

## Reading comprehension evaluation by means of the NEUROPSI assessment tool in patients attending “alcoholics anonymous” due to alcohol consumption

### Evaluación de la comprensión de la lectura a través de la batería NEUROPSI en pacientes que asisten a “alcohólicos anónimos” por consumo de alcohol

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#### Abstract

Alcohol drinking negatively affects the reading skill. The article addresses the prevalence of reading difficulties in alcohol rehabilitation patients by applying the neuropsychological assessment tool NEUROPSI.

Methodology: non-experimental, exploratory, and observational study based on the Neuropsychological assessment tool NEUROPSI in Spanish (brief version).

Findings: In a sample of 20 participants, the results indicate that only 40% fall within the normal values, whilst 60% exhibit low scores in reading comprehension, concentration, and attention. Lastly, 60% of the participants presented alterations in neurocognitive functions, with 25% indicating moderate alterations, 20% revealing severe alterations, and 15% exhibiting mild alterations.

**Reading, Neuropsychological, Alcoholis**  
**Neurocognitive assessment,**  
**functions, NEUROPSI,**

#### Resumen

El alcohol afecta negativamente la habilidad de la lectura. En el presente artículo se aborda la prevalencia de dificultades en la lectura en pacientes en rehabilitación por alcoholismo utilizando la batería de evaluación neuropsicológica NEUROPSI.

Metodología: investigación de tipo no experimental, exploratorio, observacional con base al instrumento de evaluación Neuropsicológica breve, en español NEUROPSI.

Contribución: en una muestra integrada por 20 participantes, los resultados muestran que el 60% se ubican en un rango con una baja puntuación en la comprensión lectora, mientras que el otro 40% se encuentra dentro de los valores normales. Se observan alteraciones en las funciones neurocognitivas en el 60% de los participantes de los cuales el 25% apuntan alteraciones moderadas, el 20% revelan alteraciones graves y el 15% las alteraciones son leves.

**Lectura, Funciones neurocognitivas, Evaluación neuropsicológica, NEUROPSI, Alcoholismo**

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## Introduction

Reading is related to continuous learning episodes throughout life and actively contributes to human development. Reading acquisition involves a series of complex cognitive processes that enable the interpretation of letters and the comprehension of text. These processes involve the recognition, identification and encoding of textual information (Montealegre, 2004).

Effective comprehension of the information read requires the ability to discern, reflect and apply what has been learned (OECD, 2009). This involves processes of attention, visual perception, phonological awareness and memory, which are fundamental to storing, transforming, analysing and organising information in order to understand it (Canet-Juric, Urquijo, & Richard's, 2009).

Attention selects the essential information within the text, while the process of visual perception organises and interprets textual elements (Cuetos, 2010). Phonological awareness manages and processes speech sounds. Finally, memory temporally manages the information read (Lorenzo, 2001; Morgado, 2005; Barreyro, Burin and Duarte, 2009). All these processes are executed simultaneously during reading, creating a mental representation in which new information is integrated with previous knowledge (Molinari-Marotto, Barreyro, Cevasco and Van den Broek, 2011).

In the article published by the Centro de Investigación en Salud Poblacional del Instituto Nacional de Salud Pública, it talks about the analysis carried out based on the Encuesta Nacional de Salud y Nutrición Continua 2022 in which the habits of the Mexican adolescent population were observed and reported an alcohol intake of 20.6%, with a higher prevalence in males (22.0%) than in females (19.2%) (Ramírez et al., 2022).

Since reading is a basic daily activity, it is important to study those habits that deteriorate this skill. Therefore, the aim of this study is to evaluate how the impact of alcohol consumption influences reading comprehension processes using the NEUROPSI brief neuropsychological battery (highly effective in the area of assessment and easy to apply).

To carry out this evaluation, 20 patients between 20 and 69 years of age were selected from the Alcoholics Anonymous group, regardless of their educational level. A comprehensive review of the scientific literature on the effects of alcohol on reading comprehension was conducted, as well as an empirical study with programme participants to obtain specific data and observe possible correlations.

The results of this research will provide valuable information for health professionals, therapists and leaders of Alcoholics Anonymous groups in Mexico. By better understanding the impact of alcohol on reading, they will be able to adapt and improve strategies to prevent this addiction and provide more tools for rehabilitation, supporting individuals in the recovery process in a holistic way.

## *Rationale*

Alcohol addiction is a public health problem affecting millions of people worldwide. The Global Status Report on Alcohol and Health published by the Pan American Health Organization (PAHO) in conjunction with the Regional Office for the Americas of the World Health Organization (WHO) reports that approximately 237 million men and 46 million women suffer from alcohol-related disorders. Furthermore, PAHO projects a global increase over the next 10 years (PAHO, 2018). Alarmingly, the WHO's Global Alcohol Action Plan 2022-2030 reveals that the 283 million people involved in alcoholism start from the age of 14 years onwards (WHO, 2021).

The rehabilitation programme with the largest presence in Mexico is Alcoholics Anonymous. During the sessions, it begins with a series of readings on topics selected from the list of approved literature (Alcoholics Anonymous World Services, Inc., 2019). In other words, reading becomes a primary tool for fostering therapeutic connection at both the group and individual levels. In this way, appealing to the strengthening of the cognitive processes involved in reading enriches the benefits of the rehabilitation programme.

Reading, as a cognitive skill, is essential for learning, communication and personal development. However, consuming alcohol impairs brain functions such as memory, concentration and reading comprehension (Arias 2005).

Understanding how alcohol affects reading would allow the identification of specific areas of intervention in rehabilitation programmes and improve their efficiency. It would also initiate actions through the health sector to provide access to information on this risk to the population and disseminate its prevention, as well as regularise the participation of professionals in Human Communication in recovery processes.

### **Problem**

Prolonged alcohol consumption is a public health problem that affects millions of people around the world. Individuals suffering from this addiction experience a variety of adverse consequences in their daily lives, encompassing physical, psychological and social aspects. One of the significant effects of alcohol is a decrease in reading comprehension. In addition, individuals may experience alterations in their reading skills depending on their history of exposure to alcohol and other vulnerability factors. (Arias 2005).

The ability to comprehend reading is a cognitive aspect, a crucial task that enables people to understand and extract meaning from written information. This process involves a combination of cognitive functions such as word decoding, attention, memory, inference and the ability to make connections between ideas, concepts and the meaning of letter sequences (Ferrerres and López 2009). However, prolonged drinking can have significant damage to the central nervous system, affecting brain areas related to reading comprehension (Arias 2005).

PAHO's 2020 annual report highlights that the COVID-19 pandemic significantly increased mental health risks in Mexico, including alcohol abuse (PAHO, 2021). According to Ensanut 2020, during confinement, a worrying number of adolescents in the country (414,300 males and 208,903 females), have been consuming alcoholic beverages (Secretaría de Salud 2020).

In addition, people in the process of recovery and abstinence faced relapses as a result of quarantine, necessitating the suspension of face-to-face meetings held during that period by Alcoholics Anonymous groups. This situation poses a significant problem in terms of mental health and wellbeing during the pandemic in Mexico (PAHO, 2021).

Talking about the problems alcohol causes on the brain when reading is essential to understand the effects it can have on our intellectual and cognitive capacity, which in turn can encourage a responsible attitude towards drinking alcohol and promote a healthier lifestyle.

### **Hypothesis**

**Ho:** Reading ability in AA rehabilitation patients is not impaired.

**Hi:** Reading ability is impaired in AA rehabilitation patients.

### **Objectives**

**General objective:** To investigate the current state of reading skills in patients attending AA rehabilitation.

### **Specific objectives**

- To identify the total reading ability score by NEUROPSI in patients attending AA rehabilitation.
- To identify the current status of neurocognitive functions by NEUROPSI in patients with alcohol dependence according to DSM-V classification.

### **Theoretical framework**

#### *Background*

According to Cortéz et al. (2017), drinking alcohol can be measured in grams of alcohol or in standard drinking units. The definition of a standard drink according to the World Health Organisation (WHO 2001) refers to a drink containing around 10 grams of alcohol. Some examples with their respective percentages of alcohol content would be: a 330 ml can of beer with 5%, a 140 ml glass of wine with 12%, or a 40 ml glass of distillate with 40%.

When the established limit of alcohol exposure is exceeded, it can be considered excessive. However, alcoholism, as defined by Kershenovich (2010), is a chronic disease characterised by a lack of control during consumption, continuous or intermittent drinking, and despite awareness of the consequences, causing disturbances in thinking.

Vera (2015) describes that, in the past, alcoholism was seen as a symptom of social or psychological stresses, or as maladaptive behaviour that was learned.

Since 1976, the World Health Organisation has recognised the "Alcohol Dependence Syndrome (ADS)" as manifestations of various alcohol-related emotions, behaviours and thoughts, encompassing clinical indicators involving the feeling of losing control over the amount of alcohol ingested, the strong desire to drink and the organisation of life around alcoholic beverages. (Barrero and Pérez, 2018).

The SDA pattern becomes inflexible, they drink daily despite how destructive this habit can be and develop tolerance, needing more alcohol to get the same effects. When the drinking habit is stopped or decreased, either intentionally or unintentionally, withdrawal symptoms may appear, consisting of: tremors, elevated blood pressure, sweating, sleep problems, anxiety, difficulty concentrating, memory problems, impaired judgement, changes in sensory perception and, in severe cases, seizures (Barrero and Pérez, 2018).

#### *Factors influencing alcoholism*

The desire to drink alcohol is influenced by various factors, Ríos et al. (2012) mention how family conflicts, lack or excess of discipline and lack of responsibility can trigger the early stages of addiction. Similarly, psychological factors, such as low self-esteem, anxiety problems and depression, are of paramount importance. Finally, environmental and social factors also play a relevant role, such as social norms that favour easy access to this substance, as the initial, barely perceptible symptoms involve concerns about the availability of alcohol, which strongly influences the affected person's choices of friendships and activities (Duque, 2009).

Alcoholism represents a serious global health concern, with WHO (2022) stating that up to three million people die annually due to harmful alcohol intake. Alarming, 13.5% of alcohol-related deaths are among young people between the ages of 20 and 39.

Moreno (2015) states that in Latin America and the Caribbean, there is a deep-rooted culture around alcohol that poses a significant challenge for public health in the region, as highlighted by the expert report, since the average alcohol intake per person per year is 8.4 litres, which is 2.2 litres higher than the global average. The importance of knowing these figures stems from the need to effectively address this problem in the region and promote greater awareness of the risks associated with alcohol.

#### *Impact of alcohol consumption on the neurobiological processes of Reading*

Bravo (2016), argues that reading involves the interaction of visual stimuli. From a neurobiological perspective, as analyzed by Alonso Ortiz T (1997), the development of reading involves the transmission of visual stimuli from the retina to the central nervous system. This involves specific areas of the brain such as the primary visual area and the secondary visual area, which detect and interpret visual stimuli.

Working memory is a key function in the acquisition and development of reading comprehension skills (Gómez-Veiga I., 2013). In addition, awareness of psycholinguistic knowledge, which involves phonological, lexical, syntactic and semantic analysis, is essential in the reading and writing process (Montealegre R., 2006).

It has been confirmed that ingesting alcohol has harmful effects on brain tissue and affects its functioning (Horton et al., 2015). In general, it has a detrimental impact on neurobiological processes involved in reading including visual perception, language processing and memory (Flores et al., 2019), decreased concentration spans and reflexes (Duque 2005), this can significantly influence the reading process and academic performance in adolescents that is why it is of vital importance to address this problem in order to preserve cognitive function and promote effective reading.

*DSM-V criteria and their relation to alcoholism*

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) is a publication of the American Psychiatric Association (APA) that provides standardized diagnostic criteria used by mental health professionals to classify and diagnose mental disorders, including alcoholism or alcohol use disorder. Alcohol use disorder is classified into two main categories: alcohol use disorder and alcohol use disorder in remission. Criteria for diagnosis include symptoms such as loss of control, withdrawal, alcohol tolerance.

The DSM-V emphasizes that the criteria are not based solely on quantity, but also on the individual's ability to control. These criteria provide a diagnostic structure that allows an accurate assessment of alcohol dependence and facilitates appropriate treatment and intervention (APA, 2014).

*NEUROPSI Battery*

The Brief Neuropsychological Battery, known as NEUROPSI, is an instrument used for neuropsychological screening developed and standardized in Mexico. It aims to measure cognitive functions (Ostrosky, 2015), making it the optimal assessment to identify the degree of reading impairment caused by alcohol.

This battery is applied in people with possible cognitive alterations, such as neurological, psychiatric, geriatric patients and those with chronic degenerative diseases (Ostrosky et al., 2022). This reliable tool is composed of short and easy-to-apply items, taking into account the schooling and age of those assessed (Marreros et al., 2022).

NEUROPSI provides qualitative and quantitative data that allow us to obtain a profile that indicates the degree of impairment in the different dimensions evaluated, involving the areas of: attention and concentration, memory, language, visuoconstructive processes, executive functions, writing, orientation, calculation and reading (Ostrosky-Solis F, 1999).

**Research methodology**

The present study is exploratory, non-experimental, observational and cross-sectional in nature, with a descriptive statistical analysis.

Reading comprehension in alcoholics was established as a complex variable to verify the existence of alterations and other variables such as age, gender, and schooling.

For the statistical analysis of the population studied, measures of central tendency and dispersion were used.

*Procedure*

Patients attending the 24-hour Alcoholics Anonymous group "Primero de Mayo" in the city of Durango, Dgo, Mexico were evaluated. Data were collected during the month of September 2020.

The inclusion criterion was limited to all those patients in the group who agreed to be part of the sample and signed the informed consent corresponding to the Mexican official standards (NOM-004-SSA3-2012 for the clinical record and NOM-040-SSA2-2004 on information) prior to their participation in the evaluation. Patients who declined the study invitation and those who were still actively drinking alcohol comprised the exclusion criteria. Thus, 20 valid cases were confirmed and three eliminated.

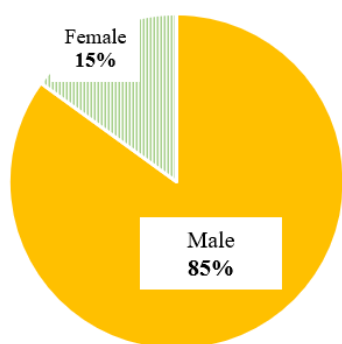
In order to create a patient profile of the sample, a clinical survey was applied to obtain the following variables: sex, age, school average, and frequency of alcohol consumption.

Afterwards, the six cognitive functions were evaluated using the NEUROPSI Brief neuropsychological instrument. For the purposes of this study, the data concerning reading comprehension were collected. These results were classified according to the ranges established by the instrument in its corresponding section, as well as in relation to the age and level of schooling of each participant. Finally, the statistical analysis was elaborated in Microsoft Excel software.

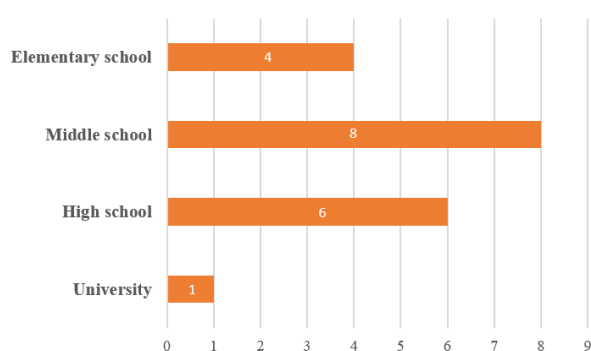
**Results**

The sample consisted of 20 people attending the 24-hour Alcoholics Anonymous group "Primero de Mayo", of whom three (15%) were women and 17 (85%) were men (see Graph 1).

The average age of the participants was 33 years, with a minimum range of 20 years and a maximum of 69 years. In terms of educational level, four people had completed primary school, eight had completed secondary school, six had completed high school and one person had a university education (see Graph 2).



**Graphic 1** Gender of the sample



**Graphic 2** Education level of the sample

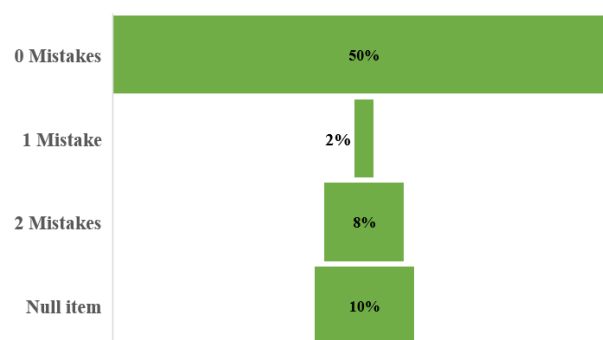
The clinical survey applied to determine the frequency with which the patient habitually consumed alcohol revealed that alcohol intake was relatively low. Only four participants admitted to having consumed it occasionally, once or twice a month.

The results of the NEUROPSI neuropsychological evaluation revealed that 40% of the persons evaluated obtained a result within the normal range, while 60% presented alterations in neurocognitive functions. Of the latter group, 15% showed mild alterations, 25% presented moderate alterations and 20% obtained results indicative of severe alterations. These findings highlight the significant presence of difficulties in neurocognitive functions in the evaluated population (Table 1).

	Persons	Percentage
Normal	8	40 %
Mild	3	15 %
Moderate	5	25 %
Severe	4	20 %

**Table 1** Results of the NEUROPSI test

Next, regarding the specific objectives, the total score for the reading ability in which 50% (10 participants) responded correctly, however, only one participant (2%) had one error, four participants (8%) with two errors and five participants (10%) with a null response (graph 3).



**Graphic 3** Participants' results obtained in the reading section of the NEUROPSI test

A significant correlation was found between alcohol consumption and reading ability, with a reliability level of 95% and a value of  $t=1.98$ . These results indicate the relationship between the data collected; therefore, the research hypothesis is approved: alcohol consumption is associated with reading ability in AA rehabilitation patients.

It is important to note that the results obtained in this population cannot be extrapolated, because it is a small sample from a single site. Comparisons with other institutes would be necessary to assess the state of cognitive functions more broadly and accurately.

## Conclusion

Drinking alcohol is one of the causes of damage to the body. This damage is critical when it occurs during adolescence, as research shows that early drinking can cause neuronal damage, alterations in behaviour, memory and affect learning processes (Zinn, Stein and Swartzwelder, 2004). All of the above are the main ones involved in reading comprehension.

The effects of heavy drinking are detrimental to brain and cognitive functions and are not limited to single episodes of intoxication. A single binge or a few days of heavy drinking can cause significant damage to the brain and the cognitive ability required for reading (Obernier, White, Swartzwelder and Crews, 2002).

The neurodegeneration that occurs as a result of heavy alcohol consumption involves the death and deterioration of brain cells. In conjunction, brain circuits that control cognitive functions such as memory, attention, reasoning and information processing are compromised for reading (Duque 2005).

One in six of the world's population is in adolescence, amounting to approximately 1.2 billion people between the ages of 10 and 19. The fact that a significant number of young people are in good health is not a sufficient condition to reduce their vulnerability to early access to alcoholic beverages, with detrimental impacts on their current and future well-being (WHO 2018). Their educational background depends on how complex cognitive processes can be operated to extract information from a text during reading. Therefore, to ensure meaningful learning that leads to successful completion of a given academic grade, it is key that conditions strengthen an alcohol-free space.

After analysing the data collected, it is clear that alcohol has a measurable effect on neurocognitive skills. Furthermore, the general and specific objectives set out in the research were achieved, and the hypothesis that recurrent alcohol drinking is related to greater alterations in reading ability is confirmed.

The results revealed that 40 % of the population assessed obtained a result within the normal range, while 15 % presented a mild result, 25 % showed a moderate result and 20 % registered a severe result. In relation to the assessment, this specific area obtained a lower percentage of correct answers, with an average of 53.3 %.

In the case of the limitations of this research, it is recommended to extend the sample to include a larger number of participants from different rehabilitation centres. Additionally, it is suggested to increase the participation of professionals in human communication therapy during the rehabilitation steps of this addiction. In this way, alongside the behavioural work, a therapeutic plan that focuses on neurocognitive processes in adults can be evaluated and structured.

Finally, it is proposed to foster collaboration with other health institutions, education and community organisations in order to develop comprehensive approaches to implement conscious prevention campaigns on issues related to alcohol consumption. It is essential that this information is accessible to the general and target audiences.

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### **References**

1. Ahumada-Cortez, Jesica Guadalupe; Gámez-Medina, Mario Enrique; Valdez-Montero, Carolina El consumo de alcohol como problema de salud pública a Ximhai, Vol. 13, núm. 2, julio-diciembre, 2017, pp. 13-24 Universidad Autónoma Indígena de México El Fuerte, México Disponible en:<http://www.redalyc.org/articulo.oa?id=46154510001>
2. Alcoholics Anonymous World Services, Inc. (2019). El Grupo de A.A., donde todo empieza. AA Grapevine, Inc. <https://www.aa.org>
3. Alonso Ortiz T. (1997). Neuropsicología del lenguaje. Madrid: CEPE Ciencias de la educación preescolar y especial. ISBN: 84-7869-191-X

4. American Psychiatric Association [APA]. (2014). Manual de diagnóstico y estadístico de los trastornos mentales 5ta Edición (DSM-5). Recuperado de: <https://www.federaciocatalanadad.org/wp-content/uploads/2018/12/dsm5-manualdiagnosticoyestadisticodelostrastornosmentales-161006005112.pdf>
5. Arias, R. (2005). Reacciones fisiológicas y neuroquímicas del alcoholismo. Perspectivas en psicología. Vol. I. (No. 2) pp. 138–147. Recuperado de: <http://www.scielo.org.co/pdf/dpp/v1n2/v1n2a03.pdf>
6. Barrero, M. y Pérez, A. (2018). Evaluación del riesgo de alcoholismo en estudiantes de la secundaria básica Vicente Quesada. Multimed. Revista Médica. Granma, Recuperado de: <https://www.medigraphic.com/pdfs/multimed/mul-2018/mul184d.pdf>
7. Barreyro, J., Burin, D. y Duarte, D. (2009). Capacidad de la memoria de trabajo verbal. Validez y fiabilidad de una tarea de amplitud de lectura. Interdisciplinaria. Revista de Psicología y Ciencias Afines, 26, 207-228. Recuperado de: <https://www.redalyc.org/pdf/180/18011827003.pdf>
8. Bravo Valdivieso, L. (2016). El aprendizaje del lenguaje escrito y las ciencias de la lectura. Un límite entre psicología cognitiva, las neurociencias y la educación. Límite, Revista Interdisciplinaria de Filosofía y Psicología, 11(36), 50-59. Obtenido de <http://www.redalyc.org/pdf/836/83646546005.pdf>
9. Canet-Juric, L., Urquijo, S. y Richard's, M. M. (2009). Predictores cognitivos de niveles de comprensión lectora mediante análisis discriminante. International Journal of Psychological Research, 2, 99-111. Recuperado de: <https://www.redalyc.org/pdf/2990/299023513003.pdf>
10. Cuetos, F. (2010). *Psicología de la lectura*. 8va Ed. Madrid: Wolters Kluwer España. Obtenido de: <https://clea.edu.mx/biblioteca/files/original/e8af5d9efa333b58dbccb1ccedb85745.pdf>
11. Arias Duque, R., (2005). Reacciones fisiológicas y neuroquímicas del alcoholismo. Diversitas: Perspectivas en Psicología, 1(2),138-147. [fecha de Consulta 10 de septiembre de 2023]. ISSN: 1794-9998. Recuperado de: <https://www.redalyc.org/articulo.oa?id=67910203>
12. Ferreres, A., López, C. (2009). Las alexias fonológicas, de superficie y profunda en hispanohablantes y los modelos de doble ruta. prensa médica Latinoamericana, III (2): 161 – 176. ISSN 1688-4094. Obtenido de: <http://www.scielo.edu.uy/pdf/cp/v3n2/v3n2a05.pdf>
13. Flores, G.; Espandian, A.; Villa, R. y Sáiz, P. (2019). Deterioro cognitivo y dependencia alcohólica, implicaciones clínicas. Adicciones vol.31, nº1. ISSN 0214-4840. Recuperado de: <https://www.adicciones.es/index.php/adicciones/article/view/1284/1015>
14. Gómez-Veiga, I., Vila, J. M., García-Madruga, J. A., y Elosúa, A. C. M. R. (2013). Comprensión lectora y procesos ejecutivos de la memoria operativa. Psicología Educativa, 19(2), 103-111. [https://doi.org/10.1016/s1135-755x\(13\)70017-4](https://doi.org/10.1016/s1135-755x(13)70017-4)
15. Horton, I.; Duffy, T.; Hollins, C. y Martin, C. (2015). Comprehensive assessment of alcohol-related brain damage (ARBD): gap of chasm in the evidence. Journal of Psychiatric and Mental Health Nursing, 22, 3-14. <https://doi.org/10.1111/jpm.12156>
16. Informe anual de 2020 "La salud universal y la pandemia de los sistemas de salud resilientes en México", Organización Panamericana de la Salud (OPS) Recuperado de: <https://iris.paho.org/handle/10665.2/55000>
17. Informe sobre la situación mundial del alcohol y la salud 2018. Resumen. Washington, D.C.: Organización Panamericana de la Salud; 2019. (OPS/NMH/19-012). Licencia: CC BY-NC-SA 3.0 IGO. Obtenido de: [https://iris.paho.org/bitstream/handle/10665.2/51352/OPSNMH19012\\_spa.pdf](https://iris.paho.org/bitstream/handle/10665.2/51352/OPSNMH19012_spa.pdf)



18. Kershenobich, D. (2010). Alcohol y alcoholismo: definiciones actuales, mecanismos de daño y tratamiento clínico. *Revista de gastroenterología de México*, 2(75), 177-178. ISSN: 0375-0906. Obtenido de: <http://www.revistagastroenterologiamexico.org/es-pdf-X0375090610873913>
19. Lorenzo, J.R. (2001). Procesos cognitivos básicos relacionados con la lectura. Primera parte: la conciencia fonológica. *Interdisciplinaria*, Vol. 18, no.1, pp. 1-33. ISSN: 0325-8203 Recuperado de: <https://www.redalyc.org/pdf/180/18011326001.pdf>
20. Marreros-Tananta, Jaime, y Guerrero-Alcedo, Jesús Manuel. (2022). Propiedades Psicométricas Del Test De Evaluación Neuropsicológica - Neuropsi En Población Peruana. *Revista Ecuatoriana de Neurología*, 31(1), 40-48. <https://doi.org/10.46997/revecuatneurol31100040>
21. Molinari-Marotto C., Barreyro P.B., Cevasco, J. y Van den Broek, P. (2011). Generation of emotional inferences during text comprehension: behavioral data and implementation through the Landscape Model. *Escritos de Psicología*, 4, 9-17. ISSN 1989-3809 DOI: 10.5231/psy.writ.2011.1803. Obtenido de: <https://scielo.isciii.es/pdf/ep/v4n1/original2.pdf>
22. Montealegre R. (2006). Desarrollo de la lectoescritura: adquisición y dominio. *Acta colombiana de psicología*, vol. 9, núm. 1 pp. 25-40. ISSN: 0123-9155. Obtenido de: <https://www.redalyc.org/pdf/798/79890103.pdf>
23. Montealegre, R. (2004). La comprensión del texto: sentido y significado. *Revista Latinoamericana de Psicología*. vol. 36, núm. 2, pp. 243-255. ISSN: 0120-0534. Recuperado de: <https://www.redalyc.org/pdf/805/80536205.pdf>
24. Moreno, J. (2015). Los países que más beben en América Latina: la dramática radiografía del consumo de alcohol en la región. Artículo BBC Mundo(s/f) [Internet] Recuperado el 30 de mayo del 2023, [https://www.bbc.com/mundo/noticias/2015/07/150723\\_consumo\\_alcohol\\_latinoamerica\\_muertes\\_paises\\_jm#:~:text=Su%20traducci%C3%B3n%20num%C3%A9rica%20es%20que,que%20ha%20elaborado%20su%20organismo.](https://www.bbc.com/mundo/noticias/2015/07/150723_consumo_alcohol_latinoamerica_muertes_paises_jm#:~:text=Su%20traducci%C3%B3n%20num%C3%A9rica%20es%20que,que%20ha%20elaborado%20su%20organismo.)
25. Morgado, I. (2005). Psicobiología del aprendizaje y la memoria: fundamentos y avances recientes. *Revista de Neurología*, 40, 289-297. DOI: <https://doi.org/10.33588/rn.4005.2005004> Recuperado de: <https://neurologia.com/articulo/2005004>
26. Obernier, J.A., White, A.M., Swartzwelder, H.S. y Crews, F.T. (2002). Cognitive deficits and CNS damage after a 4-day binge ethanol exposure in rats. *Pharmacology, Biochemistry and Behavior*, 72, 521-532. DOI: 10.1016/s0091-3057(02)00715-3. Obtenido de: <https://pubmed.ncbi.nlm.nih.gov/12175448/>
27. Organización Mundial de la Salud (OMS, 2022). La OMS señala la existencia de grandes lagunas en la reglamentación de la comercialización transfronteriza del alcohol. Nota de Prensa, <https://www.who.int/es/news/item/10-05-2022-who-highlights-glaring-gaps-in-regulation-of-alcohol-marketing-across-borders>
28. Organización Mundial de la Salud. (2001). Cuestionario de Identificación de los Trastornos Debidos al Consumo de Alcohol. Departamento de Salud Mental y Dependencia de Sustancias. WHO/MSD/MSB/01.6ª. [Internet] [citado 14 de enero de 2023]. Obtenido de: <https://www.paho.org/es/documentos/audit-cuestionario-identificacion-transtornos-debidos-al-consumo-alcohol-2001>
29. Organización Mundial de la Salud. Adolescentes: riesgos para la salud y soluciones [Internet]. 2018 [citado 14 de enero de 2023]. Disponible en: <https://www.who.int/es/news-room/fact-sheets/detail/adolescents-health-risks-and-solutions>

30. Organización para la Cooperación y el Desarrollo Económico (OCDE). (2009). Programa Internacional para la Evaluación de los Alumnos, PISA. Informe español. Madrid: Ministerio de Educación. Obtenido de: <https://www.educacionyfp.gob.es/inee/dam/jcr:bc05a3ce-effe-425b-a79b-c92f0d43f8d1/pisa-2009-con-escudo.pdf>
31. Ostrosky-Solis F, A. A. (1999). evaluación neuropsicológica breve en español NEUROPSI. México: El manual moderno. ISBN: 9700010000007
32. Ostrosky, F. G. (2015). Neuropsi: test y aplicación. Mexico: UAM. Recuperado de: <http://repositorio.ug.edu.ec/bitstream/redug/43553/2/SISTEMATIZACION%20DE%20EXPERIENCIAS%20MU%C3%91OZ%20Y%20ARREAGA%2029-08-2019-convertido.pdf>
33. Ostrosky, F.; Ardila, A. y Rosselli, M., (2022). “NEUROPSI: Evaluación Neuropsicológica breve en Español”. <https://neuropsi.com.mx/>
34. Plan de Acción Mundial sobre el alcohol 2022-2030, Organización Mundial de la Salud 2021, Recuperado de: [https://cdn.who.int/media/docs/default-source/alcohol/alcohol-action-plan/first-draft/global-alcohol-action\\_plan\\_first\\_draft\\_es.pdf?sfvrsn=59817c21\\_5](https://cdn.who.int/media/docs/default-source/alcohol/alcohol-action-plan/first-draft/global-alcohol-action_plan_first_draft_es.pdf?sfvrsn=59817c21_5)
35. Ramírez-Toscano Y, Canto-Osorio F, Carnalla M, Colchero MA, Reynales-Shigematsu LM, Barrientos-Gutiérrez T, López-Olmedo N. Patrones de consumo de alcohol en adolescentes y adultos mexicanos. *Ensanut Continua 2022. Salud Publica Mex.* 2023;65(sup11):S75-S83. <https://doi.org/10.21149/14817>
36. Ríos, B.; Vergara, L.; Arias, Y.; Casdigo, S.; Castro, G. (2012). Factores Sociales y Económicos que influyen en el consumo de alcohol. *Rev. salud mov.* 4(1): 46-53 ISSN 2027-4548, <https://core.ac.uk/download/pdf/267928748.pdf>
37. Secretaría de Salud Pública (SSP, 2020). Encuesta Nacional de Salud y Nutrición sobre COVID-19. Recuperado de: <https://ensanut.insp.mx/encuestas/ensanutcontinua2020/doctos/informes/ensanutCovid19ResultadosNacionales.pdf>
38. Vera, K. (2015). El alcohol y su incidencia en el proceso de aprendizaje en los estudiantes de primero de bachillerato del colegio José María Velasco Ibarra del cantón el Empalme, provincia del Guayas, Recuperado de: <http://dspace.utb.edu.ec/handle/49000/3538>
39. Zinn, S., Stein, R. y Swartzwelder, H.S. (2004). Executive functioning early in abstinence from alcohol. *Alcohol: Clinical and Experimental Research*, 28(9), 1338-1346 <https://doi.org/10.1097/01.ALC.0000139814.81811.62> .