

From vision to citizenship: types of tables to assess reading in special education

Da visão à cidadania: tipos de tabelas de avaliação funcional da leitura na educação especial

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ABSTRACT

The importance of reading ability has already been greatly shown throughout time and has been studied and understood through scientific research. In the case of people with low vision, reading can be the guarantee of access to education and, consequently, to citizenship. Therefore, allowing good reading ability has become the object of study of several researchers. The challenge of ensuring good reading is even greater for people with low vision, and often optical and technological aids are needed to make reading possible and fluid. Several tables, such as MNRead, Radner, Bailey-Lovie, among others, have been used to evaluate reading ability, minimum letter size for fluent reading, and maximum reading speed in words or characters per minute. These tables have been developed and calibrated according to international standards, becoming standardized and suitable for the acquisition of data that can be used in reproducible scientific research anywhere in the world. The tables have versions in several languages, and the only table standardized and translated into Brazilian Portuguese currently available is MNRead-P. We discuss here the different tables, the importance of their calibration, and their practical use. The measurements obtained with the reading tables are of great importance for planning the treatment and follow-up of individuals with low vision, since the comparisons are made from an individual parameter, between the individual's measurements, at different moments, indicating improvement or worse reading quality. The literacy of visually impaired individuals is part of the full exercise of their citizenship. Education is the lens through which the person is seen and sees society. Educating people with disabilities is in itself a form of inclusion. Therefore, assisting low vision sufferers may be a differential in their development, allowing adequate composition of the individual's identity core.

Keywords: Vision disability; Vision screening; Reading; Learning; Special education

RESUMO

A importância da leitura já foi amplamente demonstrada ao longo do tempo e vem sendo mais profundamente compreendida e elucidada através de estudos científicos. No caso de pessoas com baixa visão, a leitura pode ser a garantia de acesso à educação e conseqüentemente à cidadania. Por isso, permitir boa capacidade de leitura tornou-se objeto de estudo de diversos pesquisadores. O desafio de garantir uma boa leitura é ainda maior no caso de pessoas portadoras de baixa visão, e frequentemente auxílios ópticos e tecnológicos são necessários para que a leitura se torne possível e seja fluida. Diversas tabelas, como a MNRead, Radner, Bailey-Lovie, entre outras, têm sido utilizadas para avaliar a capacidade de leitura, o tamanho mínimo de letra suficiente para a leitura fluente, e a velocidade máxima de leitura em palavras ou caracteres por minuto. Essas tabelas foram desenvolvidas e calibradas de acordo com normas internacionais, tornando-se padronizadas e adequadas para a aquisição de dados que poderão ser utilizados em pesquisas científicas reprodutíveis em qualquer parte do mundo. As tabelas possuem versões em diversas línguas, e a única tabela padronizada e traduzida para o português brasileiro disponível atualmente é a MNRead-P. Discutimos aqui as diferentes tabelas, a importância de sua calibração, e sua utilização na prática. As medidas obtidas com as tabelas de leitura são de grande importância para o planejamento do tratamento e acompanhamento de indivíduos com baixa visão, pois as comparações são feitas a partir de um parâmetro individual, entre as medidas do próprio indivíduo, em diferentes momentos, indicando melhora ou piora da qualidade de leitura. A alfabetização de indivíduos com deficiência visual é parte do exercício pleno de sua cidadania. A educação é a lente por meio da qual a pessoa é vista e enxerga a sociedade. Educar os portadores de deficiência é por si só uma forma de inclusão. Por isso, auxiliar os portadores de baixa visão pode ser um diferencial no seu desenvolvimento, permitindo a adequada composição do núcleo de identidade do indivíduo.

Descritores: Deficiência visual; Teste de visão; Leitura; Aprendizado; Educação especial

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The authors declare no conflicts of interests.

Received for publication 26/04/2018 - Accepted for publication 22/08/2018.

INTRODUCTION

In the past, knowledge was transmitted orally. Only a few people were privileged to read and write. With the revolutions of thought, reading became popular and today is the target of programs of the Brazilian government with the aim of encouraging this habit (Programa Leia Mais, Seja Mais do Plano Nacional de Livro e Leitura – PNLL). When it comes to basic education, reading is critical. Literacy is a challenge in itself, considering the learning differences of each student who brings different habits and socioeconomic and cultural conditions. Acceptance of these differences, with differentiated and personalized teaching strategies, respecting the individualization of each individual will increase the chances of success in teaching and consequently will allow the education of more qualified people to work the functions in which they better adapt.

On July 6, 2015, the Brazilian Law for the Inclusion of Persons with Disabilities (Inclusion of People with Disabilities Act) number 13.146/2015⁽¹⁾ was created, which came into force six months later. This law was created to avoid the former practice of isolation. Rather, people with disabilities, whether physical or intellectual, might not be accepted in regular educational institutions and then be referred to special schools for their disabilities.

Law 13.146 was important to draw public attention to the need for and importance of including the disabled.⁽¹⁾ The inclusion of these individuals depends on the collective effort of the community, especially those directly involved with the educational process: parents, teachers, and other employees of the educational institution.

The importance of socializing disabled and non-disabled individuals begins with counteracting prejudice and the accepting differences. According to studies, when the child with a specifically visual impairment is deprived of the right to interact in a way that is possible according to the degree of impairment, they may be significantly delayed in the learning process, in addition to the limitations of the disability.⁽²⁾ The experiences they have and the interaction with other people help in making future decisions and solving challenges, developing greater autonomy.⁽³⁾

One should not restrict the child beyond their limitation; on the contrary, they must be stimulated to overcome the difficulties and use other means of solving problems. Children with visual impairments should be encouraged to take advantage of residual vision, and should not be deprived of reading. Often it will be necessary to enlarge the letter and make use of optical aids to magnify the image to allow the reading. The interaction between teachers, family and health professionals is important in this sense to ensure that the impaired child gets multidimensional care according to their needs and is formed as an autonomous individual capable of integrating in different environments. Every effort must be made in the inclusion of impaired people, both in education and in the job market. The role of those involved is to assist in this process and make it more comfortable.

Literacy is part of the exercise of the full right of any citizen, whether or not an impaired citizen. Works to raise teachers' awareness so that they understand the need of each student and prepare different materials may contribute to the acceptance by other students and society, providing a cultural change.

The ability to read gives autonomy and favors the inclusion of the individual in society, and therefore must be valued. Initially, a prerequisite for reading is the visual function. The visual function is established by the eye in connection with the central nervous system, in the brain. The eye can be compared to a photographic

camera, and its basic anatomy is depicted in figure 1. Light comes into the eye by crossing the tear film (the tear), the cornea, which is the transparent part of the eye through which we see the color of the eyes, then passes through the pupil and through the crystalline, which is the lens that lies inside the eye to generate focus modification through the response to the ciliary muscle movement. After crossing the lens, the light goes to the retina, where is absorbed by the photoreceptors, which are cells specialized in changing light into a chemical signal to be transported through the optic nerve to the brain, which interprets what is being observed. There are two types of photoreceptors, cones and rods. The cones predominate in the central region of the retina, called the fovea. This region is responsible for the sharpest view, details and colors. The rods are the majority, and they fill the entire peripheral region of the fovea. They are important cells in the adaptation to the dark and perception of movement.⁽⁴⁾

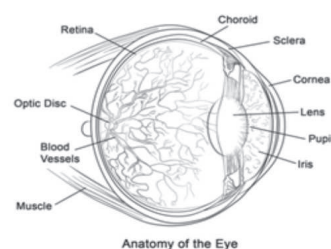


Figure 1: . Basic ocular anatomy

The eyes need to move to keep fixation, that is, keep the object of interest in the fovea. The maximum eye excursion is up to 50 degrees to the sides, 40 degrees upwards and 60 degrees downwards from the normal line of sight to the front. The movement occurring for fixation is voluntary and is called a glance, which is a fast movement.⁽⁴⁾ After fixation, the eye should be stationary and stable for a period of approximately 150 ms to allow the letters to be processed.⁽⁵⁾ During reading, the eye must fix, stop and refix to be able to catch all information.⁽⁴⁾ Visual field is the spatial area perceived by the eye, and during reading only 4 degrees of horizontal visual field and 2 degrees of vertical field around the point of attachment are used.^(5,6)

Visual acuity is the ability of visual discrimination, which is measured using a table and different units of measurement: feet, meters, logMAR, etc. A 6/18 vision demonstrates that the individual can only see a letter 6 meters from that would be visible at 18 meters for a person with preserved vision. The vision of 6/6 (in meters) or 20/20 (in feet) is considered normal.⁽⁴⁾

For good reading, a perfect vision (20/20) is not necessary. Children with visual disorders such as nystagmus (eyes with spontaneous back and forth motion), insufficiency of convergence (inability to “attach” the eyes to the nose) and insufficient accommodation can be good readers.⁽⁷⁾ Adequate reading requires visual acuity around 6/15⁽⁶⁾ Control of eye movement, integration of information throughout the reading process, memory, ability to pronounce and recognize words, vocabulary, knowledge of grammatical structure, ability to name objects quickly, and ability to keep attention for the success in reading are also necessary.^(7,8) In addition, external factors such as lighting, use of optical resources for letter enlargement, letter size and reading distance are also influencing the reading quality.⁽⁸⁾

The reading speed can be calculated in words/minute, characters/minute, and syllables/minute. Time is measured with a stopwatch while the individual reads aloud the text of a reading table. The absolute maximum reading speed is the highest number of words, characters or syllables read by the individual in 1 minute.⁽⁹⁾ In a study carried out with a type of reading table, the average reading speed of the table in Portuguese by normal individuals was 181 words/minute. The overall average of reading speed considering tables in 17 languages was 184 words/minute in normal individuals.⁽¹⁰⁾ The normal reading speed range for adults is in the range 150-250 words/minute. The reading speed is 60, 195 and 250 words/minute at 6, 12 and 17 years of age, respectively. In old age, speed reduces due to visual and cognitive reasons, reaching 40 words/minute in short tasks and 150 words/minute in long tasks.⁽¹¹⁾ Younger individuals can read 20% faster than elderly individuals.⁽¹²⁾

The reading process is complex and requires integration between good ocular functioning and transmission of the image to the cerebral cortex, so several factors may influence the reading speed. It is necessary for the cognitive characteristics to be preserved so that the content read is understood. We must add the importance of the external environment to these processes, which should also be proper to reading, such as the distance between the person and the text, the lighting of the environment, and the quality of the text, for example. Appropriate lighting is around 200 to 500 Lux, according to standard 5413 of ABNT.⁽¹³⁾ It is necessary to mention that every lighting system depends on the type of lamp and size of the environment, and that this value in lux corresponds to the light that is being projected to the didactic material.⁽¹³⁾ All these factors must be considered before taking a reading test. The individual who takes the reading test must be evaluated first for the eye condition and need for glasses. The reading evaluation should be made with the best optical correction, and under the appropriate environmental conditions.⁽⁸⁾

The reading distance should not be less than 30 to 40 cm for normal individuals, and should be constant. The position of the head while reading also needs to respect the ergonomics to avoid cervical muscle pain and tiredness. As shown in figure 2, angles of up to 30 degrees of head tilt to the right and 30 degrees to the left are considered adequate. In the sagittal plane, the appropriate angle would be up to 40 degrees. In general, the text paper should be placed perpendicular to the visual axis.^(4,14)

Ophthalmic Tables for Reading Function Evaluation

One of the tools used by the ophthalmologist to evaluate refraction (or degree) is the visual acuity tables, that is, how much one can see. Among these tables are the reading speed tables.

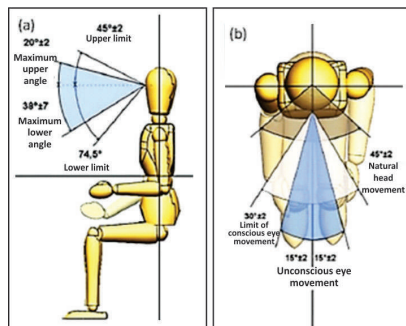


Figure 2: The adequate angle for head position for comfortable reading.

Source: Santos, VR. Desenvolvimento e validação de protótipo de sistema de leitura portátil (SLP) para baixa visão [thesis]. São Paulo: Universidade Federal de São Paulo; 2015.

It is important that the contents of the reading tables are accessible, with simple and well-known words in the language in question, so that the language is not a barrier to the analysis of the reading fluency. Reading in other languages or about less known subjects can cause greater difficulty and slowness.⁽⁸⁾

The font used may cause interference, as well as the printing quality, as some are more detailed and difficult to read. Too long lines should be avoided as well, unless the space between the lines increases to avoid the risk of the reader skipping lines. It is also important that every beginning of a sentence is aligned on a common vertical line. Colored fonts can be as readable as the black ones if the lighting is satisfactory. However, fonts with extreme wavelength color such as red and violet should be avoided due to chromatic aberration.⁽⁸⁾

The measure of visual acuity for far sight is not capable of evaluating the reading ability, so it is necessary to measure the visual acuity for near sight. Using appropriate tables to measure the visual acuity for near sight and evaluate the reading ability can generate important information. Tests to measure the reading ability and speed have been extensively studied with the purpose of understanding the processes involved, determining the changes in the font size and contrast, and assisting those with this disability. It is essential for the reading measure to be performed objectively, especially when the measures will be used in studies to propose new therapies. This requires standardized content and form in the texts, so that they can be read at comparable speeds and examiners can use different texts and take various measures.⁽⁵⁾ With the tests, it is possible, among other things, to assess the need for increased size that individuals with low vision need to read properly.

Some individuals have irreversible visual problems that can not be corrected with surgery or glasses. These individuals may be classified as having low vision or legal blindness. Individuals with low vision, i.e., corrected vision equal to or worse than 20/70 (in feet) or 6/18 (in meters) or 0.3 (in logMAR) in the best eye despite treatment are at increased risk for falls and accidents, in addition to the risk of depression.⁽⁶⁾

There are degrees of low vision (or subnormal vision): moderate when the visual acuity is between 6/18 and 6/60; severe when it is between 6/60 and 3/60; and blindness when it is worse than 3/60. The visual field is also considered in the classification. Field between 20 and 10 degrees is considered moderate, between 10 and 5 severe, and blindness when it is less than 5 degrees.⁽⁹⁾

Individuals with low visual acuity involving low contrast perception may have problems with mobility, whereas individuals with low visual acuity of high contrast perception may have difficulty with nearby tasks such as reading. People with low vision and blindness may have aids to make better use of residual vision, and also to adapt to the condition in a process called visual rehabilitation. Visual rehabilitation is important in several ways. In addition to the direct visual impact, we must also consider the psychological, self-care and labor issues. Blindness or low vision in childhood is even more problematic since it is an individual with a longer life expectancy who will have to deal with the difficulties inherent to the condition for a longer time. The reading ability can make a big difference in education, future employment, and well-being for these individuals.⁽¹⁵⁾

Reading difficulties are a frequent complaint of individuals with problems in the central visual field causing great worsening of the quality of life.⁽⁵⁾ Many diseases can affect the central visual field, such as age-related macular disease in addition to other macular diseases and scarring of retinal infections in the central area.

Older people with some degree of cataract may require more

intense lighting and higher contrast for reading. Abnormalities in the visual field may make it difficult to change lines while reading, and require increased eye movement. In the elderly, it is not uncommon to have some limitation of the extrinsic ocular motility, and in such case head movements will be needed to compensate it.⁽⁸⁾

Individuals with low vision can use reading aids such as magnifying glasses, telescopes and computerized magnification systems, but each of them has some limitations. Despite the aids to provide adequate magnification and lighting, some users prefer not to use them, even when motivated to do so. Further analysis of the reading process could help explain this phenomenon.⁽⁸⁾ On the other hand, one study showed that the speed of reading of frequent users of optical aids was greater when compared to the speed of reading of individuals who barely used or did not use the aids.⁽¹⁶⁾ This demonstrates the impact that the aid can provide, despite the limitations of each method.

The minimum reading speed sufficient for understanding a sentence is around 20 words per minute. One of the problems of optical aids is the restriction of field with the increase, which reduces the speed of reading and makes it difficult to understand long texts. Even with tactile reading in Braille, the maximum reading speed is around 100 words per minute by trained individuals. Braille is a good choice for completely blind individuals and those who did not adapt to the aids, but it is hardly learned by people who have gone blind as adults, especially after the age of 60.⁽⁸⁾

Reading Tests

Among the reading tests, we can mention: the Minnesota Low Vision Reading Test (MNREAD) table, Radner reading tables, Sloan M table, and Bailey-Lovie tables.⁽¹⁷⁾ The only standardized and validated table in the Brazilian Portuguese language is MNREAD - P (Figure 3).⁽¹⁷⁾

The classical tables (Jaeger is the most used in Brazil - shown in figure 4) are not standardized, and the progression of the font increase from one line to another is not logarithmic, that is, it does not obey a pre-established pattern. For this reason, non-standardized tables are not proper for data collection for research, which requires some internationally defined criteria.⁽¹⁸⁾

In 1988, the Visual Function Committee of the International Council of Ophthalmology established the standards necessary for reading acuity measurement. The institution in question stipulated that the progression of the printed font size must be logarithmic, the test conditions, optotypes (drawings and letters comprising the table) and table format need calibration, the distance to take the test must always be specified, continuous text materials are more convenient than isolated optotypes, and the material printed on the table should be based on the distance at which the height of the lower case letters, such as “o”, “m”, and “x” implies an angle of 5 minutes of arc.⁽¹⁹⁾

It is already known that reading words or sentences is more complex than reading isolated optotypes, such as letters or numbers. EN ISO 8596 defined the mathematical standards and what is necessary for the calibration of the reading tables, allowing the international standardization.⁽²⁰⁾

The notation of visual acuity can be made in several ways. The notation in logRAD is the acuity of reading equivalent to the acuity in logMAR. The N-point notation is based on the size of the printed point of the American system, which would be a graphical point of size 0.35mm. The N-point has the disadvantage of not allowing logarithmic growth of letter size. The Snellen notation

corresponds to the distance at which the test is done (meters or feet) and the distance at which the optotype implies 5 minutes of arc. The far sight measure used is 20/20 in feet or 6/6 in meters. For near sight it should be used 0.4/0.4 in meters for a distance of 40cm during the test. However, the annotation is done in the same way as in the distance acuity. With the explanation in each table, an adequate understanding is possible in this case. The decimal notation is calculated by the ratio of the distance of the test and the height of the letter or optotype. A 20/20 view in Snellen notation would correspond to 1.0 in the decimal one.⁽¹⁸⁾ The M notation was introduced by Sloan, and corresponds to the letter height which presupposes a visual angle of 5 minutes of arc at a distance of 1 meter.⁽²¹⁾ The notation in unit M is equal to the distance in meters at which a letter is seen as 5 minutes of arc. Its disadvantage is that it is not calculated using the actual test distance.⁽¹⁸⁾

The tests promoted with the Bailey-Lovie, Radner, and MNread tables allow the evaluation of near visual acuity, maximum reading speed, logMAR/logRAD ratio, and the critical size of the printed letter required for proper reading.⁽⁹⁾ Studies have shown that these tables work in the investigation of patients with low vision.^(9,22)

Repeated tests may analyze the effectiveness of the treatment or ancillary method proposed. Standardized evaluations can also contribute as tools in the field of psychiatry, psychology and neurology, as well as in the diagnosis of reading disorders such as dyslexia.^(12,18)

The critical size of the printed letter is the smallest font size required for the individual to maintain the maximum reading speed set by the evaluator. It is a coefficient of low repeatability because

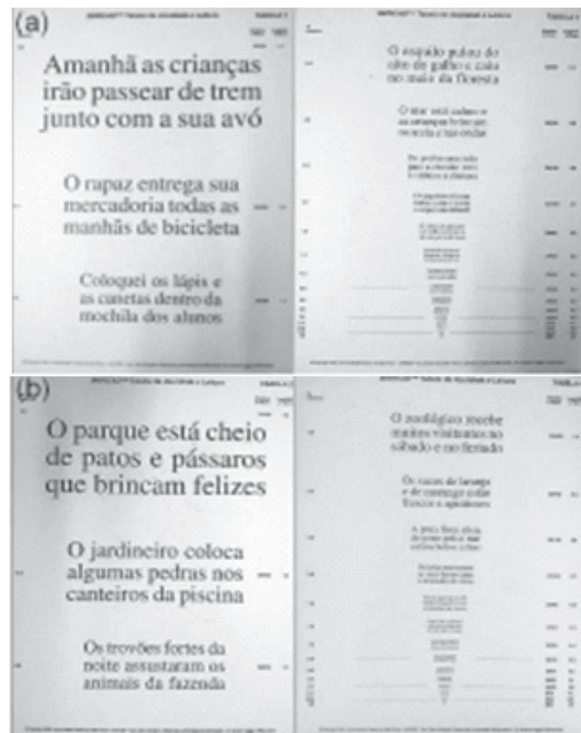


Figure 3: The MNRead-P table.

Source: Santos, VR. Desenvolvimento e validação de protótipo de sistema de leitura portátil (SLP) para baixa visão [thesis]. São Paulo: Universidade Federal de São Paulo; 2015.

of the great variability between measurements.⁽²³⁾

The use of standardized tables is essential for carrying out the evaluation of reading speed. MNread and Radner tables are examples of standard tables containing single sentences. The International Reading Speed Test (IReST) has ten standardized text paragraphs for repeated measures. The IReST test evaluates the reading speed, but not the critical printed letter size.

A comparative study among tables containing paragraphs of more than one sentence and tables containing a single sentence demonstrated that the variance of the reading speed of tables with paragraphs with more than one sentence was smaller than in the tables of a single sentence for normal individuals. Single reading speed evaluations can be well performed with single-sentence tables, such as the Radner and the MNread tables.⁽¹²⁾ Both are comparable because they present similar complexities compatible with the third grade. The IReST paragraphs are more complex, corresponding to the sixth grade.⁽¹²⁾

-Sloan Reading Cards:

They were created in 1960 to calculate the power of reading aids, and are tables with continuous paragraphs of different lengths. Sloan used the metric notation (M) to assess the near sight visual acuity. An optotype of 1.45mm by 1.45mm corresponds to an angle of 5 minutes of arc at 1 meter of distance. An advantage of this system is to allow the calculation of the degree necessary for near sight and the magnification required. The Sloan tables have texts

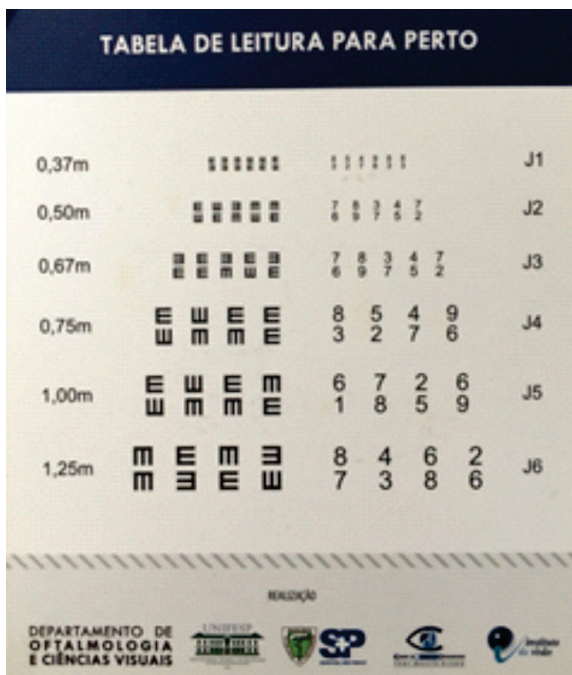


Figure 4.: Jaeger’s table for near sight test. Source: the author herself.

in sizes 1.0 M, 1.5 M, 2.0 M, 2.5 M, 3.0 M, 4.0 M, 5.0 M, 7.0 M and 10 M, an approximately logarithmic progression.⁽¹⁶⁾

-Bailey-Lovie table:

It was developed in 1980 to determine the acuity and reading speed in a single exam, a principle also adopted in the Radner and MNRead tables.

It is a reading table with non-interrelated words and with no

obvious syntactic associations. The progression of the increase of the letter is in logarithmic scale, and the font used is Times Roman. Some words are shorter and others longer. The printing size of the letters is given in N-point, metric system (M) and logMAR to 25 cm (Figure 5).⁽¹⁸⁾



Figure 5: The Bailey-Lovie table. Source: Alabdulkader B, Leat SJ. Reading in children with low vision. J Optometry. 2010;3(2):68-73. doi:10.1016/S1888-4296(10)70010-8.

-MNRead Tables

They are tables comprising short sentences using the word concept in the standard length established by Carver, which corresponds to a word with 6 letters. The sentences in this table have 60 characters with spaces, with 3 lines per sentence. Each sentence has 14 words.⁽¹²⁾ They are available in several languages, and are the only standardized table available in Portuguese. The notations are in logMAR, Snellen and metric system for 40 cm. A study with the MNRead table in Italian demonstrated good repeatability in children and adults with visual impairments.^(18,25)

- Radner Table

Created by Professor Wolfgang Radner in 1998, initially it was in German.⁽²⁶⁾ They are tables with sentences of 3 lines, 14 words, 82-84 characters with spaces and 22-24 syllables. The size of the letters increases in logarithmic progression. All word placement was defined by specific rules so that all sentences were highly comparable. Studies with the German and Dutch versions of the table demonstrated high reproducibility in the measurement of reading acuity and reading speed in individuals with or without low vision, concluding that its use is feasible in population studies and also in clinical practice.⁽⁹⁾ Notations in logRAD, Snellen, decimal and metric systems are offered for 40 and 32 cm distance. There is also a table with numbers.⁽¹⁸⁾ It is available in 12 languages, including Portugal Portuguese (Figure 6).

Recently, Professor Radner published a table with 7 longer paragraphs of 111 words each, 179 syllables and 660 characters based on a concept created for the standardization of paragraphs. Statistical analyzes with these tables demonstrated good repeatability and low reading rate variance.⁽¹⁸⁾

- IReST

It’s a vision test for people with low vision, and not just a reading table. It is a booklet with 10 long paragraphs available in 17 languages.⁽¹⁰⁾ With this test it is possible to analyze the reading fluency and speed in low vision patients. Studies have shown a

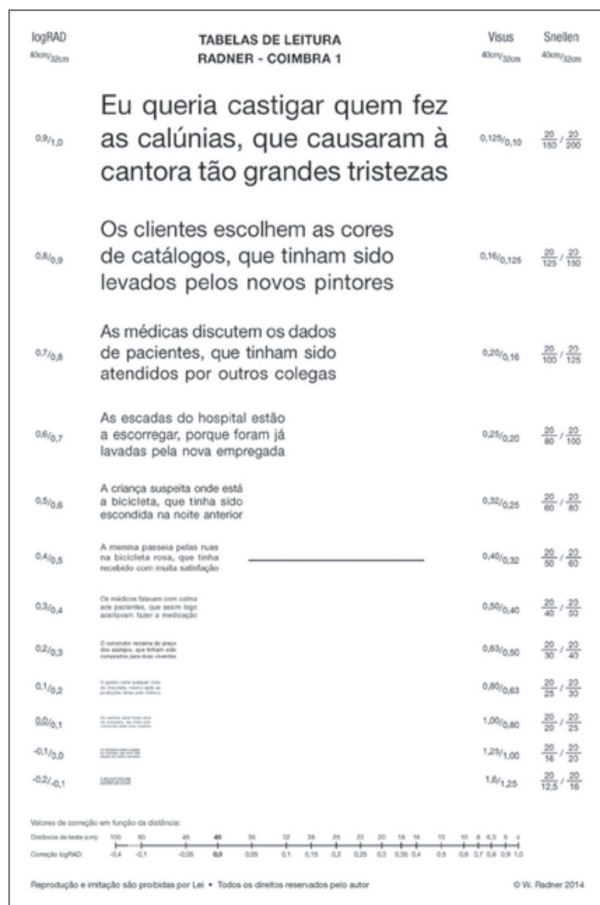


Figure 6: Radner table standardized in Portuguese. Source: Rosa AM, Farinha CL, Radner W, Diendorfer G, Loureiro MF, Murta JN. Development of the Portuguese version of a standardized reading test: the Radner-Coimbra Charts. Arq Bras Oftalmol. 2016 ;79(4):238-42.

significant difference in the reading speed among paragraphs, and the different word count in each paragraph could justify this.⁽²²⁾

CONCLUSION

Complaints about reading difficulty may persist even in people with satisfactory vision and adequate optical correction. Analyzing the characteristics of the reading with the standardized tables can help understand the problem and plan the solution. The information collected from the exam with the reading tables can also work as a guide to determine the best optical aid for individuals with low vision, that is, the one at which the reading speed is higher, and compare the speed measurements of the same individual at different times of follow-up. The comparison between the different measures will allow the conclusion on the effectiveness of the treatment and the evolution of the individual in that method. Thus, treatment follow-up will be even more personalized, so that the individualized measures themselves will be used for future comparisons, without comparisons with generic information.

It is of paramount importance that the value of the tests for the measurement of fluency and reading speed is recognized

by the pedagogues, teachers and all professionals involved in the educational process of individuals with low vision. Once the limitations and needs of these students are understood, a step is taken to seek the solution to mitigate this challenge.

Citizenship is a right for everyone, and it involves belonging to society. In other words, belonging is integrating, participating, understanding and being understood. Citizenship presupposes the right to manifest and be considered, as well as the duty to respect and consider others. The inclusion of people with visual impairment and other types of disability is bringing to these individuals the minimum necessary to reach citizenship. Assisting a visually impaired person goes beyond giving them “a good pair of eyes”, it is equipping them with essential tools for building a more plural, participatory and democratic society with their citizenship.

Education is the lens through which the person is seen and sees society. Educating impaired people is a kind of inclusion. Therefore, helping low vision patients can be a differential in their development, allowing literacy and the adequate development of the individual’s identity core. It is the responsibility of all those involved to support these individuals in all spheres, not only by law, but as an essential element in the progress of a society’s journey towards real democracy.

ACKNOWLEDGEMENTS

To Dr. José Guilherme Fontes de Azevedo Costa for the editorial assistance.

REFERENCES

1. Corsi M. Visão subnormal: intervenção planejada. São Paulo: Vida e Consciência; 2001. 122 p.
2. Vygotsky L. A formação social da mente. São Paulo: Martins Fontes; 1987.
3. Iida I. Ergonomia: projeto e produção. 2005. 340 p.
4. Messias A, Velasco e Cruz AA, Schallennüller SJ, Trauzettel-Klosinski S. [New standardized tests in Brazilian Portuguese to assess reading speed—comparison with four European languages]. Arq Bras Oftalmol. 2008;71(4):553–8. Portuguese.
5. Meyniel C, Bodaghi B, Robert PY. Revisiting vision rehabilitation. Front Syst Neurosci. 2017;11:82.
6. Handler SM, Fierson WM. Reading difficulties and the pediatric ophthalmologist. J AAPOS. 2017;21(6):436–42.
7. Legein CP, Bouma H. Reading and the ophthalmologist. An introduction into the complex phenomenon of ordinary reading as a guideline for analysis and treatment of disabled readers [A]. Doc Ophthalmol. 1982;53(2):123–57.
8. Burggraaff MC, van Nispen RM, Hoek S, Knol DL, van Rens GH. Feasibility of the Radner Reading Charts in low-vision patients. Graefes Arch Clin Exp Ophthalmol. 2010;248(11):1631–7.
9. Trauzettel-Klosinski S, Dietz K; IReST Study Group. Standardized assessment of reading performance: the New International Reading Speed Texts IReST. Invest Ophthalmol Vis Sci. 2012;53(9):5452–61.
10. Sampaio M, Haddad M, Costa Filho H, Siauly M. Baixa visão e cegueira: os caminhos para a reabilitação, a educação e a inclusão. Rio de Janeiro: Guanabara Koogan; 2010.
11. Altpeter EK, Marx T, Nguyen NX, Naumann A, Trauzettel-Klosinski S. Measurement of reading speed with standardized texts: a comparison of single sentences and paragraphs. Graefes Arch Clin Exp Ophthalmol. 2015;253(8):1369–75.
12. Associação Brasileira De Normas Técnicas (ABNT). NBR 5413: Iluminância de interiores. 1992.

13. Alabdulkader B, Leat SJ. Reading in children with low vision [Internet]. *J Optom*. 2010;3(2):68–73.
14. Decarlo DK, McGwin G Jr, Searcey K, Gao L, Snow M, Stevens L et al. Use of prescribed optical devices in age-related macular degeneration. *Optom Vis Sci*. 2012;89(9):1336–42.
15. Castro CT, Kallie CS, Salomão SR. [Development and validation of the MNREAD reading acuity chart in Portuguese]. *Arq Bras Oftalmol*. 2005;68(6):777–83. Portuguese.
16. Radner W. Reading charts in ophthalmology. *Graefes Arch Clin Exp Ophthalmol*. 2017;255(8):1465–82.
17. Colenbrander A; Consilium Ophthalmologicum Universale Visual Functions Committee. Visual Acuity Measure Standard. *Ital J Ophthalmol*. 1988;11(5):19.
18. CEN European Committee of Norms. ISO 8596. Beuth, Berlin; 1996.
19. Sloan LL. New test charts for the measurement of visual acuity at far and near distances. *Am J Ophthalmol*. 1959;48(6):807–13.
20. Brussee T, van Nispen RM, van Rens GH. Measurement properties of continuous text reading performance tests. *Ophthalmic Physiol Opt*. 2014;34(6):636–57.
21. Subramanian A, Pardhan S. Repeatability of reading ability indices in subjects with impaired vision. *Invest Ophthalmol Vis Sci*. 2009 Aug;50(8):3643-7.
22. Santos V. Desenvolvimento e validação de protótipo de sistema de leitura portátil (SLP) para baixa visão. UNIFESP; 2015.
23. Virgili G, Cordaro C, Bigoni A, Crovato S, Cecchini P, Menchini U. Reading acuity in children: evaluation and reliability using MNREAD charts. *Invest Ophthalmol Vis Sci*. 2004 ;45(9):3349–54.
24. Radner W, Willinger U, Obermayer W, Mudrich C, Velikay-Parel M, Eisenwort B. Eine neue Lesetafel zur gleichzeitigen Bestimmung von Lesevisus und Lesegeschwindigkeit. *Klin Monatsbl Augenheilkd*. 1998;213(3):174–81.
25. Rosa AM, Farinha CL, Radner W, Diendorfer G, Loureiro MF, Murta JN. Development of the Portuguese version of a standardized reading test: the Radner-Coimbra Charts. *Arq Bras Oftalmol*. 2016;79(4):238–42.
26. Carver RP. Word length, prose difficulty, and reading rate. *J Read Behav*. 1976;8(2):193–203.

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