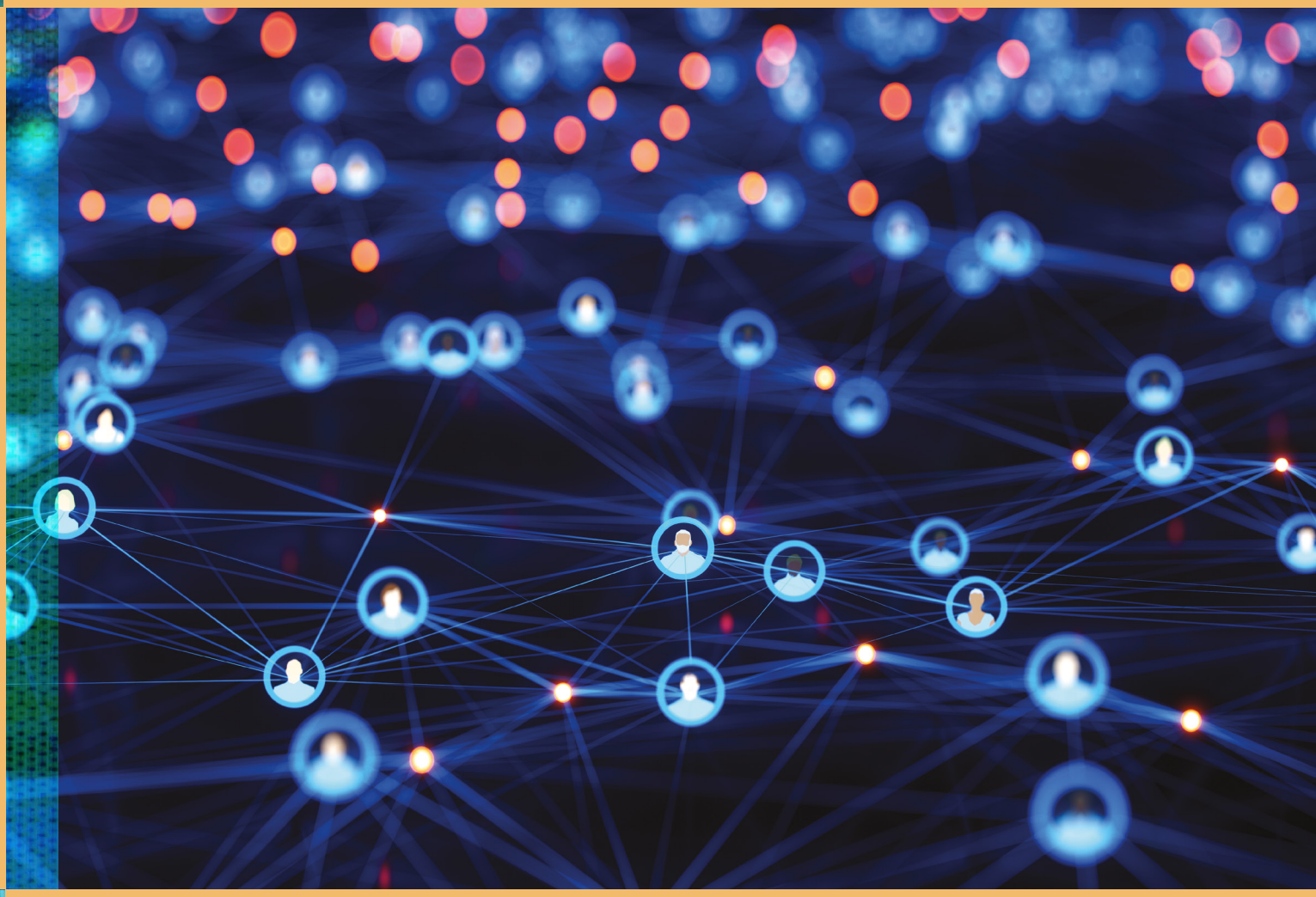
MCA
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Expert Clinical Consensus: Defining Alcohol-Related Cognitive Impairment (ARCI)

A collaboration between the Centre for Addiction and Mental Health Research (CAMHR) and the Medical Council on Alcohol (MCA)

NIHR | Mental Health Research Group

University of Hull | Centre for Addiction & Mental Health Research

Introduction

The Centre for Addiction and Mental Health Research (CAMHR) is an NIHR Mental Health Research Group funded research centre led by Professor Thomas Phillips and Professor Judith Cohen at the University of Hull.

CAMHR works in partnership with academics from the Institute of Psychiatry, Psychology and Neuroscience at King's College London and the Institute of Mental Health Research at the University of York.

CAMHR's research focuses on three research themes, one of which aims to define the needs of adults with alcohol-related cognitive impairment (ARCI). The research programme focusses on establishing the needs of those with ARCI, through systematic screening and establishing the prevalence of ARCI amongst hospital inpatients.

We convened an expert group (see Appendix 1) to inform a programme of research on ARCI that is being conducted by CAMHR, at the University of Hull. We intend that the work will have wider implications for the field of ARCI. The consensus process was facilitated by the Medical Council on Alcohol[1] which is an independent charity of health professionals from all medical specialities, dedicated to improving understanding and management of alcohol-related health harms.

Background and context

Cognitive impairment as a consequence of long-term heavy alcohol consumption is increasingly being recognised as a significant issue for individuals, their families, health and social care services, and society. Despite evidence that improvements to cognition can be made in many of those affected through abstinence and support, underidentification of ARCI in health and social care settings results in a significant proportion of individuals not receiving the support they need. This results in missed opportunities for intervention and potentially leads to a worsening of cognitive and functional difficulties.

Under-recognition of ARCI is compounded by a lack of consistency in both how the condition is defined and how it is diagnosed. Alcohol-related cognitive impairment (ARCI), alcohol-related brain damage (ARBD) and alcohol-related brain injury (ARBI) are used interchangeably as umbrella terms to describe a range of conditions and aetiologies of cognitive impairment related to alcohol, some of which are linked to discrete diagnostic categories (for example, Wernicke-Korsakoff's Syndrome) and some of which are not. A recent systematic scoping review of screening, diagnosis and assessment of patients with suspected ARCI[2] concluded that there continues to be a lack of standardisation in the identification and diagnosis of ARCI.

Aims

- Agree the terminology (i.e. ARBD, ARBI, ARCI) and associated definition and criteria for research in this area, including the CAMHR programme.
- Define a standard for identifying and measuring cognitive impairment related to heavy alcohol use.
- Agree a pragmatic application of the standard for use in research.

Process of consensus

We convened a multi-professional expert consensus group with specialist knowledge in addiction psychiatry, lived experience, hepatology, neuropsychiatry, neuropsychology, old age psychiatry and specialists in ARCI.

Following a review of the literature, the MCA chaired two expert groups. The first meeting agreed the scope of the consensus and included presentations on prevalence, the literature, a review of the diagnostic criteria and clinical pathways in specialist ARCI services. Discussion of the presented information resulted in draft criteria being circulated for review and comment through an iterative process. A second meeting focussed on each criterion, with areas of agreement and difference discussed. This was followed by a round of refinements to reach consensus on the criteria for the identification of ARCI presented in this report.

1. https://m-c-a.org.uk/about/
2. Jones L, Owens L, Thompson A, Gilmore I, Richardson P (2023) Informing the development of diagnostic criteria for differential diagnosis of alcohol-related cognitive impairment (ARCI) among heavy drinkers: A systematic scoping review. PLoS ONE 18(2): e0280749. https://doi.org/10.1371/journal.pone.0280749

Criteria for the clinical and research identification of ARCI

Terminology

Alcohol-related cognitive impairment (ARCI) was agreed as the most appropriate terminology to incorporate a range of cognitive deficits from mild to severe. The consensus criteria refer to probable ARCI, to reflect their intended purpose, described below.

Description

Probable ARCI is characterised by a cognitive impairment in one or more cognitive domains that persists beyond the usual period of alcohol intoxication or acute withdrawal from alcohol in an individual who consumes, or has consumed, alcohol at a level that could plausibly have caused cognitive impairment through one or more causal pathways.

Intended purpose of these criteria

These criteria are intended for screening and case identification by nonspecialists to indicate probable alcohol-related cognitive impairment (ARCI). These criteria represent a starting point in the assessment process, and, where probable ARCI is identified, this should lead to ongoing assessment of cognition and function and/or specialist assessment by a clinician or service with expertise in this area. Any documented diagnosis of probable ARCI must be re-evaluated and confirmed or excluded and this should be clearly documented. We envisage that these criteria and assessments will be used by frontline clinical staff across a variety of clinical settings (e.g. acute hospitals, mental health services, addiction services, primary care, memory services) to indicate the need for further assessment and for immediate care planning (e.g. supporting abstinence), including engagement with alcohol and other treatment services. They are not a substitute for comprehensive diagnostic assessment and should be applied alongside an assessment of coexisting causes of cognitive impairment (e.g. Alzheimer's disease, traumatic brain injury, vascular disease, hepatic encephalopathy).

Requirements

To meet the criteria for probable ARCI, individuals must meet the criteria for (1) cognitive impairment and (2) alcohol relatedness with or without (3) functional impairment.

Cognitive Impairment

In order to meet the criteria for **cognitive impairment**, criterion a and criterion b must both be endorsed:

a) Evidence of cognitive impairment in one or more of:

- i) Memory
- ii) Executive function
- iii) Attention
- iv) Psychomotor speed
- v) Visuoperceptual abilities
- vi) Visuospatial abilities

b) Cognitive impairment persists beyond the usual duration of alcohol intoxication or acute withdrawal

Clinical Assessment:

a) Clear evidence of cognitive impairment. This might be supported by:

- i. Cognitive assessment including neuropsychological tests related to the domains listed in Criterion A (see Appendix 2).
- ii. Cognitive assessment guided by validated cognitive screening tools, such as the Montreal Cognitive Assessment (MoCA), Addenbrookes Cognitive Assessment (ACE-III) or the Mini-Addenbrookes Cognitive Assessment Mini-ACE
- iii. Corroborative assessment from case records and/or appropriate informant.
- iv. Where brain scans are available: neuroimaging evidence which supports a diagnosis of ARCI.

b) Aim to test or retest the individual following 4 weeks of abstinence from alcohol using the same tool at each time point.

However, continued alcohol consumption should not prevent the assessment of cognitive function. Instead, factors such as ongoing alcohol consumption, prescribed medications and non-prescription drugs, acute illness and environment should be taken into consideration when interpreting cognitive assessments. Cognitive assessment should be repeated over time to explore the persistence of impairment.

Further guidance on assessment and management can be found in the Clinical guidelines for alcohol treatment - 20. People with alcohol related brain damage - Guidance - GOV.UK

Research Assessment:

a) Administer validated neuropsychological tools to assess cognitive function in the identified cognitive domains (see Appendix 2 for examples).

b) Test individual following a period of 4 weeks of abstinence using the same tool. Collect data on current alcohol consumption, prescribed medications and non-prescription drugs, acute illness and environment as confounders.

Notes: Cognitive Impairment

i. Where possible it should be established whether evidence of cognitive impairment demonstrates a deterioration from prior functioning to identify whether the impairment is alcohol-related or pre-existing.

ii. Social cognition and judgement may also be affected in ARCI and their impairment would support the diagnosis of probable ARCI.

iii. Predominant language impairment or progressive cognitive decline in the absence of continuing alcohol use are uncommon in ARCI and may be suggestive of additional causes of cognitive impairment.

iv. It is important to assess people for ARCI in any setting. Where concerns with cognitive function are identified but the individual is still consuming alcohol, in alcohol withdrawal or taking sedative medications to manage alcohol withdrawal, every effort should be made to repeat cognitive assessment 4 weeks following cessation of alcohol / completion of medically assisted alcohol withdrawal.

v. The presence of ARCI does not preclude the presence of other related disorders and appropriate investigations into other causes of cognitive impairment or disease should proceed. Common conditions that might be present in this population and require additional assessment and treatment include, but are not limited to, hepatic encephalopathy see guidance: https://www.journal-of-hepatology.eu/article/S0168-8278(22)00346-4/fulltext, Wernicke's encephalopathy (see NICE guideline: https://www.nice.org.uk/guidance/cg100/chapter/recommendations, dementia (of any type) (see NICE guideline: https://www.nice.org.uk/guidance/ng9, traumatic brain injury (see NICE guideline: https://www.nice.org.uk/guidance/ng232, stroke (see NICE guideline: https://www.nice.org.uk/guidance/ng128.

Alcohol-Relatedness

In order to meet the criteria for **alcohol-relatedness**, criterion a and criterion b must both be endorsed:

a) Meet the criteria for alcohol use disorder (including alcohol dependence or harmful pattern of alcohol use).

b) Meet the time criterion for the relevant alcohol-related diagnosis:

- a. Alcohol use disorder (DSM-V[1]): features occurring over 12 months
- b. Alcohol dependence (ICD-11[2]): features usually evident over at least 12 months, but minimum of 3 months if use is continuous (daily or almost daily)
- c. Harmful pattern of alcohol use (ICD-11[2]): the pattern of alcohol use evident over at least 12 months if episodic or at least 1 month if continuous

1. American Psychiatric Association. (2013). Alcohol Use Diorder. In Diagnostic and statistical manual of mental disorders (5th ed.). https://doi.org/10.1176/appi.books.9780890425596
2. World Health Organization. (2022). International statistical classification of diseases and related health problems (11th ed.). ICD-11 https://icd.who.int/en/

Clinical Assessment:

Clinical assessment of alcohol use disorder including time since problems with alcohol / time since drinking at harmful levels began (with the individual or in collaboration with an informant). Assess the patient for alcohol dependence or harmful pattern of alcohol use (ICD-11) using validated tools to support diagnosis (i.e. Alcohol Use Disorder Identification Test (AUDIT) as recommended in NICE guidelines[1] to be used in any clinical assessment for the identification of alcohol use disorders).

The repeat of cognitive and alcohol assessments using the same tools over time is recommended to identify whether cognitive impairment stabilises or reverses in the absence of alcohol.

[1]National Institute for Health and Care Excellence (2011). AUD: diagnosis, assessment and management of harmful drinking and alcohol dependence (CG115). https://www.nice.org.uk/guidance/cg115

Further guidance on assessment and management can be found in the Clinical guidelines for alcohol treatment - 20. People with alcohol related brain damage - Guidance - GOV.UK

Research Assessment:

To be administered to the patient or completed with assistance from an informant:

a) Administer AUDIT

AUDIT scores are indicative of:

0-15:	Low risk drinking:	Alcohol-related: unlikely
16-19:	Harmful drinking/possible dependence:	Alcohol-related: possible
20+:	Probable alcohol-dependence:	Alcohol-related: probable

Administer SADQ for those scoring ≥16 on the AUDIT to assess severity of dependence (mild ≤15; moderate 16-30; severe ≥31).

Consider administration of the CIDI alcohol, which includes an item on time since problems started, in addition to, or instead of the above.

Indicator of ARCI:
Repeat cognitive and alcohol assessments over time to assess for persistence of cognitive symptoms in the absence of alcohol. Collect data on ongoing alcohol consumption, prescribed medications and non-prescription drugs, acute illness and environment as confounders.

Notes: Alcohol-Relatedness

i. In general, the purpose of these criteria is to identify new cases of ARCI and they therefore focus on people with current alcohol dependence or harmful patterns of alcohol use. However, individuals with pre-existing ARCI who have been abstinent for more than one year would still be considered as experiencing ARCI.

ii. It is important to assess people for ARCI in any setting. Where concerns with cognitive function are identified but the individual is still consuming alcohol or in alcohol withdrawal, every effort should be made to repeat cognitive assessment 4 weeks following cessation of alcohol / completion of medically assisted alcohol withdrawal.

Functional Impairment Specifier

In order to meet the criteria for probable ARCI with **functional impairment**, the criteria for cognitive impairment and alcohol-relatedness must be met, and criterion a and criterion b (below) must both be endorsed:

a) Cognitive impairment is severe enough to interfere with independence or an individual's ability to perform activities related to personal, family, social, educational, and/or occupational domains. This could include medication management, finances, driving, employment, self-care and safe living.

b) The impairment should represent a change from a previously stable level of functioning.

Clinical Assessment:

a) Brief clinical assessment of functioning and ability to perform activities of daily living, including 1) history, 2) observation, and 3) independent corroboration and/or collateral records. Consider an occupational therapy assessment (e.g. patient being observed preparing a meal or a hot drink and/or using a validated measure such as the Multiple Errands Test).

b) Aim to test or retest the individual following 4 weeks of abstinence from alcohol. However, continued alcohol consumption should not prevent functional assessment. Instead, factors such as ongoing alcohol consumption should be taken into consideration when interpreting functional assessments.

Research Assessment:

Administer a validated scale, such as the Work and Social Adjustment Scale (WSAS), World Health Organization Disability Assessment Schedule (WHODAS 2.0), Global Assessment of Function (GAF) scales, Life skills Profile (by informant).

Notes: Functional Impairment Specifier

i. Alcohol consumption, withdrawal and cognitive impairment can impair functioning. Where possible, functioning should be re-assessed in the absence of alcohol or alcohol withdrawal.

ii. Obtaining information from an informant is important when assessing functional impairment.

iii. When asking the individual, questions about functioning should be tailored to the individual's situation rather than focus on generalities.

Notes: Additional Risk Factors

Thiamine deficiency is a significant risk factor for ARCI, being one of the key causal pathways through which alcohol consumption can lead to cognitive impairment. Therefore, thiamine and nutritional replacement are important in this patient group and people who regularly miss meals, are at risk of malnutrition, have a low body mass index or who have other conditions associated with thiamine deficiency may be at greater risk.

Appendix 1: Consensus Group Members

Professor Colin Drummond (Chair), Emeritus Professor of Addiction Psychiatry, King's College London

Professor Thomas Phillips, Professor of Nursing in Addictions, and Director, Centre for Addiction and Mental Health Research

Dr Philippa Case, Senior Research Fellow, Centre for Addiction and Mental Health Research

Professor Judith Cohen, Professor of Clinical Trials, Centre for Addiction and Mental Health Research

Dr Lynsey Corless, Consultant Hepatologist, Hull University Teaching Hospitals NHS Trust and Centre for Addiction and Mental Health Research

Professor Anthony David, Professor of Mental Health and Director, Institute of Mental Health, University College London

Dr Dominique Florin, Medical Director, Medical Council on Alcohol

Professor Robert Howard, Professor of Old Age Psychiatry, Division of Psychiatry, University College London

Dr Nicky Kalk, Consultant Addiction Psychiatrist King's College Hospital Alcohol Care Team; Adjunct Senior Lecturer, Addictions Department, King's College London

Dr Julia Lewis, Consultant Addiction Psychiatrist; Visiting Professor, University of South Wales

Dr Steven Masson, Consultant in Liver Diseases and Transplant Medicine, The Newcastle upon Tyne Hospitals NHS Foundation Trust; Honorary Clinical Senior Lecturer, Newcastle University

Alison Sharpe, Public Co-applicant, Centre for Addiction and Mental Health Research, University of Hull

Dr Iain Smith, Consultant Psychiatrist and Honorary Clinical Senior Lecturer (Glasgow); Chair, Medical Council on Alcohol

Dr Victoria Teggart, Consultant Clinical Neuropsychologist, Addictions & Homeless Division, Greater Manchester Mental Health NHS Foundation Trust

APPENDIX 2: Tests utilised in studies according to cognitive domain from Crowe et al. (2020)

A list of neuropsychological tests used to assess cognitive function is listed below. Note that the use of the majority of these tests is limited to specific disciplines (e.g. clinical neuropsychologists) and user qualifications specified by test publishers should be checked prior to administration.

(Crowe SF, Cammisuli DM, Stranks EK. Widespread Cognitive Deficits in Alcoholism Persistent Following Prolonged Abstinence: An Updated Meta-analysis of Studies That Used Standardised Neuropsychological Assessment Tools. Archives of Clinical Neuropsychology. 2020;35(1):31-45.)

Cognitive domain	Neuropsychological test
Speed of processing	DSST, TMT A&B, Lafayette Grooved Pegboard, Grooved Pegboard, WAIS Digit Symbol, MicroCog Cued Timers, MicroCog Simple Timers, SDMT, Stroop, RBANS Coding
Problem solving/executive function	WCST, Raven's Progressive Matrices, Category Test, Weigl Colour Sort Test, Shipley Abstract Reasoning, LPS subtest 4 (Non-Verbal Reasoning) LPS subtest 12 (verbal closure), Clock Drawing Test, WAIS- Matrix Reasoning, Tower of London, Microcog Analogies, Microcog Object Match A, Short Categories, Hayling Inhibition Task, Tower of Toronto, Modified Cart Sorting Test
Visuospatial	WAIS Block Design, WAIS Picture Arrangement, Tactual Performance Test, Luria 99, RCF (Copy), LPS subtest 9 (Spatial Imagination)
	LPS subtest 10 (Flexibility of Closure), Benton Visual Form, (CERAD) Figure Copy, WAIS Picture Completion, RCF (Orientation), Microcog Tic Tacs, Microcog Clocks, RBANS Figure Copy, RBANS Line Orientation, Benton Facial Recognition Test
Verbal learning	WMS Stories (immediate recall), Short Term Verbal Memory, WMS Logical Memory (immediate recall), RAVLT (Trial 5), AVLT (immediate recall), Word list (trials 1–3), WMS Verbal Paired Associates I, HVLT (Learning), Microcog Word List 1, Microcog Story Recall (immediate recall), CVLT (Trial 1, Trial 1 to 5, recall short delay, errors free recall, cued recall, differed cued recall), RBANS List Learning, RBANS Story Memory
Verbal memory	WMS Stories (delayed recall), Long Term Verbal Memory, WMS Logical Memory (delayed recall), WMS Associate Learning, RAVLT (delayed recall), Word list (delayed, intrusions), WMS Verbal Paired Associates II, HVLT (delayed recall, intrusions, recognition), Microcog Word List 2, Microcog Story Recall (delayed recall), CVLT (recognition, long-term recall), AVLT (delayed recall), RBANS List Recall, RBANS Story Recall, Verbal Learning, and Memory Test
Visual learning	WMS Figures (immediate recall), Short Term Visual Memory, Short Term Visual Learning, WMS Figures (learning), RCF (immediate recall), WMS Design Reproduction (immediate recall), WMS-R Visual Reproduction (immediate recall), BVRT, WMS Visual Paired Associates I
Visual memory	WMS Figures (delayed recall), Memory-For-Designs Test, WMS Figures (delayed recall), WMS Design Reproduction (delayed recall), RCF (delayed recall), WMS-R Visual Reproduction (delayed recall), CERAD Figures Recall, WMS Figurative Memory, WMS Visual Paired Associates II, RBANS Figure Recall
Verbal fluency/language	WAIS Similarities, WAIS Comprehension, Shipley Verbal Test, FAS, LPS subtest 1 and 2 (Verbal Knowledge) LPS Subtest 5 (Word Fluency), BNT, Word fluency (name, animal, alternation), COWAT, Ruff Figural Fluency, WAIS-R Vocabulary, Verbal Fluency Test, RBANS Semantic Fluency, Regensburg Word Fluency Test
Working memory	WAIS Digit Span, WMS Visual Memory Span, WMS Digit Span, WAIS-R Arithmetic, PASAT, Microcog Numbers Forward, Microcog Numbers Backward, Microcog Alphabet, Digit span Forward, Digit Span Backward, Letter-Number Sequencing Test, N-Back task, SDMT
Inhibition/impulsivity	Stop Signal Reaction Time, Circle(1) Tracing Time, CPT

Notes: DSST = Digit Symbol Substitution Test, TMT = Trail Making Test, WCST = Wisconsin Card Sorting Test, LPS = Leistungs Pruf System, WAIS = Wechsler Adult Intelligence Scale, SDMT = Symbol Digit Modalities Test, RCF = Rey Complex Figure, CERAD = Consortium to Establish a Registry for Alzheimer's Disease, WMS = Wechsler Memory Scale, RAVLT = Rey Auditory Verbal Learning Test, AVLT = Auditory Verbal Learning Test, HVLT = Hopkins Verbal Learning Test, RBANS = Repeatable Battery for the Assessment of Neuropsychological Status CVLT = California Verbal Learning Test, BVRT = Benton Visual Retention Test, BNT = Boston Naming Test, COWAT = Controlled Oral Word Association Test, PASAT = Paced Auditory Serial Addition Test, CPT = Continuous Performance Task.

Recommended citation

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