement. In C. S. Lidz (Ed.), *Dynamic assessment: An interactional approach to evaluating learning potential* (pp. 82-115). New York: The Guilford Press.
- Carlson, J. S., & Wiedl, K. H. (1978). Use of testing-the-limits procedures in the testing of intellectual capabilities in children with learning difficulties. *American Journal of Mental Deficiency, 11*, 559-564.
- Carlson, J. S., & Wiedl, K. H. (1979). Toward a differential testing approach: Testing-the-limits employing the Raven matrices. *Intelligence, 3*, 323-344.
- Carlson, J. S., & Wiedl, K. H. (1980). Applications of a dynamic testing approach: Empirical results and theoretical formulations. *Zeitschrift für Differentielle und Diagnostische Psychologie, 4*, 303-318.
- Case, R. (1985). *Intellectual Development from Birth to Adulthood*. New York: Academic Press.

Doise, W., & Mugny, G. (1981). *Le développement social de l'intelligence*. Paris: Inter Editions.

Feuerstein, R., Rand, Y., & Hoffman, M. B. (1979). *The Dynamic Assessment of Retarded Performers: The Learning Potential Assessment Device Theory, Instruments, and Techniques*. Baltimore, MD: University Park Press.

Feuerstein, R., Rand, Y., Hoffman, M. B., & Miller, R. (1980). *Instrumental enrichment*. Baltimore: University Park Press.

Feuerstein, R., Rand, Y., Jensen, M. R., Kaniel, S., & Tzuriel, D. (1987). Prerequisites for testing of learning potential: The LPAD model. In C. S. Lidz (Ed.), *Dynamic assessment: An interactional approach to evaluating learning potential* (pp. 35-51). New York: The Guilford Press.

Guthke, J. (1992). Learning tests: The concept, main research findings, problems and trends. *Learning and Individual Differences*, 4, 137-151.

Guthke, J., & Beckman, J. (2000). The learning test concept and its application in practice. In C. S. Lidz & J. G. Elliot (Eds.), *Dynamic assessment: Prevailing models and applications* (pp. 17-69). Greenwich, CT: Elsevier-JAI.

Guthke, J., & Wiedl, K. H. (1996). *Dynamisches Testen*. Gottingen, Germany: Hogrefe.

Inhelder, B., Sinclair, H., & Bovet, M. (1974). *Apprentissage et structures de la connaissance*. Paris: P.U.F.

Piaget, J. (1926). *La représentation du monde chez l'enfant*. Paris: Alcan.

Piaget, J., & Szeminska, A. (1941). *La genèse du nombre chez l'enfant*. Neuchâtel: Delachaux et Niestlè.

Piaget, J., & Inhelder, B. (1959). *La genèse des structures logiques élémentaires: classifications et seriations*. Neuchâtel: Delachaux et Niestlè.

Piaget, J., & Inhelder, B. (1962, 2a ed.). *Le développement des quantités chez l'enfant. Conservation et atomisme*. Neuchâtel: Delachaux et Niestlè.

Resnick, L. B. (Ed.) (1976). *The nature of intelligence*. Hillsdale, NJ: Erlbaum.

Sternberg, R. J. (1981). The nature of intelligence. *New York: University Education Quarterly*, 12, 10-17.

Sternberg, R. J. (1984). Macrocomponents and microcomponents of intelligence: some proposed loci of mental retardation. In Brooks, Sperber & McCauley (Eds.), *Learning and cognition in the mentally retarded* (pp. 89-114). Hillsdale, New Jersey: Erlbaum.

Sternberg, R. J. (1988). *The triarchic mind: A new theory of human intelligence*. New York, Viking.

Sternberg, R. J., & Grigorenko, E. L. (2002). *Dynamic Testing. The nature and measurement of learning potential*. Cambridge: Cambridge University Press.

Swanson, H. L. (1995a). Effects of dynamic testing on the classification of learning disabilities: The predictive and discriminant validity of the Swanson Cognitive Processing Test. *Journal of Psychoeducational Testing*, 1, 204-229.

Swanson, H. L. (1995b). Using the cognitive processing test to assess ability: Development of a dynamic assessment measure. *School Psychology Review*, 24, 672-693.

Vianello, R., & Marin, M. L. (1997). *OLC. Operazioni logiche e conservazione. Dal pensiero intuitivo al pensiero operatorio concreto: prove per la valutazione del livello di sviluppo*. Bergamo: Junior.

Vygotskij, L. S. (1935). *Problemy psichiceskogo razvitija rebënka*. Moskva: Academy of Pedagogical Sciences.

## APPENDIX

Table 1 – *Description of the tasks regarding the seriation area. Presentation of material and instructions regarding each task of both static and dynamic versions.*

SERIATION				
LOC		LOC-DV		
Material	Instructions and procedure	Material	Instructions and procedure	
1	5 houses with bases of cm 4, 6, 8, 10 and 12.	The psychologist places the 5 houses on the table at random and says: <i>“Place these houses in order from the largest to the smallest”</i> making at the same time a gesture with the hand tracing an oblique segment in the air from up to down. It is very important to be sure that the child has understood the instructions. If the psychologist thinks it necessary, he/she can ask the subject to point at the largest house, and then the largest one of the remainder, suggesting him to place the second next to the first; then he/she can ask him to go on saying: <i>“Place the other houses too from the largest to the smallest”</i> . The psychologist can help only in this task (considered as passed, like the next ones, even if the child places the houses in order from the smallest to the largest). What is important is that he/she arranges the houses in a series.	The same as in the static version.	
2	The 5 houses of the first task, plus another 4 houses with bases of cm 5, 7, 9 and 11.	If the child does not pass task n.1, the psychologist helps him until he succeeds (however the task can't be considered as passed). Then the psychologist goes on placing the other four houses in their right places (pointing at the spaces between the houses) in order to form again a scale from the largest to the smallest. If the subject has made the previous seriation placing the 5 houses close to one another, before formulating the instructions of this task it is necessary to separate them in order to have enough room to insert the others: on this occasion the psychologist can say: <i>“Let's make some room, as we have to place other houses”</i> . If the child starts reorganizing the series already made, the psychologist stops him/her and says: <i>“Don't do it all over again, place the new houses without moving the others”</i> . After this further instruction the task is passed only if the child inserts the houses correctly without reorganizing the previous series. In other words he/she must not make a new seriation of 9 elements, but he/she has to insert the other 4 elements in a series of 5. This is also valid for tasks 4 and 6.	The same as in the static version.	If the child is wrong by inserting the first or the second house, the psychologist helps him placing the house in its right place and saying him: <i>“This is the right place, because so this house (pointing at the house inserted) is smallest then this (pointing at the previous house), but it is largest then this (pointing at the following house). Now houses are in order from the largest to the smallest (making at the same time a gesture with the hand tracing an oblique segment in the air from up to down)”</i> . If the child inserts correctly the two or three houses that remain, the task can be considered as passed. If the child inserts correctly the first two houses, but he/she is wrong the third (and the, consequently, the fourth), the psychologist doesn't must help the child. At that point, also say <i>“Think it over”</i> would be not easing, but suggestive, because there are only two possibilities and the child may be change just for suggestion, without be aware of why it's opportune to change house.

SERIATION

		LOC		LOC-DV	
	Material	Instructions and procedure	Material	Instructions and procedure	
3	5 1 × 1 cm square sectioned green rods of cm 10, 12, 14, 16, 18.	The procedure is the same as in the task 1. The psychologist says: <i>“Places these rods in order from the longest to the shortest”</i> , making at the same time a gesture with the hand tracing an oblique segment in the air from up to down. If the child tries to place them upright, the psychologist adds: <i>“Lay them down on the table, in order from the longest to the shortest”</i> .	The same as in the static version.	If the child is wrong the task, the psychologist, as in previous task, telling him/her how to do, but considering the task as not passed.	
4	The 5 rods of the previous task, plus other 4 1 × 1 cm square sectioned green rods of cm 11, 13, 15, 17.	This task is proposed only if the previous task has been passed. The procedure is the same as in task 2. The psychologist says: <i>“Put these rods in their right places (pointing at the spaces between the rods) in order to form a scale from the longest to the shortest”</i> .	The same as in the static version.	The same instructions as in task 2.	
5	10 1×1 cm square sectioned blue rods of cm 10, 11, 12, 13, 14, 15, 16, 17, 18, 19	The procedure is the same as in task 3.	The same as in the static version.	If the child didn't pass either the task 2 or the task 4, it's advisable to pass on the task 7. If the psychologist proposes this task, he/she can help the child saying him that he/she must be patient and that he/she must go on step by step, comparing well the rods. Further, if the child compares the first rods, without “leaning them on a field basic line”, the psychologist can help him/her putting the first two or three rods on this field line. If the child succeeded the task 2, but not the task 4, It's advisable don't insist. Indeed if he/she is clearly hard put, it's better attend, saying: <i>“This task is for kids older than you”</i> or <i>“This task is very difficult; it's better to do another one”</i> and go on directly at the task 7.	
6	10 1×1 cm square sectioned blue rods of cm 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 plus 9 1×1 square sectioned blue rods of cm 10,5, 11,5, 12,5, 13,5, 14,5, 15,5, 16,5, 17,5, 18,5.	The procedure is the same as in task 4.	The same as in the static version.	This task is proposed only if the tasks 4 and 5 has been passed. The procedure is the same as in the tasks 2 and 4.	



Table 2 – Description of the tasks regarding the numeration area. Presentation of material and instructions regarding each task of both static and dynamic versions.

NUMERATION				
LOC		LOC-DV		
Material	Instructions and procedure	Material	Instructions and procedure	
7	5 bottles and 7 glasses.	The psychologist places a row of 5 bottles on the table and, apart, a group of 7 glasses. The instruction formula is: <i>“Place a glass in front of each bottle”</i> .	The same as in the static version.	No aids are provided.
8	5 bottles and 5 glasses.	If the child doesn't pass the previous task, the psychologist helps him until he/she succeeds (however the task can't be considered as passed). Then the psychologist removes the two surplus glasses from the table and says: <i>“Count the glasses; how many are there?”</i> . The psychologist goes on only if the child says the right number, placing a cardboard sheet in front of the bottles, in order to hide them completely, and saying: <i>“Can you tell me how many bottles there are behind this sheet?”</i> .	The same as in the static version.	If the child counts (up) to 5, but after he/she cannot say how many are the bottles, the psychologist can pick up, for a moment, the cardboard sheet saying: <i>“You can see only a little bit”</i> , but for a minimum time that cannot allow the child to count the bottles, but only to note that for each glass there is a bottle.
9	5 bottles and 5 glasses.	Even if the child hasn't passed the previous task, the psychologist goes on taking the cardboard sheet away, grouping the glasses and saying: <i>“Are there more bottles or more glasses, or are there the same number?”</i> .	The same as in the static version.	If the child keeps silence, dubious, the psychologist can say: <i>“Look, we do it again”</i> and the psychologist puts the glasses in front of the bottles and then he/she groups the glasses again.
10	10 red counters and 12 blue counters.	The psychologist places the 10 red counters in a row on the table and groups the 12 blue counters together. The procedure is the same as in task 7: the psychologist asks the child to place a blue counter in front of each red counter. If the child doesn't succeed the task is not passed. If, on the contrary, he succeeds, the psychologist removes the two surplus counters and says: <i>“How many blue counters are there?”</i> . If the child can't count them, the task is not passed. If, on the contrary, he/she can count them, the procedure is the same as in task 8: the psychologist places a cardboard sheet over the red counters, in order to hide them completely and asks: <i>“Can you tell me how many red counters there are?”</i>	The same as in the static version.	The procedure is the same as in task 8.

<i>NUMERATION</i>			
<i>LOC</i>		<i>LOC-DV</i>	
<i>Material</i>	<i>Instructions and procedure</i>	<i>Material</i>	<i>Instructions and procedure</i>
11	10 red counters and 10 blue counters.	The procedure is the same as in task 9. The psychologist says: " <i>Are there more red counters or more blue counters, or is the number the same?</i> ".	The same as in the static version. The procedure is the same as in task 9.
12	8 cardboard cutout boys (9, 11, 13, 15, 17, 19, 21, 23 cm high) and 8 cardboard cutout sticks (5,4; 6,6; 7,8; 9,0; 10,2; 11,4; 12,6; 13,8 cm high).	The psychologist places the cutout boys and sticks on the table and asks the child to arrange the 8 cutout boys in a series. If he/she succeeds the psychologist says: " <i>Place in front of each boy his own stick, from the highest to the shortest</i> ". If the child carries it out correctly the psychologist goes on "closing" the series of sticks (that is drawing them nearer to each other, without undoing the series) and saying (pointing at the third stick from the left): " <i>Which boy does this stick belong to?</i> ".	The same as in the static version. Since it is important that the third stick be far from third cutout boy (for example if all sticks are grouped, moving them far to the right compared to the row of the boys); if the child's wrong or, at the request for identify the owner of third stick, he/she doesn't point the correct cardboard cutout boy, the psychologist asks him/her: " <i>Which boy does this stick belong to (pointing at the first stick)? And this (pointing at the last stick)? And this (pointing at the third stick)?</i> ".

Table 3 – Description of the tasks regarding the classification area. Presentation of material and instructions regarding each task of both static and dynamic versions.

CLASSIFICATION				
LOC		LOC-DV		
Material	Instructions and procedure	Material	Instructions and procedure	
13	8 cardboard geometrical figures which differ in shape, color and dimension: an 8 cm diameter red circle, a 4 cm diameter red circle, an 8 cm diameter blue circle, a 4 cm diameter blue circle, an 8x8 cm red square, a 4x4 cm red square, an 8x8 cm blue square, a 4x4 cm blue square.	The psychologist places the 8 figures on the table at random saying: “Group the figures that are similar, and have something alike”. If the child makes a figural collection or makes some distinctions (for example grouping the red squares and the blue squares), the task can be considered as passed and the psychologist goes on with the next task.	The same as in the static version.	No aids are provided.
14	8 cardboard geometrical figures which differ in shape, color and dimension: an 8 cm diameter red circle, a 4 cm diameter red circle, an 8 cm diameter blue circle, a 4 cm diameter blue circle, an 8x8 cm red square, a 4x4 cm red square, an 8x8 cm blue square, a 4x4 cm blue square.	If the child, following the previous instructions has already classified the material into two groups according to color, shape or dimension, this task can also be considered as passed. If, on the contrary, this fact hasn’t happened, the psychologist says (making an explicative gesture with the hands in order to locate two different places, one on the left and the other on the right, where the child has to place the elements of the two groups): “Now you have to make two groups with the figures that have something alike: place one group here and the other one here (making a gesture with the hands just as before). In each group you must place the figures that have something alike”. If during the execution of this task or of the previous one the child hasn’t made two groups, but four (for example grouping the two red circles, the two red squares, the two blue circles, and the two blue squares) task 13 can be considered as passed, but in task 14 it is necessary to specify: “Not four groups, but only two. You have to make only two groups with the figures. In each group you must place the figures that have something alike”.	The same as in the static version.	If the child cannot make two groups, the psychologist takes a cardboard figure and asks him/her to describe it. If the child says “red” (or blue) or “circle” (or square), the psychologist repeats what said: “Well, this is red (or what child said) and we place it here. Now we place also the other figures, a few here and a few there”.
15	The same as in the tasks 13 and 14.	If the child passes the previous task, the psychologist picks up the figures, mixes them up and says: “Now you should make two groups again, but in a different way from before (brief pause); in each group you put the figures that have something alike, but it must not be the same thing as before”.	The same as in the static version.	If the child seems confused, or he/she can’t (do it), the psychologist can add something at the standard instructions, as in the task 14, namely he/she can ask to describe an element (a cardboard geometrical figure), saying something like: “This is red, but it is also...”. Then the psychologist continues what child told (for example “circle”) saying: “Well, this is a circle and we place it here...now place also the other figures...a few here and a few there...”.

CLASSIFICATION			
LOC		LOC-DV	
Material	Instructions and procedure	Material	Instructions and procedure
16	The same as in the tasks 13, 14 and 15.	If the child passes task 15, the psychologist picks up the figures, mixes them up and says: <i>“Now you should make two groups again, but in yet another way (brief pause); in a different way from the two previous time”</i> .	The same as in task 14, the psychologist doesn't help him/her (when the task is too difficult, helping the child could be counterproductive at level of the motivation for the continuation of the test). If the child passed task 15, the procedure is the same as in task 15, or rather the psychologist invites him/her to describe the figures, saying something as: <i>“This is red and it is also a circle (or what the child said), but is it also...?”</i> . If the child doesn't say “small” (or big) it's better not insist for not risk the suggestion.
17	Three 4 cm diameter circles (green, blue and yellow), a 4x6 cm red rectangle, a 4x4 cm red square and 4x4 cm red isosceles triangle.	The psychologist arranges the three circles in a vertical position, one under the other, and the other three elements in a horizontal position, one beside the other, in order to form a right angle whose vertex is missing. Then he/she asks: <i>“Can you tell me what figure, which is not present, is missing here? (pointing at the empty place at the intersection between the column of the circles and the row of the polygons). What figures can fit in with this group (pointing at the column) but also with this one (pointing at the row)?”</i> . If the child answers correctly that what is missing is the red circle, the following task can be also considered as passed.	A cardboard sheet containing 6 geometrical figures: three circles (green, blue and yellow) in a vertical position, one under the other, and other three red elements (a triangle, a rectangle and a square) in a horizontal position, one beside the other. The elements are placed in order to form a right angle whose vertex is missing. Since this is, normally, one of the most difficult task of the test, it can take in order to provide an aid only if he/she were succeeded most of the previous tasks, and in particular the task 15. If the child answer wrongly, the psychologist can help him/her by guiding starting from the red figures, and then proceeding with the circles, giving time to the child in order to describe up to say “red” (in the first three elements) and “circle” (for the other three). It's important not insist in a way demotivating.
18	The same as in task 17 plus a cardboard sheet containing 6 geometrical figures arranged in two parallel columns. On the left column, from top to bottom, there are: a 4x2 cm red rhombus, a 4 cm diameter brown circle and a 6x4 cm blue rectangle. On the right column there are from top to bottom: a 4 cm diameter violet circle, a 4 cm diameter red circle and a 4 cm diameter orange circle.	If the child does not pass the previous task, the psychologist shows him/her the cardboard sheet with the 8 geometrical figures and asks him: <i>“Now, can you tell me which of these figures (pointing at the cardboard sheet) can fit in with this group (pointing at the three circles arranged on the table) and with this one too (pointing at the three polygons arranged on the table)?”</i> .	The same as in the previous task plus a cardboard sheet containing a red rhombus (at the bottom left), a violet circle (at the top left), a brown circle (at the bottom right) and a red circle (at the top right). The psychologist can help the child by guiding him/her in a description of the elements, one by one.

Table 4 – Description of the tasks regarding the conservation area. Presentation of material and instructions regarding each task of both static and dynamic versions.

CONSERVATION			
LOC		LOC-DV	
Material	Instructions and procedure	Material	Instructions and procedure
19	Two transparent glasses of equal size and a third transparent glass higher and narrower than the others. A bottle to pour the water.	Two black strings of the same length.	The psychologist places the two strings on the table and talks with the child in order to agree that they make believe that the strings are sweets and to be sure that the child agrees that the length is the same (placing the strings on the table, as two segments of line). After this the psychologist modifies one of the string rolling up it, while the other stays as a segment if line. The psychologist asks the children to do the same on more than one way (for example as a spiral too narrow, or a little more large) and, above all, seeing that the string be place before as a segment of line, and then as a spiral. At this point, the psychologist asks: “ <i>We can suppose that you eat this string (pointing at the string rolled up) and I eat this string (pointing at the string as segment of line). One of us eat more or we eat the same quantity of sweet?</i> ”.
20	The same as in task 19.	Even if the child hasn't passed the previous task, the psychologist goes on saying: “ <i>Now I want to pour into this glass (pointing at B) as much water as there was before, like this one (pointing at A). To do this is the water that is here (pointing at C) all right or do I have to take some away or do I have to put some more in?</i> ”.	The same as in task 19. The psychologist places the two strings of the previous task. While one remains rolled up the other is folded like a V (very narrow). Then the psychologist asks child to do the same on more than one way (for example as a “V” too narrow, or a “V” too large), and above all seeing that the string be place before as a segment of line, and then as a “V”. Then the psychologist asks: “ <i>We can suppose that you eat this string (pointing at the string rolled up) and I eat this string (pointing at the string folded like a “V”). One of us eat more or we eat the same quantity of sweet?</i> ”.

CONSERVATION

		CONSERVATION	
		LOC	LOC-DV
	Material	Instructions and procedure	Material Instructions and procedure
21	The same as in the tasks 19 and 20.	Even if the child hasn't passed the previous task, the psychologist goes on asking: " <i>Here and here (pointing at A and C) is there the same quantity of water or is there more in this glass (pointing at A) or in this one (pointing at C)?</i> ".	Two transparent glasses of equal size and a third transparent glass higher and narrower than the others. A bottle to pour the water. If the child gives the wrong answer, the psychologist asks him/her: " <i>Can you point what will be the level of the water in this glass (B), if I pour it from this (C)?</i> ". If the child points at the same level of A, the psychologist says him/her: " <i>I'm not quite sure. If I pour the water that is here (pointing at C) into this glass (pointing at B), is the quantity of water as in this (pointing at A), or not?</i> ".
22	Plasticine or other malleable material to form two about 7-8 cm diameter balls.	The psychologist places on the table two equal balls (A and B) of malleable material and says: " <i>What do you call this?</i> ". If the child can't answer, the psychologist says: " <i>Let's call it paste (or another term used locally). All right?</i> ". If, on the contrary, the child uses another term, the psychologist has to use it instead of the term "paste" here mentioned. Then the psychologist asks: " <i>Here and here (pointing at A and B) are there two equal balls or is there more paste here (pointing at A) or here (pointing at B)?</i> " If the child doesn't recognize the equality, the psychologist adds or takes away paste until he/she agrees that the balls have the same quantity of paste. At this point the psychologist proceeds with the real task. The psychologist shapes one of the balls into a "sausage" (C) and asks: " <i>The paste that there is here (pointing at C) is it the same that there was in the previous ball, or is it another?</i> ".	The same as in task 21. Before to ask the child if into the two glasses (A and C) there is the same quantity of water, the psychologist can help him/her by asking to point up to where the water arrived, in the glass B, before being poured. It's important not influence the child. This aid can be useful because it's a further invitation to think about.
23	The same as in task 22.	Even if the child hasn't passed the previous task, the psychologist goes on saying: " <i>Now I want to make a ball like the former one, the same as this one (pointing at A). To do this is the paste that is here (pointing at C) all right or do I have to take some away or do I have to add some more?</i> ".	Plasticine or other malleable material to form two about 7-8 cm diameter balls. If the child gives the wrong answer, the psychologist asks him/her: " <i>Can you point how was this (pointing at the "sausage")?</i> ". If the child says that it was as "A", the psychologist asks: " <i>I'm not quite sure. If I shape this (pointing at the "sausage") like a ball, does it become like this (pointing at A) or different?</i> ". If the child answers "different", the psychologist asks: " <i>Greater or smaller?</i> ", in order to be sure that he/she is considering the quantity and not the shape.

<i>CONSERVATION</i>			
<i>LOC</i>		<i>LOC-DV</i>	
<i>Material</i>	<i>Instructions and procedure</i>	<i>Material</i>	<i>Instructions and procedure</i>
24	The same as in the tasks 22 and 23.	Even if the child hasn't passed the previous task, the psychologist goes on saying: " <i>Here</i> (pointing at A) <i>and here</i> (pointing at C) <i>is there the same quantity of paste or is there more here</i> (pointing at A) <i>or here</i> (pointing at C)?"	The same as in task 23. Before to ask if the "sausage" (C) and the ball (A) contain the same or a different quantity of plasticine, the psychologist can help the child asking him/her how were the two balls, before that one be shaped. This aid can be useful because it's a further invitation to think about.

Table 5 – Means and standard deviations at different ages of children 4 to 8 years old in the LOC-DV and in the LOC tests.

<i>Age</i>	<i>LOC-DV</i>		<i>LOC</i>	
	<i>Mean</i>	<i>St. Dev.</i>	<i>Mean</i>	<i>St. Dev.</i>
4 years	9.30	2.83	8.18	2.28
5 years	13.40	3.58	11.44	3.15
6 years	19.05	2.43	15.35	3.35
7 years	20.85	1.99	19.59	2.45
8 years	21.63	1.74	20.41	2.96

Table 6 – Table of conversion of score in mental age.

<i>Score</i>	<i>Mental Age</i>
7	4;00
8	4;03
9	4;06
10	4;09
11	5;00
12	5;03
13	5;06
14	5;08
15	5;10
16	6;00
17	6;02
18	6;04
19	6;06
20	7;00
21	7;06
22-23-24	> 8;00



Table 7 – LOC-DV: ratio IQ.

Age	Score																			
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21					
4:00	100	106	113	119	125	131	138	142	>145	>145	>145	>145	>145	>145	>145					
4:01	98	104	110	116	122	129	135	139	143	>145	>145	>145	>145	>145	>145					
4:02	96	102	108	114	120	126	132	136	140	144	>145	>145	>145	>145	>145					
4:03	94	100	106	112	118	124	129	133	137	141	145	>145	>145	>145	>145					
4:04	92	98	104	110	115	121	127	131	135	138	142	>145	>145	>145	>145					
4:05	91	96	102	108	113	119	125	128	132	136	140	143	>145	>145	>145					
4:06	89	94	100	106	111	117	122	126	130	133	137	141	144	>145	>145					
4:07	87	93	98	104	109	115	120	124	127	131	135	138	142	>145	>145					
4:08	86	91	96	102	107	113	118	121	125	129	132	136	139	>145	>145					
4:09	84	89	95	100	105	111	116	119	123	126	130	133	137	>145	>145					
4:10	83	88	93	98	103	109	114	117	121	124	128	131	134	145	>145					
4:11	81	86	92	97	102	107	112	115	119	122	125	129	132	142	>145					
5:00	80	85	90	95	100	105	110	113	117	120	123	127	130	140	>145					
5:01	79	84	89	93	98	103	108	111	115	118	121	125	128	138	>145					
5:02	77	82	87	92	97	102	106	110	113	116	119	123	126	135	145					
5:03	76	81	86	90	95	100	105	108	111	114	117	121	124	133	143					
5:04	75	80	84	89	94	98	103	106	109	113	116	119	122	131	141					
5:05	74	78	83	88	92	97	102	105	108	111	114	117	120	129	138					
5:06	73	77	82	86	91	95	100	103	106	109	112	115	118	127	136					
5:07	72	76	81	85	90	94	99	101	104	107	110	113	116	125	134					
5:08	71	75	79	84	88	93	97	100	103	106	109	112	115	124	132					
5:09	70	74	78	83	87	91	96	99	101	104	107	110	113	122	130					
5:10	69	73	77	81	86	90	94	97	100	103	106	109	111	120	129					
5:11	68	72	76	80	85	89	93	96	99	101	104	107	110	118	127					
6:00	67	71	75	79	83	88	92	94	97	100	103	106	108	117	125					
6:01	66	70	74	78	82	86	90	93	96	99	101	104	107	115	123					
6:02	65	69	73	77	81	85	89	92	95	97	100	103	105	114	122					
6:03	64	68	72	76	80	84	88	91	93	96	99	101	104	112	120					
6:04	63	67	71	75	79	83	87	89	92	95	97	100	103	111	118					
6:05	62	66	70	74	78	82	86	88	91	94	96	99	101	109	117					
6:06	62	66	70	74	78	82	86	88	91	94	96	99	101	108	115					
6:07	61	65	69	73	77	81	85	87	90	92	95	97	100	106	114					
6:08	60	64	68	72	76	80	84	86	89	91	94	96	99	106	113					
6:08	60	64	68	71	75	79	83	85	88	90	93	95	98	105	113					

Age	Score																			
	7 4:00	8 4:03	9 4:06	10 4:09	11 5:00	12 5:03	13 5:06	14 5:08	15 5:10	16 6:00	17 6:02	18 6:04	19 6:06	20 7:00	21 7:06					
6:09	59	63	67	70	74	78	81	84	86	89	91	94	96	104	111					
6:10	59	62	66	70	73	77	80	83	85	88	90	93	95	102	110					
6:11	58	61	65	69	72	76	80	82	84	87	89	92	94	101	108					
7:00	57	61	64	68	71	75	79	81	83	86	88	90	93	100	107					
7:01	56	60	64	67	71	74	78	80	82	85	87	89	92	99	106					
7:02	56	59	63	66	70	73	77	79	81	84	86	88	91	98	105					
7:03	55	59	62	66	69	72	76	78	80	83	85	87	90	97	103					
7:04	55	58	61	65	68	72	75	77	80	82	84	86	89	95	102					
7:05	<55	57	61	64	67	71	74	76	79	81	83	85	88	94	101					
7:06	<55	57	60	63	67	70	73	76	78	80	82	84	87	93	100					
7:07	<55	56	59	63	66	69	73	75	77	79	81	84	86	92	99					
7:08	<55	55	59	62	65	68	72	74	76	78	80	83	85	91	98					
7:09	<55	55	58	61	65	68	71	73	75	77	80	82	84	90	97					
7:10	<55	<55	57	61	64	67	70	72	74	77	79	81	83	89	96					
7:11	<55	<55	57	60	63	66	69	72	74	76	78	80	82	88	95					
8:00	<55	<55	56	59	63	66	69	71	73	75	77	79	81	88	94					
8:01	<55	<55	56	59	62	65	68	70	72	74	76	78	80	87	93					
8:02	<55	<55	55	58	61	64	67	69	71	73	76	78	80	86	92					
8:03	<55	<55	55	58	61	64	67	69	71	73	75	77	79	85	91					
8:04	<55	<55	<55	57	60	63	66	68	70	72	74	76	78	84	90					
8:05	<55	<55	<55	56	59	62	65	67	69	71	73	75	77	83	89					
8:06	<55	<55	<55	56	59	62	65	67	69	71	73	75	76	82	88					
8:07	<55	<55	<55	55	58	61	64	66	68	70	72	74	76	82	87					
8:08	<55	<55	<55	55	58	61	63	65	67	69	71	73	75	81	87					
8:09	<55	<55	<55	<55	57	60	63	65	67	69	70	72	74	80	86					
8:10	<55	<55	<55	<55	57	59	62	64	66	68	70	72	74	79	85					
8:11	<55	<55	<55	<55	56	59	62	64	65	67	69	71	73	79	84					
9:00	<55	<55	<55	<55	56	58	61	63	65	67	69	70	72	78	83					
9:01	<55	<55	<55	<55	55	58	61	62	64	66	68	70	72	77	83					
9:02	<55	<55	<55	<55	55	57	60	62	65	67	69	71	76	82	87					
9:03	<55	<55	<55	<55	<55	57	59	61	63	65	67	68	70	76	81					
9:04	<55	<55	<55	<55	<55	56	59	61	63	64	66	68	70	75	80					
9:05	<55	<55	<55	<55	<55	56	58	60	62	64	65	67	69	74	80					
9:06	<55	<55	<55	<55	<55	55	58	60	61	63	65	67	68	74	79					

Italian standardization of the dynamic version of the LOC-DV

Age	Score																
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		
	4:00	4:03	4:06	4:09	5:00	5:03	5:06	5:08	5:10	6:00	6:02	6:04	6:06	7:00	7:06		
9:07	<55	<55	<55	<55	<55	55	57	59	61	63	64	66	68	73	78		
9:08	<55	<55	<55	<55	<55	<55	57	59	60	62	64	66	67	72	78		
9:09	<55	<55	<55	<55	<55	<55	56	58	60	62	63	65	67	72	77		
9:10	<55	<55	<55	<55	<55	<55	56	58	59	61	63	64	66	71	76		
9:11	<55	<55	<55	<55	<55	<55	55	57	59	61	62	64	66	71	76		
10:00	<55	<55	<55	<55	<55	<55	55	57	58	60	62	63	64	70	75		
10:01	<55	<55	<55	<55	<55	<55	55	56	58	60	61	63	64	69	74		
10:02	<40	<55	<55	<55	<55	<55	<55	56	57	59	61	62	64	69	74		
10:03	<40	<55	<55	<55	<55	<55	<55	55	57	59	60	62	63	68	73		
10:04	<40	<55	<55	<55	<55	<55	55	55	56	58	60	61	63	68	73		
10:05	<40	<55	<55	<55	<55	<55	<55	<55	56	58	59	61	62	67	72		
10:06	<40	<55	<55	<55	<55	<55	<55	<55	56	57	59	60	62	67	71		
10:07	<40	<55	<55	<55	<55	<55	<55	<55	55	57	58	60	61	66	71		
10:08	<40	<55	<55	<55	<55	<55	<55	<55	55	56	58	59	61	66	70		
10:09	<40	<55	<55	<55	<55	<55	<55	<55	<55	56	57	59	60	65	70		
10:10	<40	<40	<55	<55	<55	<55	<55	<55	<55	55	57	58	60	65	69		
10:11	<40	<40	<55	<55	<55	<55	<55	<55	<55	55	56	58	60	64	69		
11:00	<40	<40	<55	<55	<55	<55	<55	<55	<55	55	56	58	59	64	68		
11:01	<40	<40	<55	<55	<55	<55	<55	<55	<55	55	56	57	59	63	68		
11:02	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	55	57	58	63	67		
11:03	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	55	56	58	62	67		
11:04	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	56	57	62	66		
11:05	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	55	57	61	66		
11:06	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	55	57	61	65		
11:07	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	55	56	60	65		
11:08	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	56	60	64		
11:09	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	55	60	64		
11:10	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	55	59	63		
11:11	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	55	59	63		
12:00	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	<55	58	63		
12:01	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	58	62		
12:02	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	58	62		
12:03	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	57	61		
12:04	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	57	61		
12:05	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	56	60		
12:06	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	56	60		
12:07	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	56	60		

Age	Score																				
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21						
12:08	<40	4:03	4:06	4:09	5:00	5:03	5:06	5:08	5:10	6:00	6:02	6:04	6:06	7:00	7:06						
12:09	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	55	59						
12:10	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	55	59						
12:11	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	55	58						
13:00	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	58						
13:01	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	57						
13:02	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	57						
13:03	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	57						
13:04	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55	56						
13:05	<40	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	56						
13:06	<40	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	56						
13:07	<40	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	55						
13:08	<40	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	55						
13:09	<40	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	55						
13:10	<40	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55						
13:11	<40	<40	<40	<40	<40	<40	<55	<55	<55	<55	<55	<55	<55	<55	<55						

Italian standardization of the dynamic version of the LOC-DV

Table 8 – LOC-DV: deviation IQs

Age	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22-24
4:00	87	96	103	110	118	125	139	>145	>145	>145	>145	>145	>145	>145	>145	>145
4:01	86	95	102	109	117	124	137	>145	>145	>145	>145	>145	>145	>145	>145	>145
4:02	85	94	101	108	116	123	135	145	>145	>145	>145	>145	>145	>145	>145	>145
4:03	84	93	100	107	115	122	133	143	>145	>145	>145	>145	>145	>145	>145	>145
4:04	84	92	99	106	114	121	131	140	>145	>145	>145	>145	>145	>145	>145	>145
4:05	83	91	98	105	113	120	128	137	144	>145	>145	>145	>145	>145	>145	>145
4:06	82	90	97	104	112	119	126	134	141	>145	>145	>145	>145	>145	>145	>145
4:07	81	88	95	102	110	117	124	131	138	145	>145	>145	>145	>145	>145	>145
4:08	80	87	94	101	108	114	121	128	135	142	>145	>145	>145	>145	>145	>145
4:09	78	85	92	99	105	112	119	126	132	139	>145	>145	>145	>145	>145	>145
4:10	77	84	90	97	103	110	117	123	130	136	143	>145	>145	>145	>145	>145
4:11	76	82	89	95	101	108	114	120	127	133	140	>145	>145	>145	>145	>145
5:00	75	81	87	93	99	105	112	118	124	130	136	143	>145	>145	>145	>145
5:01	73	79	85	91	97	103	109	115	121	127	133	139	145	>145	>145	>145
5:02	72	78	84	89	95	101	107	113	118	124	130	136	142	>145	>145	>145
5:03	71	76	82	88	93	99	104	110	116	121	127	132	138	144	>145	>145
5:04	69	75	80	86	91	96	102	107	113	118	124	129	134	140	145	>145
5:05	68	73	79	84	89	94	99	105	110	115	120	125	131	136	141	>145
5:06	67	72	77	82	87	92	97	102	107	112	117	122	127	132	137	>130
5:07	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	>130
5:08	63	68	73	78	83	88	93	98	103	108	113	118	123	128	133	>130
5:09	61	66	71	76	81	86	91	96	101	106	111	116	121	126	131	>130
5:10	59	64	69	74	79	84	89	94	99	104	109	114	119	125	130	>130
5:11	57	62	67	72	77	82	87	92	97	102	107	112	118	123	128	>130
6:00	55	60	65	70	75	80	85	90	95	100	105	111	116	121	126	>130
6:01	<55	58	63	68	73	78	83	88	93	98	104	109	114	119	124	>115
6:02	<55	56	61	66	71	76	81	86	91	96	102	107	112	117	122	>115
6:03	<55	<55	59	64	69	74	79	84	89	95	100	105	110	115	120	>115
6:04	<55	<55	57	62	67	72	77	82	87	93	98	103	108	113	118	>115
6:05	<55	<55	55	60	65	70	75	80	85	91	96	101	106	111	116	>115
6:06	<55	<55	<55	58	63	68	73	78	84	89	94	99	104	109	114	>115
6:07	<55	<55	<55	56	61	66	71	77	82	87	92	98	103	108	113	>115
6:08	<40	<55	<55	<55	59	64	69	75	80	85	91	96	102	107	112	>115
6:09	<40	<55	<55	<55	57	62	67	73	78	84	89	95	100	106	111	>115

	Score															
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22-24
6:10	<40	<40	<55	<55	<55	60	66	71	77	82	88	93	99	105	110	>115
6:11	<40	<40	<55	<55	<55	58	64	69	75	81	86	92	98	103	109	>100
7:00	<40	<40	<40	<55	<55	56	62	67	73	79	85	91	96	102	108	>100
7:01	<40	<40	<40	<55	<55	<55	60	65	71	77	83	89	95	101	107	>100
7:02	<40	<40	<40	<55	<55	<55	58	64	70	76	82	88	94	100	106	>100
7:03	<40	<40	<40	<40	<55	<55	56	62	68	74	80	86	92	99	105	>100
7:04	<40	<40	<40	<40	<55	<55	<55	60	66	72	79	85	91	97	104	>100
7:05	<40	<40	<40	<40	<40	<55	<55	58	64	71	77	83	90	96	103	>100
7:06	<40	<40	<40	<40	<40	<55	<55	56	63	69	76	82	89	95	101	>100
7:07	<40	<40	<40	<40	<40	<40	<55	<55	60	66	73	80	87	94	100	>100
7:08	<40	<40	<40	<40	<40	<40	<55	<55	56	64	71	78	85	92	99	>100
7:09	<40	<40	<40	<40	<40	<40	<40	<55	<55	61	68	76	83	91	98	>100
7:10	<40	<40	<40	<40	<40	<40	<40	<55	<55	58	66	74	82	90	97	>100
7:11	<40	<40	<40	<40	<40	<40	<40	<40	<55	55	63	72	80	88	96	>100
8:00	<40	<40	<40	<40	<40	<40	<40	<40	<55	<55	61	70	78	87	95	>100
8:01	<40	<40	<40	<40	<40	<40	<40	<40	<55	<55	59	67	76	85	94	>100
8:02	<40	<40	<40	<40	<40	<40	<40	<40	<40	<55	56	65	75	84	93	>100
8:03	<40	<40	<40	<40	<40	<40	<40	<40	<40	<55	<55	63	73	83	92	>100
8:04	<40	<40	<40	<40	<40	<40	<40	<40	<40	<55	<55	61	71	81	91	>100
8:05	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<55	59	70	80	90	>100
8:06	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<55	57	68	79	89	>100
8:07	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<55	55	66	78	88	>100
8:08	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<55	<55	65	77	87	>100
8:09	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	63	76	87	>100
8:10	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	62	75	86	>100
8:11	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	<40	61	74	86	>100