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Neuropsychological Assessment in the Forensic Context: A Scoping Review

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Abstract. The introduction of neuropsychologists in legal practice allowed for the field of forensic neuropsychology to arise. However, it is still a recent field of knowledge that is in continuous development. The existing literature highlights the incipience of studies in this area and the need for adaptation of instruments and methods. Thus, this scoping review aims to analyze how neuropsychological assessment has been employed so far in the forensic context. In order to do this, a search and a follow-up were conducted in the databases PsycInfo, Scopus and Web of Science. The query used for both searches was "(neuropsychological assessment OR neuropsychological test)" AND "forensic" OR "forensic neuropsychology". Initially, 1001 papers were identified, and after a two-stage screening process, 83 articles were included for analysis. Regarding neuropsychological assessment, the most investigated constructs were cognitive levels, memory and symptom validity. The heterogeneity of employed instruments we found in the studies evidenced the great existing variability in forensic neuropsychological practice. Among the most assessed populations were individuals with psychiatric, psychological or neurological diagnoses and male adult detainees in general. With this review, we expect to provide an overview on the current state of forensic neuropsychology, as well as information that may serve as a starting point for new research and further developments in the field.

Keywords: Neuropsychology; Forensic psychology; Neuropsychological test.

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1. Introduction

The justice system requires scientifically based evidence in order to make the fairest and most appropriate decisions possible. Thus, it is always looking for other fields of knowledge and new methods to support its decision-making process[1]. One such field is neuropsychology, and the intersection between its methods and the law has recently established itself as a new field of study and practice.

The development of systematic methods for evaluating psychological consequences from traumatic events and investigating the association of affective and cognitive processes in socially disruptive behavior has allowed neuropsychology to find space to enter the boundaries of legal practice[2]. Due to it being an evidence-based way of addressing the relationship between brain (mental state) and behavior, neuropsychology can significantly contribute to understanding criminal conduct or civil demands[3] in forensic contexts. Neuropsychological assessment results can also provide important complementary data to other professionals in situations related to the law[1].

The introduction of neuropsychologists in legal practice has thus generated the field called forensic neuropsychology. It is still a recent field of knowledge, in continuous development, and the existing literature highlights the incipience of studies in the area regarding the necessity of ethical adaptation of instruments and methods to the legal context[4].

Ensuring that the instruments and methods of forensic neuropsychology are adapted to ethical principles is vital. Otherwise, there is a risk of non-scientific and questionable practices occupying this field of intervention[3]. This evidences the importance of developing ethical guidance alongside the field itself[5], as well as the need to educate and train forensic neuropsychologists, given the insufficiency of specialized professionals to meet current demands[6].

The inappropriate use of neuropsychological knowledge can contribute to spreading prejudices, stigmatizing notions and over-pathologizing of issues related to mental disorders and their possible correlation with judicial problems[2]. Responsible application of this knowledge ensures a reliable and evidence-based practice, granting forensic neuropsychology the potential to assist in the primary function of the judiciary system: the search for truth and the promotion

of justice[3]. However, in order to do so, a clearer notion of how forensic neuropsychological practice stands in its current form is required.

Hence, the main objective of this scoping review is to analyze how neuropsychological assessment has been used in the forensic context. Specifically, we intend to answer three questions: (1) *What is the purpose of neuropsychological assessments in the legal context?* (2) *What are the most used instruments in neuropsychological assessments?* (3) *In the forensic context, neuropsychological assessment is commonly used to assess which population?* Thus, we expect to provide an initial and broad screening of forensic neuropsychology, adding to the existing reflections on issues present in the literature.

2. Methods

2.1 Protocol

The present study consists of a scoping review of the literature on forensic neuropsychology, aiming to understand how neuropsychological assessment has been used in the forensic context. Scoping reviews are a technique used to systematically map broader concepts and topics in a research area[7] allowing researchers to identify the main terms, theories, sources of evidence and gaps in the analyzed field[8].

2.2 Data sources and search strategy

The initial search was conducted in the electronic databases PsycInfo, Scopus and Web of Science, on August 19th, 2020. The search query used was "(neuropsychological assessment OR neuropsychological test)" AND "forensic" OR "forensic neuropsychology". A follow-up search was conducted on June 12th, 2022, to identify any additional articles published after the initial search. This was done in order to update our findings and to further base this review. The same three databases were consulted, and the search query was identical to the one used in the first search.

2.3 Eligibility criteria

Studies were eligible for inclusion if they had (a) empirical research designs (not systematic or literature reviews, descriptive studies, letters to the editor, book

chapters, books, dissertations, thesis, opinion texts or corrections) and if they (b) approached in any way the use of neuropsychological assessment or tests in a forensic context. As for the exclusion criteria, papers were excluded from the review if they were (a) not written in Portuguese, Spanish or English, (b) not fully available online, and/or were (c) published before 2015, ensuring that only the most recent publications regarding the main topic of interest were selected.

2.4 Study selection process

A two-stage screening process was used to assess the relevance of studies identified in the search and their adequacy to this review's purpose. The first step was to select studies based on reading their titles and abstracts in the databases and then deciding on their inclusion or exclusion based on the previously established criteria. On the first search round, after the exclusion of 150 duplicate papers, 644 studies were screened. Scopus had 150 results, from which 62 were excluded (see Figure 1 for details on the reasons for exclusion), leaving the remaining 88 articles for the second-stage screening. In the Web of Science database, the search resulted in 46 articles. Of these, 29 were excluded and 17 were selected for the second-stage screening. In PsycInfo, from a total of 448 results, 411 were excluded and the remaining 37 articles were included in the second-stage screening. Thus, a total of 142 articles were included in the second-stage screening.

During the follow-up search, 207 new results were found in the 3 databases combined. After the exclusion of duplicates (n = 86), the titles and abstracts of the remaining 121 results were read, and their inclusion or exclusion was decided based on the same previously established criteria. Scopus provided 39 new results, from which 27 were excluded (see Figure 2 for details on the reasons for exclusion), leaving 12 articles for the second-stage screening. In the Web of Science database, there were 44 new results, from which 37 were excluded, leaving 7 articles for the second-stage screening. In PsycInfo, from the 38 new results, 26 were excluded and 12 were included in the second-stage screening. A total of 31 articles were included in the second-stage screening after the follow-up search.

2.5 Data extraction process and final sample

The following data were extracted from the 142 studies selected from the first search: the complete reference, type of study design, sample characteristics and instruments utilized. After this in-depth reading of the 142 articles, the papers inconsistent with the purpose of the review (n = 77) were excluded, totalizing 65 studies selected for complete analysis.

The same data was extracted from the 31 articles included in the follow-up search. After this in-depth reading, other 13 papers were excluded for not being consistent with the purpose of this review, totalizing 18 studies selected for the complete analysis. Adding the two searches together, a total of 83 papers were analyzed in this review.

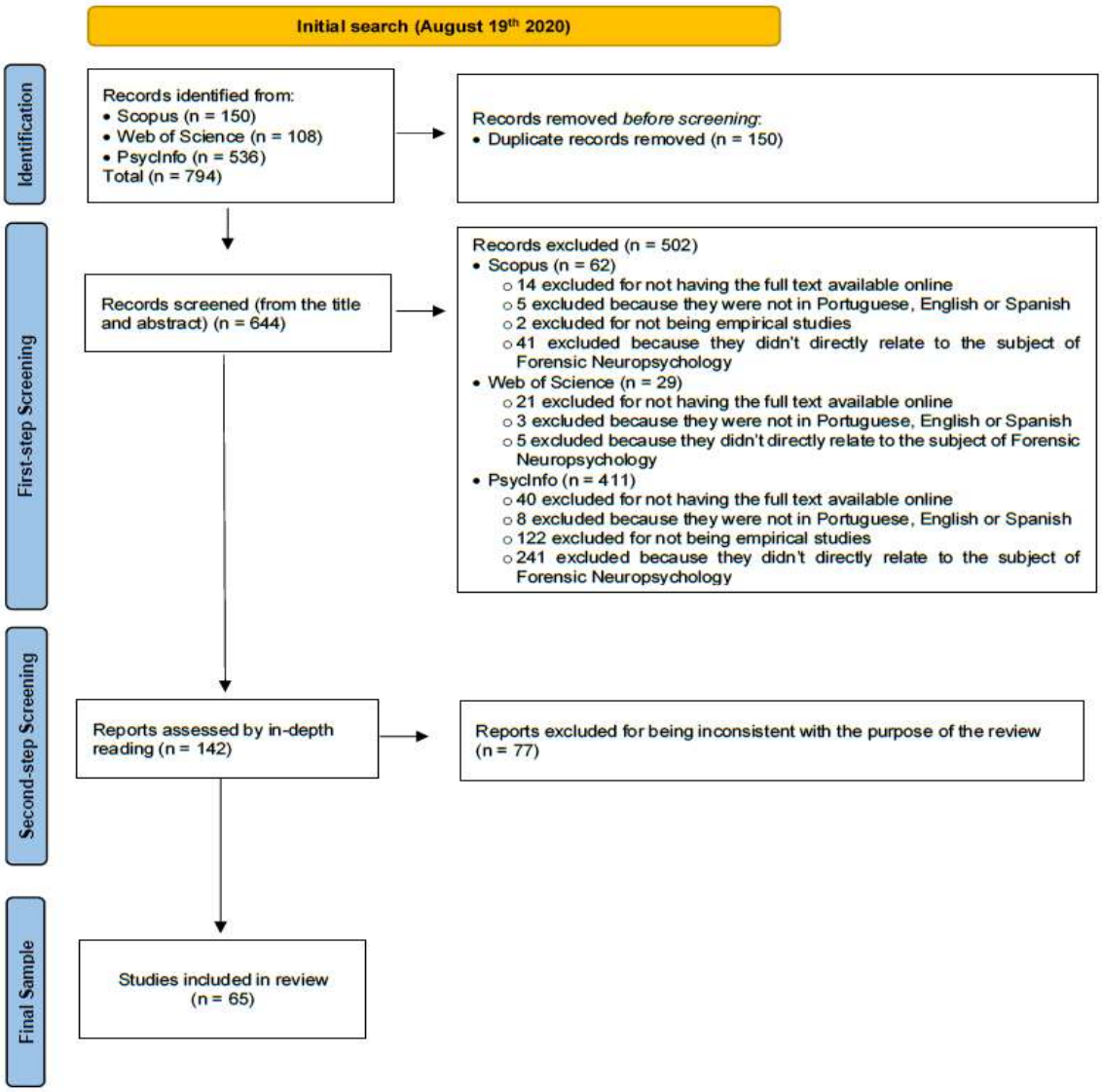

Figure 1. Literature search flowchart diagram.

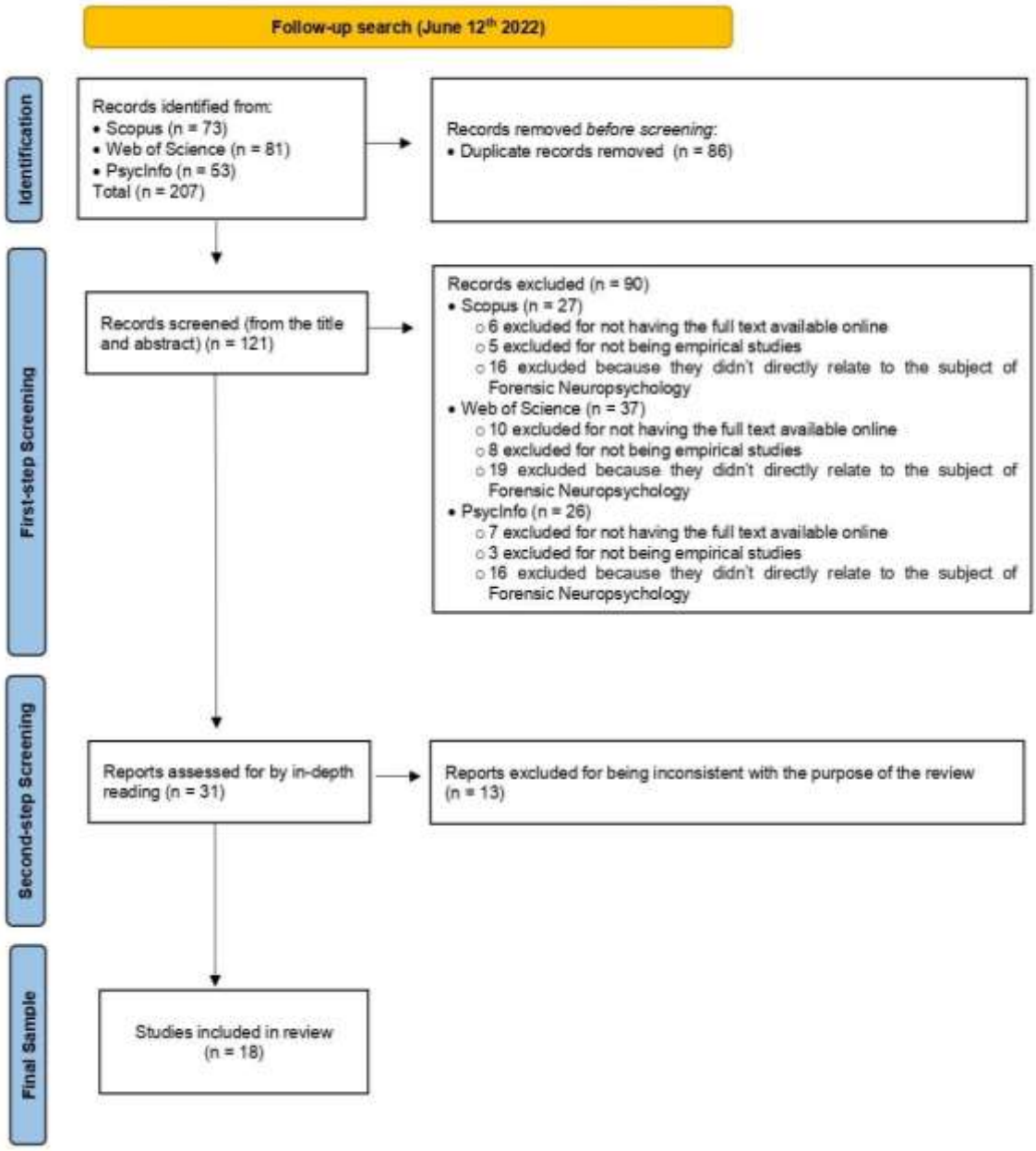

Figure 2. Literature follow-up search flowchart diagram.

3. Results

The literature search resulted in a total of 1001 articles (sum of the records identified in the initial and follow-up search; see Figure 1 and Figure 2). After the exclusion of the duplicate papers (n = 236) and the analysis of titles and abstracts, 592 articles were excluded, and the data of 173 were extracted. 90 other studies were then excluded for being inconsistent with the review's purpose. The final 83 articles were included for analysis.

The most frequent study designs (Table 1*) were case-control (n = 33; 40%), non-randomized clinical trial (n = 23; 28%) and cross-sectional analytical studies (n = 16; 19%). There were also 5 cohort studies (6%), 3 randomized clinical trials (4%) and 3 retrospective studies (4%).

In total, 41 articles (49%) used at least one neuropsychological test to investigate the sample's intelligence levels. Neuropsychological instruments were used by 24 papers (29%) to evaluate memory. Symptom validity was investigated by 39 papers (47%) with at least one instrument used for this purpose. Among the most common instruments were the Test of Memory Malingering (TOMM) (n = 18; 22%), Victoria Symptom Validity Test (VSVT) (n = 8; 10%) and the Medical Symptom Validity Test (MSVT) (n = 7; 8%).

Overall, more than 140 different types of instruments were identified. Table 1 provides a description of all instruments used in neuropsychological assessments in the forensic context of the analyzed articles. Among the main neuropsychological tests used were the California Verbal Learning Test (CVLT) (n = 15; 18%), Word Memory Test (WMT) (n = 14; 17%) and the Trail-Making Test (TMT) (n = 13; 16%). The Wechsler Scales were also used in several researches: in 27 (33%), one of the editions of the Wechsler Adult Intelligence Scale (WAIS) - WAIS-R, WAIS-III, WAIS-IV or WAIS-IV-NL - was applied, 10 (12%) others used the Wechsler Memory Scale (WMS) - 3rd, 4th edition or Revised -, and the Wechsler Abbreviated Scale of Intelligence (WASI) was used in 5 (6%) studies. The Psychopathy Checklist-revised (PCL-R) was part of the instruments in 8 (10%) studies, such as the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS), also used in 8 (10%) papers.

Regarding samples, we found that 38 (46%) studies had a sample made up of forensic patients, detainees admitted to forensic institutions/hospitals and/or individuals with psychiatric, psychological or neurological diagnoses. 15 (18%) studies specifically investigated patients diagnosed with psychiatric/psychological disorders - such as Conduct Disorder, Psychotic Disorders or Personality Disorders. 9 studies (11%) specifically addressed individuals with Schizophrenia Spectrum Disorders and other 7

*Table 1 can be accessed through this link:
https://drive.google.com/file/d/1dO6RgqF_gfKbeSrTDBllatkeJ8vY5MkJ/view

studies (8%) had patients with Psychopathy or antisocial disorder as their sample. The sample of other 15 (18%) studies didn't focus on one specific condition, instead investigating forensic hospitals' general population. Furthermore, another 8 (10%) papers focused on investigating patients with a history and diagnosis of neurological conditions, such as stroke, acquired brain injury, traumatic brain injury or dementia.

45 (54%) papers focused on the forensic population involved in criminal or civil lawsuits without identified or diagnosed health conditions. 18 (22%) were adults arrested for one or more crimes (in general). 13 (16%) investigated individuals convicted of violence or assault - 3 (4%) specifically for sexual assault and 4 (5%) for sexual abuse or assault against minors. 7 (8%) articles assessed adolescents or children who committed a crime or were incarcerated. 5 (6%) investigated adults who committed murder, but only one paper focused specifically on women convicted of this crime. 2 (2%) recent papers also focused on evaluating veterans and U.S. service members' justice claims. Finally, 2 others (2%) assessed children who were victims of crime.

4. Discussion

4.1 What is the purpose of neuropsychological assessments in the legal context?

From the analysis of the 83 selected articles, we ascertained that 47% of the studies involving the application of tests sought to investigate the validity of the symptoms presented by those evaluated[9-13]. This data is congruent with legislation that determines that deficits or neurological conditions can decrease sentence time, legally acquit the accused or even provide monetary compensation in civil cases[14]. Thus, the retrieved data demonstrates the relevance of the investigation of symptom validity in the conduction of trials and lawsuits.

Neuropsychologists are called upon to intervene in the forensic context when there are questions about the adequacy of the examinee's neuropsychological functions[15,16]. In other words, to assist in determining the individual's competence to stand trial and assume responsibility for the crime[2,17]. Cognitive functions seem to be especially relevant in determining

one's ability to be judged. Research has mainly converged on the investigation of memory and cognitive functions[2,18].

An expressive number of articles stated that neuropsychological assessment is commonly conducted to investigate the individual's cognitive functions. Intelligence tests were used in 49% of the studies, which may be related to the fact that cognitive deficits have an influence on volitional behavior and, consequently, with criminality[19-21]. Also, cognitive impairment and competence to stand trial could be associated factors[18], which demands more research to further explore this correlation. Intelligence levels in forensic contexts are also an up-to-date relevant research topic, since it was found that the estimated prevalence of intellectual disability in the forensic population appears to be higher than expected[22].

Memory functions are also commonly investigated since they have significant associations with the validity of individuals' performance or symptoms[14,23-25]. As well as witness capability to provide evidence in a trial[26]. The importance of global neuropsychological assessment in the forensic context can also help in the examination of specific situations such as, for example, simulation of symptoms and performance in tests[27-29].

4.2 What are the most used instruments in neuropsychological assessments?

Neuropsychological assessment is mostly used to assess cognitive and memory functions and the presence of neuropsychiatric symptoms. In this review, a significant variability of assessment instruments was observed (140 different types of tests). Therefore, there is a lack of standardization regarding the tools for neuropsychological assessments in the forensic context and an indication that a wide variety of neuropsychological functions are being evaluated in different ways. This fact can be expected due to the field of neuropsychology being relatively recent. However, the lack of standardization of the instruments used by neuropsychologists is also pointed out as a possible problem, since there is evidence showing it can compromise the reliability of results in neuropsychological assessments, the quality of these procedures and how this information is understood by legal professionals[2].

Most of the studies involved validation and analysis of psychological instruments' applicability to the forensic population, investigating constructs such as symptom validity or malingering[30-36], performance validity[11,37-40], trial competence[41], and psychopathy or antisocial symptoms[42]. Also, other studies investigated the validation and standardization of new instruments developed for this specific setting, regarding the assessment of memory performance[14], executive functions in forensic populations[43-46], social cognition[47], feigning symptoms[48,49] and testamentary capacity in older adults[50].

This data also aligns with the previous discussion regarding the young age of this research field[2]. Since it is still an expanding area for the use of neuropsychological knowledge and practice[3], it is expected to be at a stage where neuropsychological instruments are being validated for the forensic population and settings and their usage is thus widely variable.

It is important to highlight that restricting detainees' hands (through the use of handcuffs) during the execution of neuropsychological tests can affect the performance of the assessed individuals[51]. Therefore, the generalization of forensic neuropsychological assessments and their results must be considered with caution and properly contextualized.

4.3 In the forensic context, neuropsychological assessment is commonly used to assess which population?

Neuropsychological assessment has been employed to assess a wide variety of neuropsychiatric conditions in the forensic population. Some studies have focused their investigations on samples of hospitalized forensic patients. Forensic patients with psychiatric disorders showed various neuropsychological impairments, mainly related to memory, cognition and impulsivity, which can increase the risk of violent behavior[52-56]. This fact matches the literature in that it affirms the importance of neuropsychological assessment of psychiatric and neurological patients, as it can provide important information about risk factors, deficits or associated dysfunctions[57,58].

One of the most investigated conditions was schizophrenia. Studies of forensic patients with schizophrenia were frequently associated with the use of violence[59,60], such as aggressive behavior and offenses, and especially homicide and other neuropsychiatric conditions[42]. In these patients, social

cognition directly affects the manifestation of violence and the severity of symptoms[61]. These findings are essential for thinking about how neuropsychological deficits common in schizophrenia may have implications for a person's capacity to stand trial and take responsibility for their actions[62-64]. These data suggest the need for individualized interventions for schizophrenic incarcerated individuals[65-67].

Other conditions frequently investigated in the forensic context were psychopathy and personality disorders[68-75]. The interpersonal and affective traits that characterize psychopathy, including irresponsibility, impulsiveness, and tendencies to ignore or violate social conventions and rules, have been associated with socially deviant behavior and consequences in criminal contexts[76,77].

Some researchers have investigated forensic populations convicted of violence or sexual assault. The conclusions of their studies showed lower scores in the tests of immediate memory, visuospatial/constructive and response inhibition[20,78]. These data support the interpretation of impulsivity, response inhibition, and decision-making as crucial etiological factors in understanding sexually aggressive/criminal behavior[78-81]. However, the importance of idiosyncratic evaluations and rehabilitations was stated, since sex offenders are not a homogeneous group as they are generally categorized by society[82].

Regarding the underage population convicted of crimes, the general objective of the studies was to try to identify executive dysfunctions in these individuals[83-86]. They also investigated possible risk factors for minors to develop criminal behavior in relation to previous environmental conditions, life experiences and comorbid conditions[87,88].

Other papers focused on the people who were convicted of homicide. This population was primarily evaluated to identify common neuropsychological deficits and association with criminal behavior[89,90]. Associated disorders and risk factors related to recidivist criminal action were also investigated[91]. Notably, most studies only analyzed criminal authorship in the male population, with only one focusing on a female sample[92].

4.4. Limitations

The main limitation of this study concerns the eligibility criteria. In this review, only empirical articles were included, which may limit the scope of the obtained information. Future research could include theses, dissertations, book chapters, and literature reviews in order to provide additional information on neuropsychological assessment in the forensic context.

5. Conclusion

This review aimed to analyze how neuropsychological assessment has been used in the forensic context. The results showed the main purposes of the assessment, instruments used, and types of populations investigated. Regarding the purpose of neuropsychological assessment, most of the analyzed studies investigated the validity of instruments and competence for standing trial. Many other constructs and functions can be approached in future research regarding this population and setting.

We identified that some groups are very well represented in this field's research, such as psychiatrically, psychologically or neurologically impaired forensic patients, and male adults. Future studies could focus on investigating understudied populations, such as women, children and the elderly, victims of crimes, prison guards and other professionals involved in the legal context. Such research may add new insights to the neuropsychological effects of crimes or being imprisoned.

Neuropsychologists are gaining more space in the forensic sphere to intervene in many different demands. However, we found there is a wide variety of instruments used in neuropsychological evaluation, and this has possible negative repercussions. Standardizing forensic neuropsychological assessment procedures is necessary in order to safely continue the development of this field and guarantee more reliable assessment results.

Finally, we aimed to provide a profile of the current state of forensic neuropsychology and information that may serve as a starting point for new research that covers topics that were sparsely addressed or not addressed at all in the studies analyzed here. Through this research, neuropsychology can continue to expand and improve its space in the forensic context. It can also fulfill, in a reasoned and ethical manner, its objectives and responsibilities of

basing judicial decisions, which, in turn, will bring significant consequences for the lives of a great number of individuals.

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