

Teleneuropsychology (TeleNP) in Response to COVID-19: Practical Guidelines to Balancing Validity Concerns with Clinical Need

Rene Stolwyk, DPsych(Clin.Neuro), PsyBA

Senior Lecturer and Clinical Neuropsychologist

Turner Institute for Brain and Mental Health

Monash University, Melbourne, Australia

Email: rene.stolwyk@monash.edu

Twitter: @rene_stolwyk

Lana Harder, PhD, ABPP

Board Certified in Clinical Neuropsychology

Board Certified Subspecialist in Pediatric Neuropsychology

Children's Medical Center Dallas

Associate Professor of Psychiatry and Neurology

University of Texas Southwestern Medical Center

Email: lane.harder@childrens.com

Dustin B. Hammers, Ph.D., ABPP(CN)

Board Certified in Clinical Neuropsychology

Associate Professor, Department of Neurology

University of Utah, Salt Lake City, Utah

Email: dustin.hammers@hsc.utah.edu

C. Munro Cullum, Ph.D., ABPP-CN

Professor of Psychiatry, Neurology, and Neurosurgery

Pam Blumenthal Distinguished Professor of Clinical Psychology

Senior Neuropsychologist, O'Donnell Brain Institute

University of Texas Southwestern Medical Center

Email: munro.cullum@utsouthwestern.edu

Objectives

Following this webinar, attendees will be able to:

- Understand the evidence base supporting TeleNP procedures as well as the strengths and limitations of different models
- Apply knowledge of models of TeleNP and evaluate potential feasibility within your own clinical settings
- Understand key legal and ethical considerations when providing TeleNP services

Outline

- Ethical and Legal Challenges
- Logistical and Practical Considerations
- Models of TeleNP
- Evidence for use of Specific Measures over TeleNP and Patient Satisfaction
- Practical Considerations for Home-Based TeleNP

Our Experience with TeleNP

- Dr. Hammers leads the University of Utah TeleNP Program
 - Joint relationship between University of Utah Cognitive Disorders Clinic and St. John's Institute of Cognitive Health in Jackson, WY
 - >400 patients seen since 10/2009
- Dr. Stolwyk leads the Monash TeleNP Service
 - Running since 2016
 - Delivering Tele-Neuropsychology assessment and rehabilitation services across four hospitals in rural Victoria, from a Melbourne metropolitan hub
 - Includes secondary consultation and primary patient assessments
 - Research program includes validating telehealth administration of neuropsychological assessment tasks in stroke populations

Our Experience with TeleNP

- Dr. Harder has conducted the only known study evaluating a neuropsychological assessment battery via home-based TeleNP in children and adolescents.
- Dr. Cullum has conducted the largest TeleNP study to date, along with a series of related TeleNP projects that have demonstrated the feasibility, reliability, validity, and acceptability of TeleNP procedures in older adults with and without cognitive disorders and in underserved populations.

A Pressing Need

- In response to the Coronavirus (COVID-19) outbreak, there is a need for neuropsychology to apply tele-communication technologies to assist patients in novel ways.
- Potential limitations on in-person direct cognitive testing:
 - Hospital and institutional restrictions on in-person visits
 - Private practice providers attempts to reduce the COVID-19 exposure possibility for their patients
 - Patient cancellations and understandable avoidance of appointments at the current time

Striking a Balance

- Validity concerns vs. practical needs when using tele-communication strategies in the times of COVID-19
- Even during these unprecedented times, APA Ethics Codes, APA Tele-psychology Guidelines, and respective state copyright laws still apply
 - <https://www.apa.org/ethics/code/>, <https://www.apa.org/practice/guidelines/telepsychology>
 - <https://www.psychology.org.au/for-members/resource-finder/resources/ethics/Ethical-guidelines-psychological-assessment-tests>
 - <https://www.psychology.org.au/for-members/resource-finder/resources/ethics/Ethical-guidelines-psychological-services-internet>
- Check your national Ethics Codes and Guidelines, and IOPC's Provisional Recommendations – Guidance for Teleneuropsychology-COVID-19 (<https://iopc.squarespace.com/teleneuropsychology>).
- Most important to consider :
 - **What service is in the best interest of the patient?**
 - Immediate clinical necessity during COVID-19 outbreak vs. modified evaluation

What is TeleNP?

- Telepsychology is defined as the provision of psychological services using telecommunication technologies.
- Examples: telephone, mobile devices, interactive videoconferencing, email, chat, text, and Internet (e.g., self-help websites, online psychoeducational materials or bulletin boards, blogs, and social media).
- Different technologies may be used in various combinations and for different purposes during the provision of telepsychology services.
- **NOTE:** While several telephone screenings measures exist, such as *TICS/mTICS*, *COGTEL*, or *T-MOCA* (among MANY others), we will be focusing this talk on remote video conferencing

Ethical and Legal Challenges for TeleNP

Ethical Balance:

- **Principle A: Beneficence and Nonmaleficence**

- Psychologists strive to benefit those with whom they work and take care to do no harm

Vs.

- **Principle D: Justice**

- Psychologists recognize that fairness and justice entitle all persons to access to and benefit from the contributions of psychology and to equal quality in the processes, procedures, and services being conducted by psychologists.

Direct-To-Home TeleNP

- **Pros:** Access to care during COVID-19, patient convenience, accommodating patient special needs

Vs.

- **Cons:** Information security, emergency management, alterations to service delivery (testing session), less ability to “control” the session/interview, potential threats to validity

Direct-To-Home TeleNP

- Services Ideal for:
 - History
 - Feedback
 - Interventions
- Limited direct-to-home cognitive testing:
 - Verbal cognitive tests
 - Tests without manipulated stimuli

Informed consent must specifically address the unique concerns related to TeleNP services

UTAH TELEHEALTH NETWORK Informed Consent for Telehealth Consultations

Health care services are available by two-way interactive video communications and/or by the electronic transmission of information. Referred to as “telemedicine” or “telehealth,” this means that I may be evaluated and treated by a health care provider or specialist from a different location. Since this is different than the type of consultation with which I am familiar, I understand and agree to the following:

1. The consulting health care provider or specialist will be at a different location from me. A physician or other health care provider (“presenting practitioner”) will be at my location with me to assist in the consultation.
2. The presenting practitioner may transmit or share electronically details of my medical history, examinations, x-rays, tests, photographs or other images with the specialist who is at a different location.
3. Details of my medical history, examinations, x-rays, and tests will be discussed with the specialist who is at a different location.
4. I will be informed if any additional personnel are to be present other than myself, individuals accompanying me, the consultant and presenting practitioner. I will give my verbal permission prior to additional personnel being present.
5. Video recordings may be taken of the telehealth consultation, after I have given my written permission prior to recording. Video recordings and other data, including x-rays, images, and photos may be kept, viewed, and used for purposes including teaching, training, technical, scientific, research, or administrative purposes.
6. The physician or health care provider for whom the on-site examination or treatment is performed will keep a record of the consultation in my medical record.

Noting all the above, I understand that my participation in the process described (called “telemedicine” or “telehealth”) is voluntary and constitutes a waiver of the usual right to physician-patient privacy and may possibly increase the risk of disclosure of my medical data.

I further understand that I have the right to:

1. Refuse the telehealth consultation, or stop participation in the telehealth consultation at any time.
2. Limit any physical examination proposed during the telehealth consultation.
3. Request that the presenting practitioner refrain from transmitting my information if I make the request before the information is transmitted.
4. Request that nonmedical personnel leave the room(s) at any time.
5. Request that all personnel leave the room(s) to allow a private consultation with the off-site specialist(s).

Legal Aspects

- It is essential to know not only which relevant laws are applicable, but also from what state are the laws applicable
 - Laws and regulations are based on **where the patient is located**
 - This includes the neuropsychologist being **licensed** in that particular state
- Relevant laws may include:
 - Duty to Warn
 - Duty to Report
 - Record Keeping
 - Patient Confidentiality/Access to Records
 - Red Flag Laws (DE, FL and MD)
- Remember, if conducting tele- services out of state, and laws conflict between the neuropsychologist's and patient's states, the patient's state overrules

Competency

- While neuropsychologists have directed years of training and practice to develop and maintain their competence related to neuropsychological practice and theory:
 - How many psychologists are well-learned in tele-communication issues?
 - Do they know the resources available for the areas in which your patients are located?
- This COVID-19 pandemic is creating a unique opportunity for trainees and practitioners in applied TeleNP, TelePsychology, and TeleHealth

A Quick Word About Billing

- We will be providing limited information regarding billing practices
 - Each state/region is unique, as are hospital billing practices
 - We encourage you to review the following for the latest updates
 - iopc.online
 - CMS.gov
 - We encourage you to also speak to your state/provincial/territorial association for information specific to your needs



State telehealth coverage mandates for private insurance

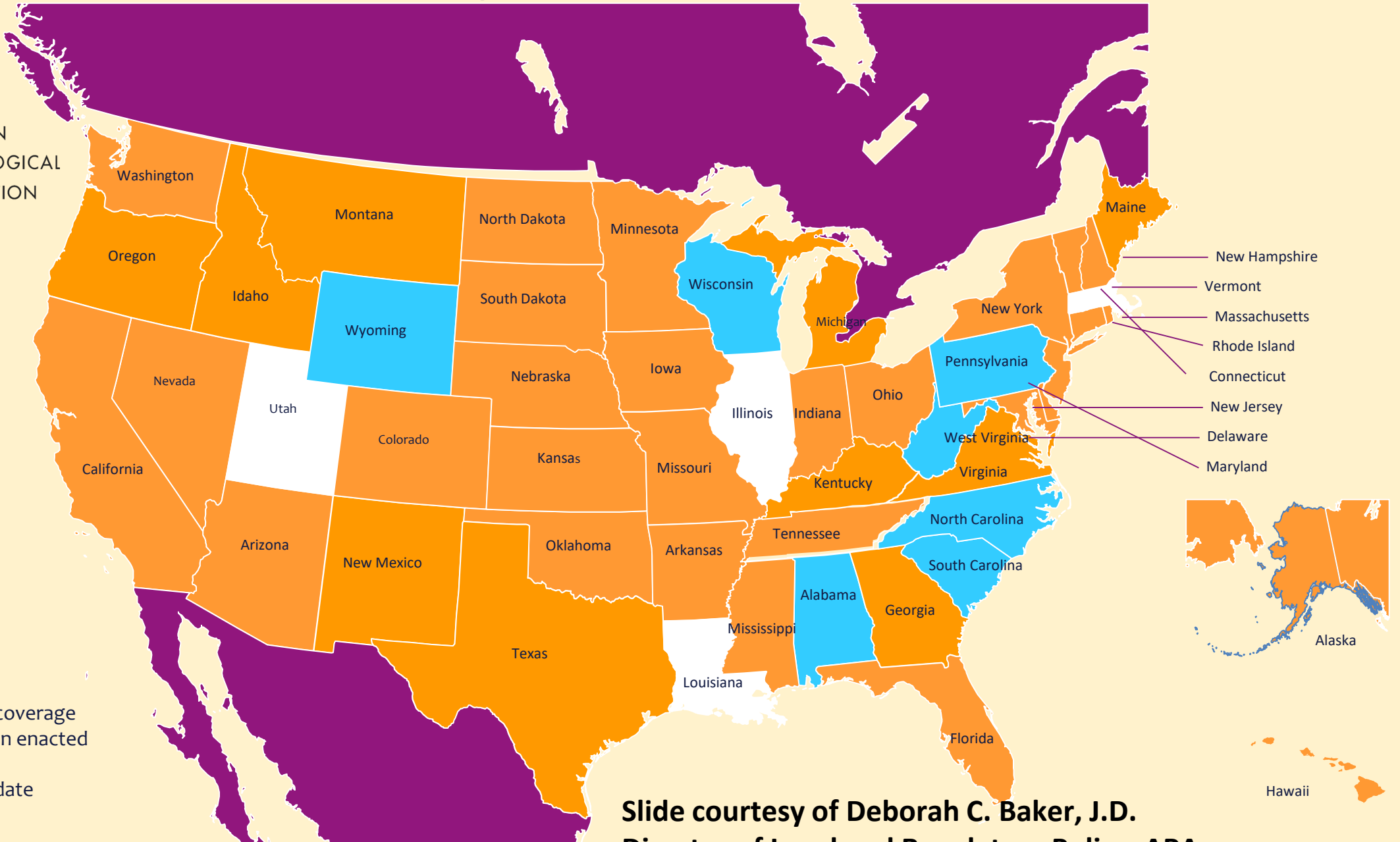


AMERICAN
PSYCHOLOGICAL
ASSOCIATION



ASPPB
Association of State and
Provincial Psychology Boards

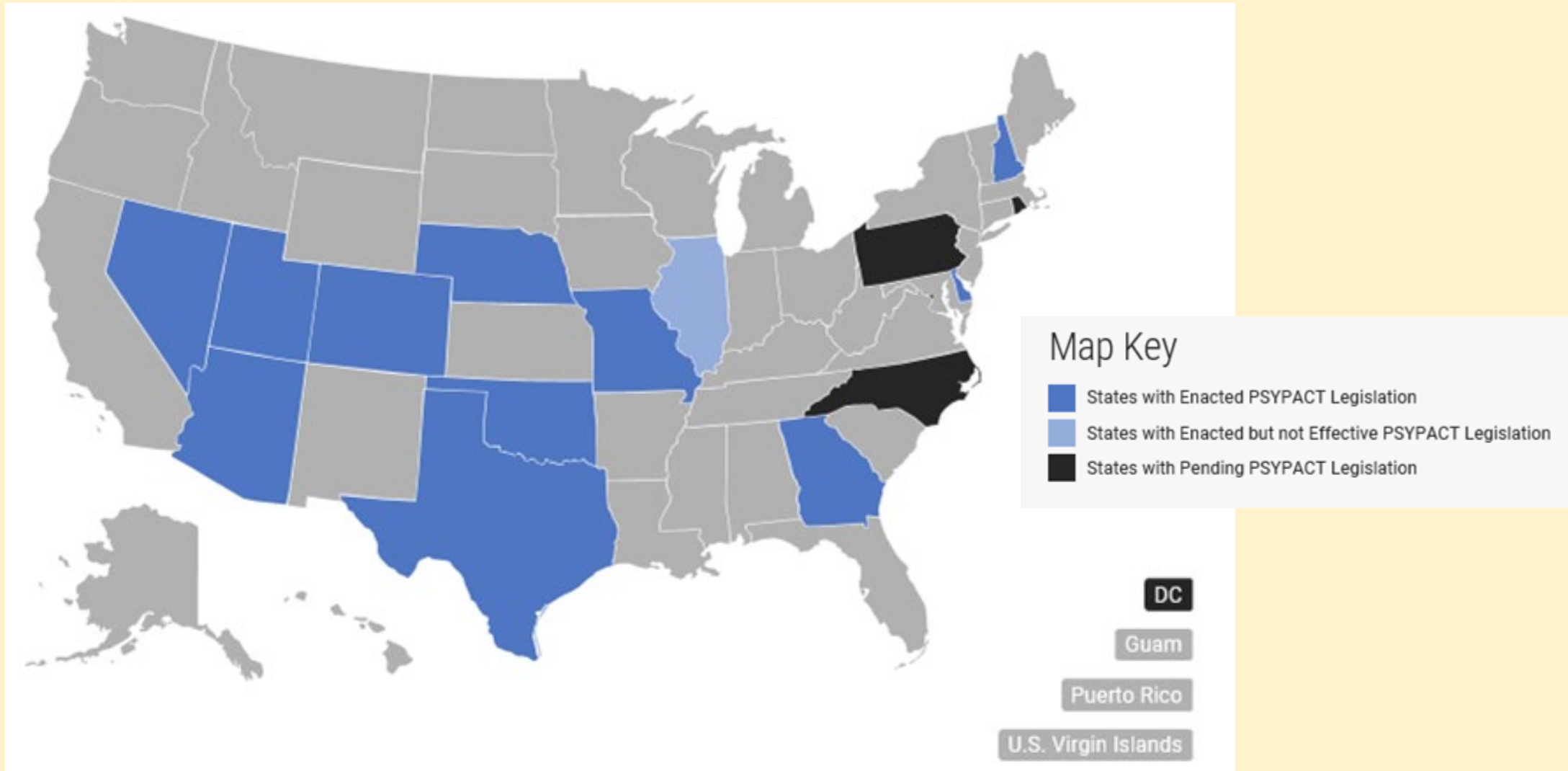
-  Private insurance coverage mandate legislation enacted
-  No coverage mandate



Slide courtesy of Deborah C. Baker, J.D.
Director of Legal and Regulatory Policy, APA

State PSYPACT legislation efforts

<https://www.asppb.net/page/PSYPACT>



***IMPORTANT NOTE:** PSYPACT has become operational as seven states have officially enacted PSYPACT legislation. Next, the PSYPACT Commission will be established and they will be responsible for the creation of Bylaws and Rules. Once those are finalized, the application process will open for the E.Passport and Interjurisdictional Practice Certificate (IPC).

Logistical and Practical Considerations

General Service Requirements and On-Site Logistics

Requirements

- Computer with consistent bandwidth for both locations
- Camera - at least one*
- Private Room
- Neuropsych testing materials

Logistical Steps and Concerns

- Contract between hospital systems or insurance pre-authorization
- Telehealth consent for patient
- Review results with patient/
send other providers the report
- Billing

Comparing Tele-Health Platforms



AMERICAN PSYCHOLOGICAL ASSOCIATION
Services, Inc.

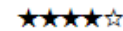
Doxy.me



READ REVIEW

Review Ratings

4



5



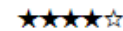
thera-LINK



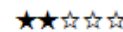
READ REVIEW

Review Ratings

4



2



Zoom



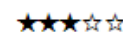
READ REVIEW

Review Ratings

5



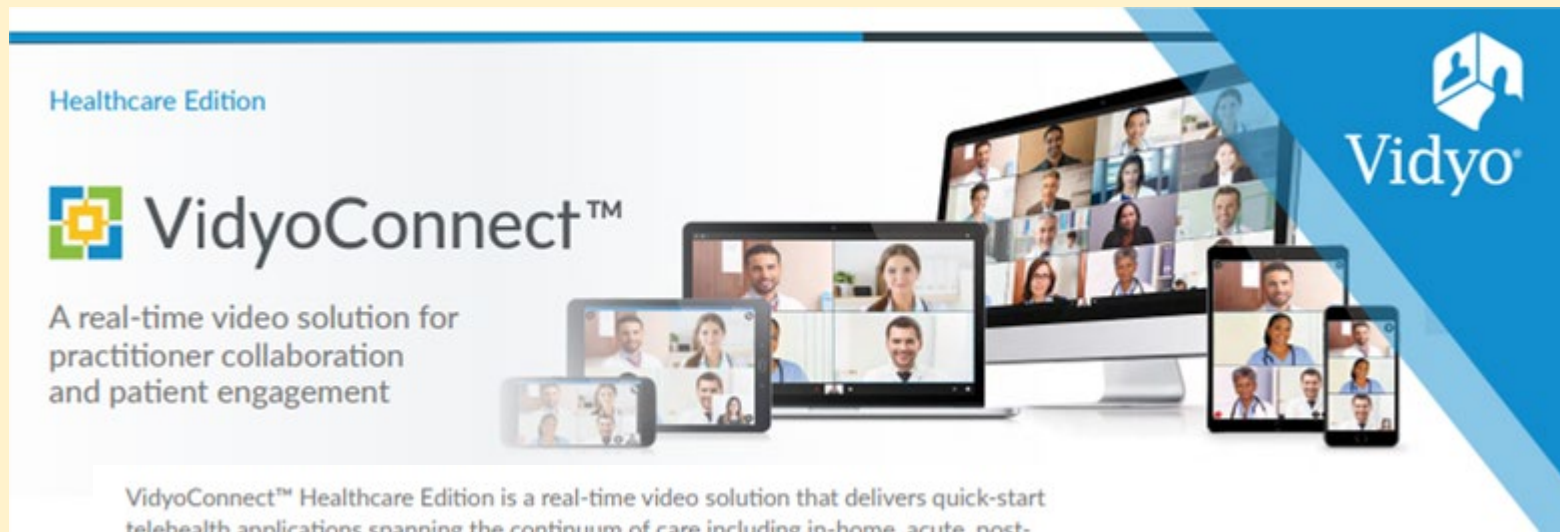
3



Owings-Fonner, N. December, 2019.
Let's Get Technical: Comparing The
Latest Tele-Health Solutions. *APA
Practice News*.

<https://www.apaservices.org/practice/business/technology/tech-column/telehealth-solutions#doxy>

Ratings Based On:
Privacy/Security, Available
Features, Ease of Use,
Functionality, Customer
Support, Value For Money



VidyoConnect™ Healthcare Edition is a real-time video solution that delivers quick-start telehealth applications spanning the continuum of care including in-home, acute, post-acute, emergent, scheduled, and on-demand virtual visits. VidyoConnect can be easily integrated with the provider's EHR solution and workflows, browser and mobile-based patient portals, and existing scheduling tools.

VidyoConnect offers a unified user experience across mobile, desktop, and clinically focused endpoints such as telemedicine carts and wall-mounted stations designed for inpatient care settings. These endpoints can enrich the patient-provider experience with the addition of multi-participant capabilities, remotely operated pan/tilt/zoom cameras, medical exam cameras, and digital stethoscopes. VidyoConnect delivers the consistency, ease of use, and rich features that drive clinical adoption across the care continuum.

Note: Only a sample of Tele-Health Platforms have been discussed during this presentation, and inclusion does not mean that we are endorsing a particular product.

Important Features of any platform:

- Creation of encrypted “virtual room”
- Optimal video quality, even for low-bandwidth locations
- Advanced integrations into EHR systems including Epic, Allscripts, and Cerner
- HIPAA-compliant business associate agreement (BAA): BAA indemnifies the psychologist or practice if they cause a HIPAA breach

TeleNP Essential Issues to Consider

- Cognitive Severity or Developmental Level
 - Is the provision of TeleNP services appropriate and beneficial
 - Challenging for certain ages, neurodegenerative conditions, or developmental delays
- Psychiatric or Behavioral Severity and Stability
 - Given the modified interaction style of the tele-communication medium, are patients too emotionally labile or unstable?
 - Is a child too young or behaviorally dysregulated?
 - Well-articulated referral notes and pre-session history questionnaires advised
- Therapeutic Needs
 - Consider limitations of providing emotionally-challenging information over a medium with reduced rapport
 - Alternatives to tele-feedback, or assurance of a “safety net” after feedback

- Other factors to consider:
 - Connectivity issues
 - Language barriers or comprehension issues (hearing loss, aphasia)
 - Technological competence (both psychologist and patient)
 - Medical conditions (epilepsy)
- In the ideal world, consider some initial in-person contact with the patient to facilitate an active discussion on these issues and/or conduct the initial assessment.

Issues that may arise with test instruments and approaches designed for in-person implementation

- **Psychometric Validity:** Are the psychometric properties of the tests and assessments (e.g., reliability and validity) preserved when adapted for use with such technologies?
- **Standardization Issues:** Are the conditions of the testing preserved as suggested in the test manual?
 - Secure room, free of distractions from family or medical support staff?

Further Validity and Test Security Issues

- **Construct Validity:** Are patients receiving assistance with test instructions in a non-standardized manner, or could family (or nursing staff) unintentionally be influencing answers?
- **Distraction Issues:** Because neuropsychologists are not in the room, could other sensory issues be present in the room be present that could affect performance during an assessment that may not be obvious or visible (e.g., sight, sound, smell, or temperature)?
- **Test Security:** If the patient became in possession of test materials or stimuli regardless of the testing medium, this would represent both an ethical and legal violation

TeleNP Norms and Write-up

- Important to use test norms derived from telecommunication technologies administration if such are available
 - If not available, okay to use pre-existing norms but apply conservative interpretation
- Document use of tele-neuropsychology, what norms used, and describe any accommodations or modifications that have been made
- Recognize the potential limitations of all assessment processes conducted via telepsychology, and be ready to address the limitations and potential impact of those procedures versus results obtained in-person

Recent Changes in Test Publisher Guidelines



- Before test administration, the qualified professional must obtain documented agreement from the examinee that the **session will not be recorded, reproduced or published**, and that **copies of the materials will not be made**. Further, the qualified professional may not utilize recording capabilities to record live test administrations.
- This permission is intended to include the use of non-public facing screen-mirroring and screen share methods to **remotely share test item content with examinees on a computer screen** and capture responses either verbally or through other means.
- This permission is **not intended to allow for use of photocopying, scanning, or duplication** of test protocols, including any screen capture or session recording technology, but is merely intended to support practical live delivery of tele-health services.
- This permission is also **not intended to allow for any modification** to the original test content as it currently appears.

What this means in practice:

- In coming days Pearson will release electronic version of stimulus books via Q-Global platform
 - Clinicians may screen share/mirror with the patient screen these digital stimulus books purchased on Q-interactive
 - <https://www.pearsonassessments.com/professional-assessments/digital-solutions/telepractice.html>
- For traditional stimuli, clinicians may 1) use a document camera or 2) display the stimuli in front of the camera to screen-share stimulus materials
- It is still a **copyright violation and breach of test security** to scan/photocopy stimulus materials, or to mail out test materials or forms

Technical Issues:

- Even if tele-communication is secure, is the patient confident of that?
- Does the patient know (or think) that the session is being recorded?
- Increased risk of intrusions to confidentiality and patient security given back-and-forth between sites
- TeleNP most appropriate when using a trained on-site assistant to:
 - help verify the identity of the patient
 - provide needed on-site support to administer certain tests or subtests
 - protect the security of the psychological testing and/or assessment process

Additional Considerations

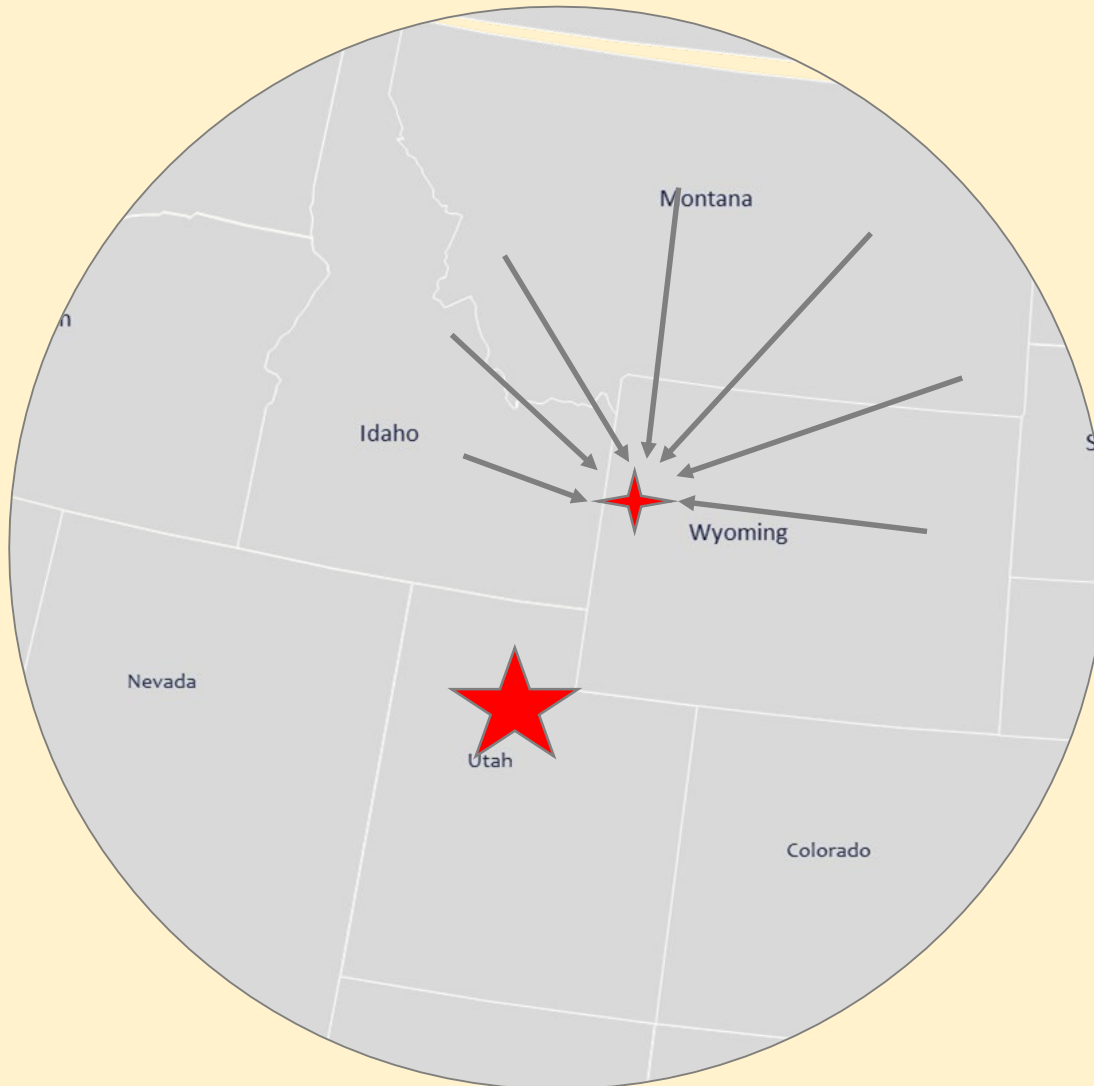
- Consistent, fast audiovisual connection
 - Audio clarity, consistency, loudness essential
- Clear view of subject / examiner
 - Adequate monitor size, resolution, recovery rate
 - Responses, writing/motor behavior, attitude
 - Useful for examiner to view subject and self
 - Camera mobility useful
 - Where do I look / how do I look?
 - How many cameras do you need?

- Enhancing subject comfort with testing environment and ability to understand & carry out instructions, manipulate test materials, & assist examiner
- What materials are needed at remote site?
 - How will clients access materials?
 - What will be shown to them vs. local manipulatives?

TeleNP Models

TeleNP Models

Trained Technician “Tele-Interview” Model



= Home Site



= Remote Site w/ NΨ Tech

- Pros:

- Comparable battery to local
- Assess wide range of severity

- Cons:

- Trained tech at every site
- Patient must be within drive of remote site
- In-person testing may be restricted because of COVID-19

Assistant Proctored “Full- TeleNP” Model



= Home Site



= Remote Sites w/ Assistants

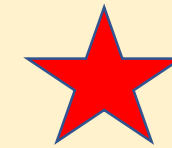
- Pros:

- Services provided to many sites
- No need for on-site technician
- Minimal travel for patients

- Cons:

- Stable internet connection required
- Licensure issues
- In-person testing may be restricted because of COVID-19

In-Clinic Hybrid “TeleNP” Model



= Home Site



= Remote Clinical Sites

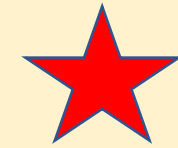
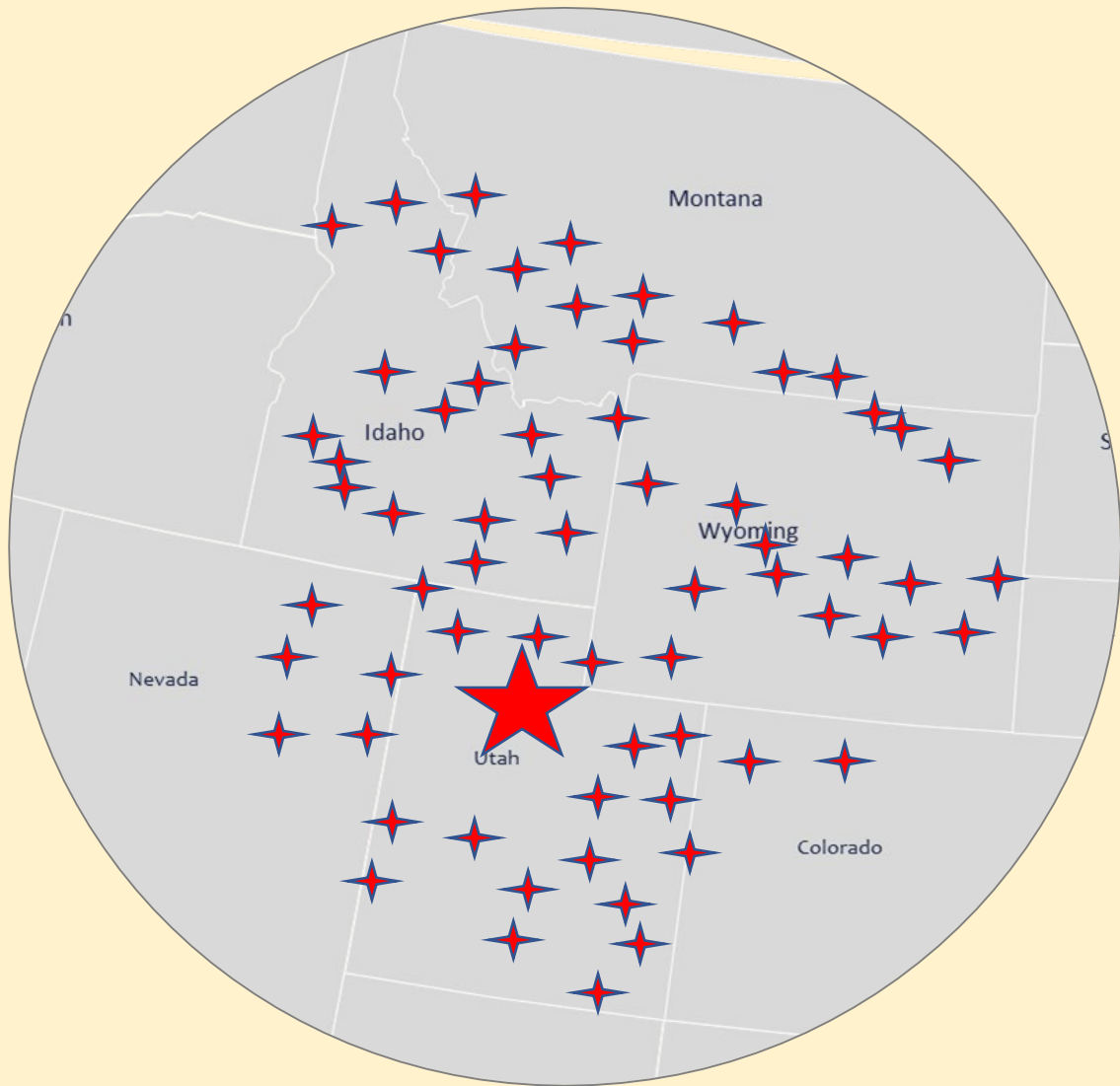
- Pros:

- Clinician and patient in adjacent rooms, or at least at spatial distance
- Ideal for when clinics transition to or from “lock down”
- Stronger test security, better able to “control”

- Cons:

- Patient must be more cognitively able
- Still requires patients and providers to come to clinic

Direct - to - Home “Full- TeleNP” Model



= Home Site



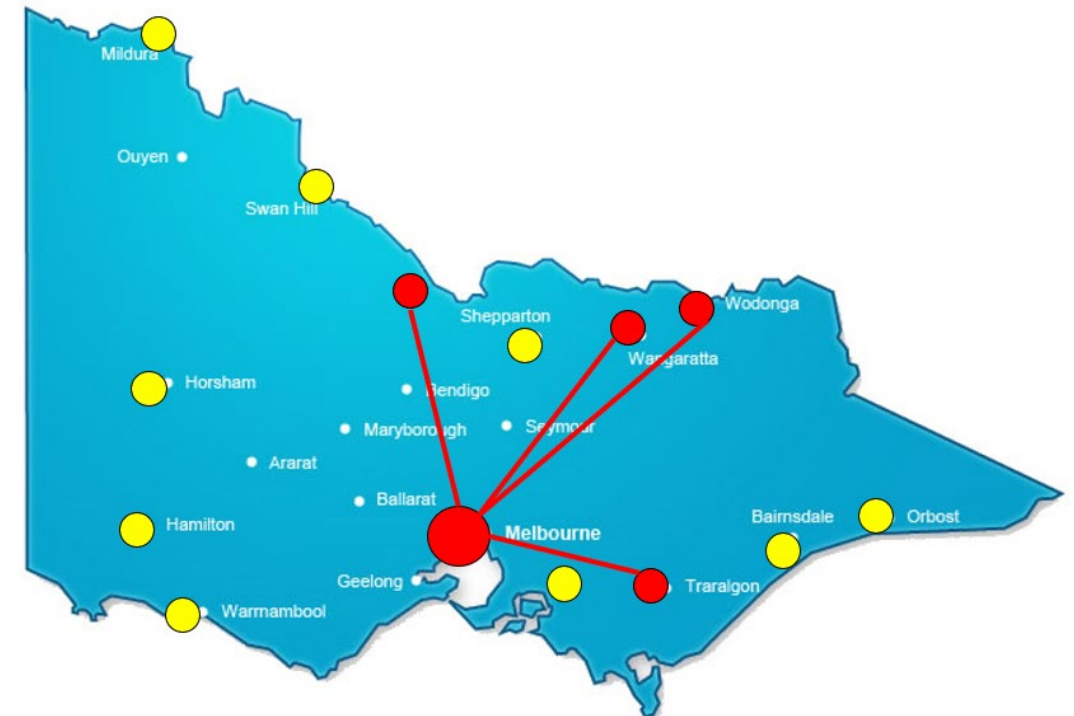
= Remote Sites w/in
Patient Households

- Pros:
 - Services provided directly to home
 - No assistant training or patient travel
- Cons:
 - More limited battery for testing
 - Validity/Security concerns
 - Limited guidance if confusion present
 - Connection and licensure issues

Assistant Proctored “Full TeleNP” Model

Location	Clinician and Client in separate clinics/hospitals. E.g. Monash Psychology Clinic to Echuca Regional Health
Trained Assistant Required?	Yes
Restrictions to Test Selections	Minimal
Cognitive/Sensory/Motor requirements of Client	Minimal
Travel Requirements	None
Meeting Social Distancing Requirements?	No

Monash TeleNeuropsychology Service has been running since 2016. Most research has used this model...



Secondary Consultation

☐ Team and Family meetings

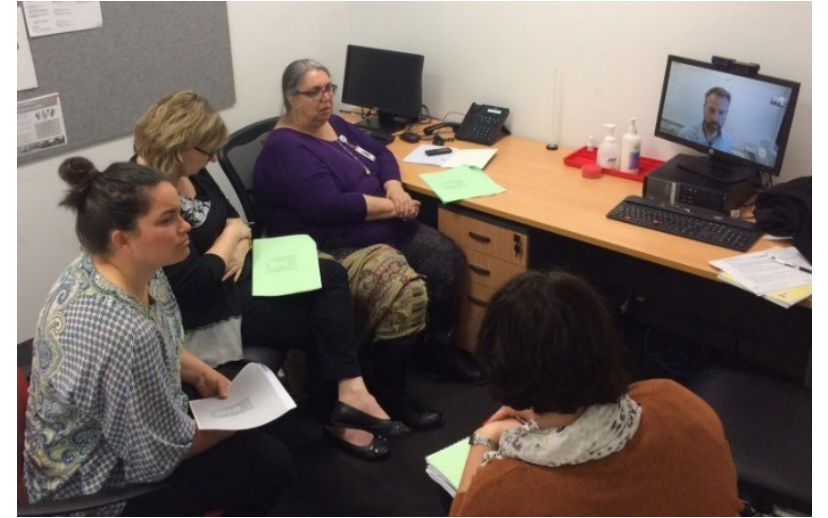
- ☐ Identifying referrals and opportunities for rehabilitation
- ☐ Discharge planning and decision making capacity issues

☐ Guiding team on how to managing neuropsychological impairments

- ☐ Collaborative SMART goal setting for cognition and behaviour

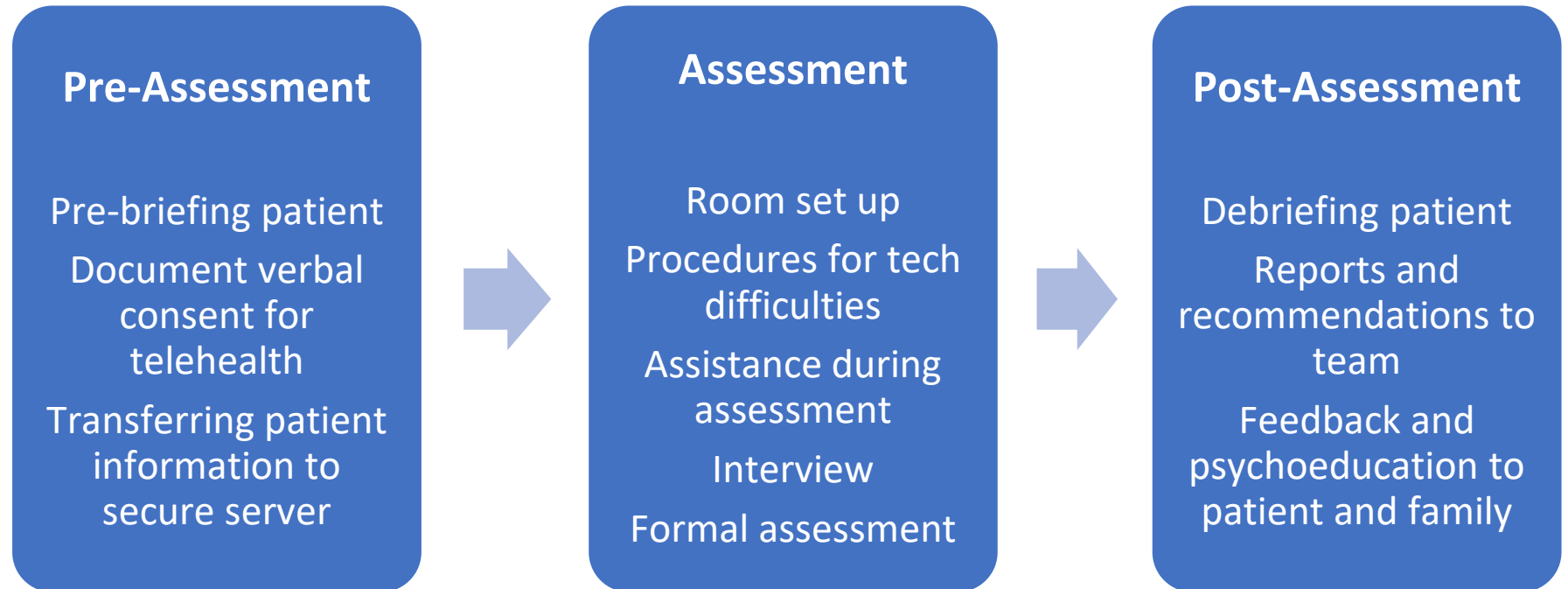
☐ Behaviour Management

- ☐ Development behaviour management plans
- ☐ Avoiding over-sedation and chemical restraint



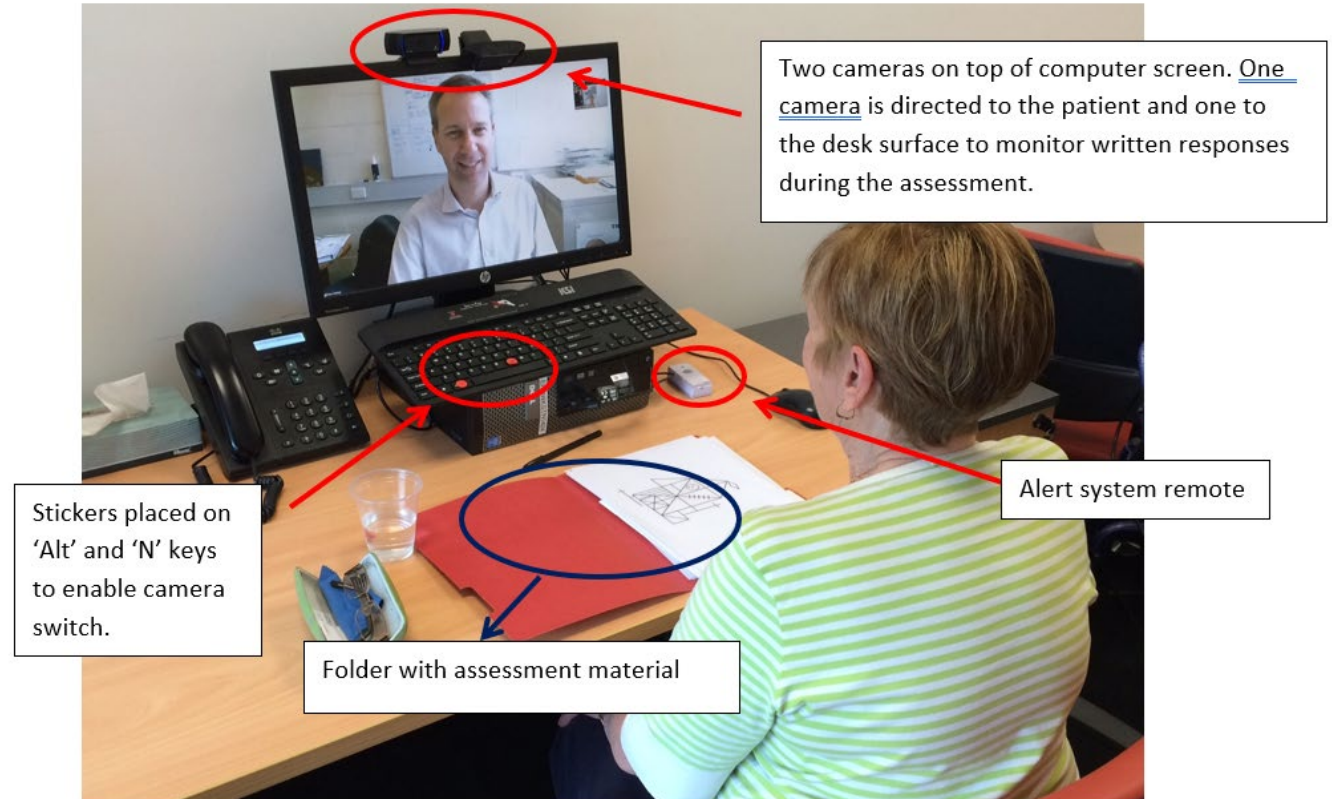
TeleNP Assessment

- ❑ Relatively brief (90 mins approx.)
- ❑ Focus on neuropsychological strengths and weaknesses to guide rehabilitation
- ❑ Occasionally conducted for diagnostic opinion or decision making capacity issues



Set Up

- ☐ Zoom videoconferencing software, existing PC and tablet hardware
 - ☐ Screen sharing
 - ☐ Multiple cameras for assessment
 - ☐ Session recording
- ☐ Virtual Private Networks to share documents
- ☐ Web-based encrypted email
- ☐ Private rooms on both ends
- ☐ Trained assistants available



Client Pre-briefing

Dr Upeka Embuldeniya and Ms Kate French



Tele-Neuropsychology in Stroke Rehabilitation

Patient Appointment Information

Why have I been referred for Neuropsychology?

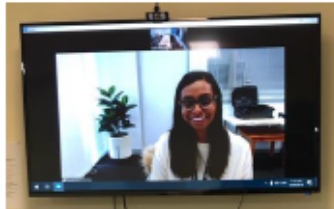
- You have had a stroke
- Your Rehab team have referred you to Neuropsychology to help you understand any changes to your thinking, memory, and coping after your stroke.
- Our Neuropsychologist is **Upeka**

What do Neuropsychologists do?

- A Neuropsychologist focuses on understanding the relationship between the **brain** and **behaviour**.
- After having a stroke, it is common for people to have **changes** with how they think, their memory, mood and behaviour.
- Upeka, our Neuropsychologist, is able to **assess** these changes and provide **recommendations** to **assist with your rehabilitation**.

What is TeleHealth?

- TeleHealth is providing healthcare using technology (via a **computer**)
- Upeka, our neuropsychologist, is located in Melbourne
- She completes her sessions on Tuesdays via the computer



Who will be present during the appointment?

- Upeka will be present via the computer.
- There will also be another Rehab staff member to help if needed.

What do I need to bring to the appointment?

- Aids to assist with vision (e.g. glasses), hearing (e.g. hearing aids) and mobility.



How long will the appointment take?

- Each session will take approximately **1 hour**
- You may be seen across multiple sessions.

What does the appointment involve?

Upeka will:

- Speak to you about how you have been going since the stroke, asking questions about
 - Your **thinking** and **memory**
 - Your **coping** and **mood**
 - Your **life** before the stroke (e.g. what you did for work, who are your main supports)
- Do some tasks to assess your thinking and memory
 - You do not have to prepare for this
 - There will be both easy and hard tasks

Client Pre-briefing

Where will the appointment take place?

- The appointment will take place in the **TeleNeuropsychology Project Room** in Nicholson Rehabilitation ward.
- A staff member will come and collect you for your appointment.



What if I have any questions about my appointment?

- Please ask the team to contact Kate French
 - Kate is a Senior Occupational Therapist (OT) and the Key Contact Person.
 - Kate's pager number is 32673
- Feel free to ask any member of the Rehab team and they can direct you to Kate or Upeka to help answer your questions

Training TeleNP Assistants

Dr April Philpott

Setting up for session:

- Allow at least 15 minutes for set-up prior to the scheduled session time
- Prepare assessment tools, as directed by the Neuropsychologist
 - Gather required assessment forms and equipment from the storage cupboard
 - Provide 2 pens and some blank paper
 - Place all assessment resources into respective coloured folders
- Check that cameras are attached to the computer and working
 - 1 x camera facing patient when seated
 - 1 x camera facing table directly in front of patient

Training TeleNP Assistants (cont)

The environment:

- Clear the assessment area and remove any potential distractions
- Ensure enough space in front of computer for A4 piece of paper (in portrait orientation)
- Ensure tissues are available and within reach for the patient
- Room should be quiet and well-lit – consider closing curtains/blinds
- Not shared patient room or shared office
- Place 'assessment in progress' sign on door and close door

Training TeleNP Assistants (cont)

During session:

- Ask patient's permission to stay for session
- Ensure seating is appropriate for patient – e.g. reaching desk to write
- Ensure patient has glasses/hearing aids
- Check sound and video quality (be aware that sound can become distorted/unclear if too loud and may be heard from corridor)
- Check camera switching function is working
- Stay for assessment or negotiate time to return to assist for a portion

When Assisting with Neuropsychological Assessments, Please:

- DO make sure you are familiar with the forms and tests in the test kit before the session starts
- DO use blank paper for drawing or written tasks, rather than the flip side of test forms – always give to the Patient in portrait orientation
- DO provide the Patient with pens that are dark/thick enough to be seen when scanned, rather than pencils
- DO provide the RCF form to the Patient in portrait orientation



↑ *This way up*

- DO take test forms away from the Patient as soon as the test is completed, placing them out of sight
- DO scan all pieces of paper that the Patient has written on and send them to the Neuropsychologist immediately after the session
- DO NOT repeat, rephrase or clarify task instructions or questions, unless instructed to do so by the Neuropsychologist
- DO NOT photocopy copyrighted test booklets, such as the WAIS-IV Response Booklet 1 and WMS-IV Response Booklet 1 (plenty of original booklets have been provided)

Training TeleNP Assistants (cont)

Individual patient sessions:

- Ensure Neuropsychologist has number to call if assistance required
- Show patient how to switch cameras using keyboard (stickers should be placed on keys)
- Orient patient to the staff alert system and advise when to use
- Offer glass of water before leaving room
- Ensure patient is able to safely exit the room on completion of session (can be difficult if in wheelchair)

Training TeleNP Assistants (cont)

Following session:

- Provide patient with an opportunity for questions / feedback
- Upload all written documentation from the session to the shared folder for neuropsychologist to access
- Shred test forms when confirmed received by Neuropsychologist (do not place in medical file)
- Document in medical file that session has occurred (do not include content of session)

Cognitive Assessment

No Modification Required	Stimulus Materials and Forms in Coloured Folders	Assistant Required
<ul style="list-style-type: none">• WAIS-IV Digit Span• WAIS – IV Similarities• HVLT-R• Semantic Fluency (Animals)• Letter Fluency (FAS)	<ul style="list-style-type: none">• MoCA• TOPF• Stroop Test (Victoria Version)• Oral SDMT• WAIS-IV Vocabulary• BNT-2• Trail Making Test	<ul style="list-style-type: none">• WAIS-IV Block Design• WMS-IV Visual Reproduction• WAIS-IV Matrix Reasoning• RCFT



* Level of assistant input depends on client motor/sensory abilities, level of cognitive/behavioural function etc.

In-Clinic Hybrid Model

Location	Clinician and Client in adjacent rooms, or at least at social distance
Trained Assistant Required?	No
Restrictions to Test Selections	Some
Cognitive/Sensory/Motor requirements of Client	Some
Travel Requirements	Both clinician and client need to travel
Meeting Social Distancing Requirements?	Yes



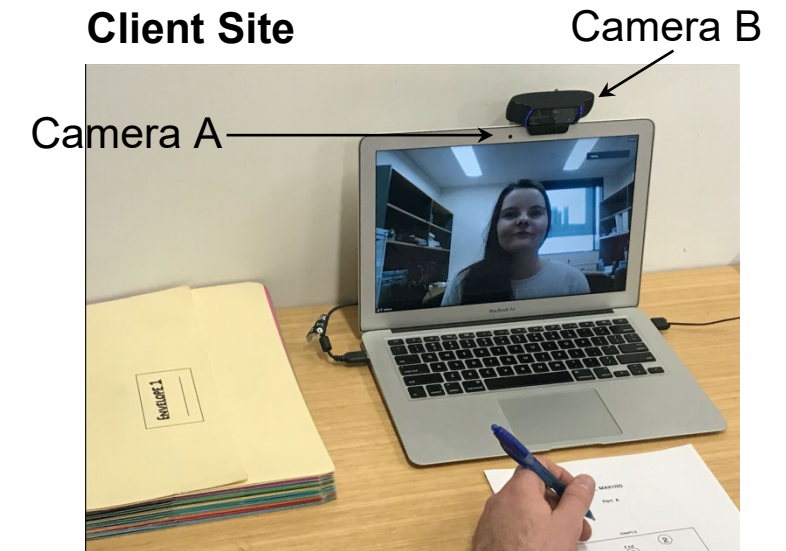
In-Clinic Hybrid Model – Clinical Considerations

- Pre-briefing via phone on procedures
- Avoid waiting rooms. Clients to wait in car. Call when ready.
- Follow clinic/hospital infection control measures
- Interview at social distance or via telehealth in adjacent room
- Assessment of verbal tests at social distance or via telehealth in adjacent room
- Assessment of test requiring stimulus materials and/or test forms
 - Use Q-interactive to present stimulus where possible
 - Use Q-global stimulus materials when available (or document camera in interim)
 - Use coloured folders for test forms etc
- Thorough disinfection of materials/forms post assessment
- De-brief via phone post assessment

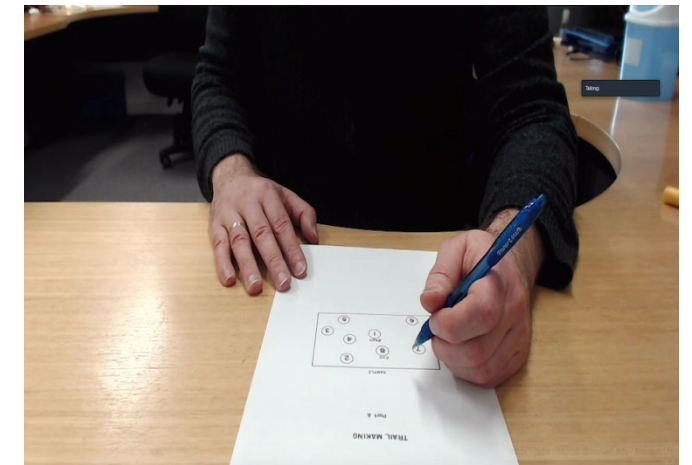
Clinic Cognitive Assessment

No Modification Required	Screen Share Stimulus Materials	Forms in Coloured Folders Materials on hand	Not possible
<ul style="list-style-type: none"> • WAIS-IV Digit Span • WAIS – IV Similarities • HVLT-R • Semantic Fluency (Animals) • Letter Fluency (FAS) 	<ul style="list-style-type: none"> • TOPF • WAIS-IV Vocabulary • WAIS-IV Matrix Reasoning 	<ul style="list-style-type: none"> • Trail Making Test • Oral SDMT 	<ul style="list-style-type: none"> ❖ BNT-2 ❖ Stroop Test (Victoria Version) ❖ RCFT
	<ul style="list-style-type: none"> • <u>MoCA</u> • WAIS-IV Block Design • WMS-IV Visual Reproduction 		

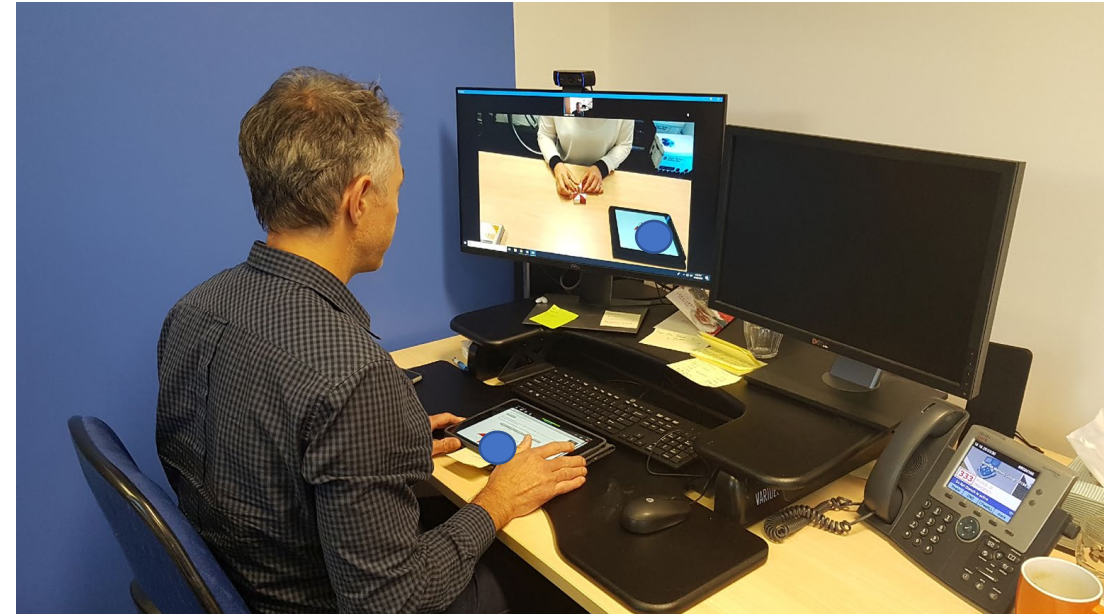
- ✓ New Online Admin of MoCA has been released
<https://www.mocatest.org/remote-moca-testing/>
- ❖ Not possible until publishers give permission for electronic stimulus presentation
- Again, all the above depends on the cognitive behavioural status of your client



Clinician View (Camera B)



Within Clinic Test Administration Q-interactive



Ethical Issues and Evidence Base

- Limited evidence to support presentation of stimulus materials up on screen as opposed to flat on table
 - May particularly impact subtests such as Block Design

Direct-to-Home Full TeleNP Model

Location	Clinician in clinic/home, Client at home
Trained Assistant Required?	No
Restrictions to Test Selections	Most
Cognitive/Sensory/Motor requirements of Client	Significant
Travel Requirements	None (assuming appropriate home office set up)
Meeting Social Distancing Requirements	Yes

The New Frontier !?



Direct- To- Home Full TeleNP Model – Clinical Considerations

- Pre-briefing via phone on procedures
- Ensure client has adequate set up at home
 - Adequate bandwidth
 - Able to access your telehealth platform
 - Determine/document screen size (preferably desktop, minimum tablet, not phone)
 - Quiet, secure, well lit room. Mobile phone on silent.
 - Explain no recording of session or screen capture
- Complete test run on a previous day
- Assessment of test requiring stimulus materials
 - Use Q-global stimulus materials when available (or document camera in the interim)
- Non-copyrighted forms within public domain sent back via pre-paid registered mail.
- De-brief via phone post assessment

Home Cognitive Assessment

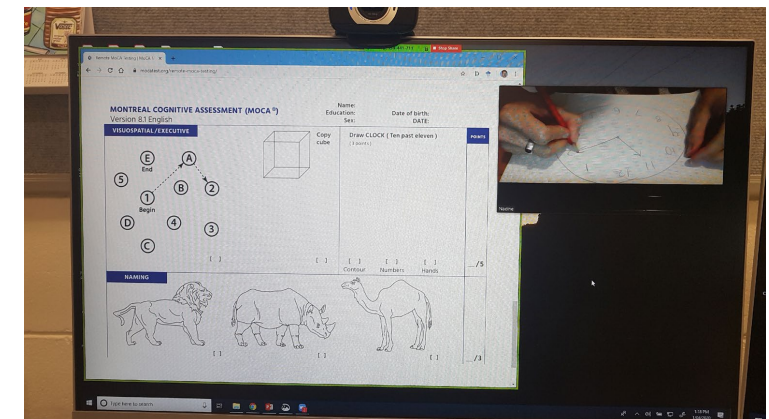
No Modification Required	Screen Share Stimulus Materials	Stimulus Materials and Forms in Coloured Folders	Not possible
<ul style="list-style-type: none"> • WAIS-IV Digit Span • WAIS – IV Similarities • HVLT-R • Semantic Fluency (Animals) • Letter Fluency (FAS) 	<ul style="list-style-type: none"> • TOPF • WAIS-IV Vocabulary • WAIS-IV Matrix Reasoning ✓ MoCA 		<ul style="list-style-type: none"> • WAIS-IV Block Design • WMS-IV Visual Reproduction ❖ BNT-2 ❖ RCFT ❖ Trail Making Test ❖ Stroop Test (Victoria Version) ❖ Oral SDMT

- ✓ New Online Admin of MoCA has been released
- ❖ Not possible until publishers give permission for electronic test stimuli presentation
- Again, all the above depends on the cognitive behavioural status of your client

Client Site



Clinician View




Some examples of potential workarounds? (a work in progress...)

Cognitive Domain	Alternate Tests
Word Retrieval	Expressive Vocabulary Test (Q-Global*) SYDBAT
Visual Perception	VOSP (Q-Global*)
Visual Construction	Simple Copy Clock Drawing
Visual Memory	Doors and People (Doors Subtest*)
Executive Functions	Hayling Sentence Completion Test DKEFS subtests (Q Global*) Dysexecutive Questionnaire FrSBe
Attention	TEA (elevator counting with distraction)? Oral Trail Making Test?

* No guarantees all these tests will be uploaded to Q Global. Need to wait and see...

<https://www.pearsonassessments.com/content/dam/school/global/clinical/us/assets/telepractice/Q-global-free-resource-library.pdf>



The screenshot displays a web interface for a "Resource Library". At the top left of the library area is a "Back" button. The title "Resource Library" is centered at the top. Below the title is a list of assessment tools, each preceded by a plus icon and a document icon. The tools listed are DIAL-4, EVT-2, and EVT-3. Under EVT-3, there are two folder icons labeled "General" and "Restricted". The "Restricted" folder is expanded, showing three PDF documents: "FREE TRIAL - EVT-3 Form A Digital Stimulus Book.pdf", "FREE TRIAL - EVT-3 Form B Digital Stimulus Book.pdf", and "FREE TRIAL - EVT-3 Manual.pdf". Below these are several other assessment tools, each with a plus icon and a document icon: GAMA, GFTA-3, GRS, KABC-II, KTEA-3, KTEA-3-Brief, M-PACI, MACI, MAPI, and MBMD. A vertical scrollbar is visible on the right side of the list. At the bottom of the page, there is a footer section. On the left, it says "PEARSON" followed by links for "About", "Contact", "Terms", "Privacy", "Q-global", and "Mobile Options", and a copyright notice "Copyright © 2020 NCS Pearson, Inc. All rights reserved.". On the right, it says "Build Version 64.0.56 - 775" and a link for "Release Notes".

« Back

Resource Library

- + DIAL-4
- + EVT-2
- + EVT-3
 - General
 - Restricted
 - FREE TRIAL - EVT-3 Form A Digital Stimulus Book.pdf
 - FREE TRIAL - EVT-3 Form B Digital Stimulus Book.pdf
 - FREE TRIAL - EVT-3 Manual.pdf
- + GAMA
- + GFTA-3
- + GRS
- + KABC-II
- + KTEA-3
- + KTEA-3-Brief
- + M-PACI
- + MACI
- + MAPI
- + MBMD

PEARSON [About](#) | [Contact](#) | [Terms](#) | [Privacy](#) | [Q-global](#) | [Mobile Options](#)
Copyright © 2020 NCS Pearson, Inc. All rights reserved.

Build Version 64.0.56 - 775
[Release Notes](#)

Special recommendations for administering CELF-5 via telepractice

1. Audio/visual environment



2. Examiner factors



3. Examinee factors



4. Test/test materials



- Make sure you have only one (1) image of the stimulus pictures showing to the examinee at any time
- Go to "full screen" with the stimulus pictures to eliminate distractions on the desktop/video window within the telepractice environment for the examinee
- The tests that have no visual stimulus should screen share the appropriate page in the digital stimulus book during the administration (a title page or blank page)
- Four CELF-5 tests (Linguistic Concepts, Following Directions, Recalling Sentences, and Structured Writing) are in the process of being studied and the nature of administering the task by telepractice is more complicated. Descriptive reporting may be warranted if the administration is attempted and documentation of the exact procedures must be fully described in the report

5. Other/miscellaneous



Evidence for use of Specific Measures over TeleNP and Patient Satisfaction

Teleneuropsychology Assessment Questions

- Many neuropsychological tests involve question-answer responses & require little equipment
- Which tests can be administered via video teleconference technology?
- Some administration procedures for other tests could be modified for telemedicine application

Teleneuropsychology Assessment Questions

- *Impact on reliability / validity?*
- Need for validation in the tele-environment?
 - Modified instructions/administration effects
- Applicability of norms?
- What populations are suitable for this assessment medium?

Telepsychology / Telepsychiatry Evidence

- Most studies report similar outcomes to traditional face-to-face therapies*
- Similar diagnostic impressions in many disorders
- Good acceptability by patients & families
- Adequate to good acceptability by therapists
- Appears to be reasonable alternative, particularly when distance/time is a factor
- Cost-efficiency demonstration is complex

**Limited data for pediatric studies*

Typical Video Teleconference (VC) setup



Implications for *teleneuropsychology*?

Teleneuropsychology Assessment Literature

- Preliminary *neuropsychological* literature search in 2006 revealed < 10 studies, with varying samples and tests, though encouraging results

Ball et al. 1993, Troster et al., 1995, Montani et al. 1997, Ball & Puffet 1998, Kirkwood et al. 2000, Menon et al. 2001, Jacobsen et al. 2003, Hildebrand et al. 2004, Vestal et al. 2006

Teleneuropsychology Literature

- Early studies generally examined singular or a few brief screening tools (e.g., MMSE)
- Designs varied
 - Sample sizes generally small
 - Limited tests examined
 - Alternate test forms inconsistently used
 - Counterbalancing often not done
 - Use/role of remote assistants
 - Normal vs. impaired subjects

Feasibility of Telecognitive Assessment in Dementia

C. Munro Cullum
Myron F. Weiner
Helena R. Gehrman
Linda S. Hynan

University of Texas Southwestern Medical Center at Dallas

Videoconferencing (VC) technology has been used successfully to provide psychiatric services to patients in rural and otherwise underserved settings. VC-based diagnostic interviewing has shown good agreement with conventional face-to-face diagnosis of dementia in several investigations, but extension of this technology to neurocognitive assessment has received little attention. To this end, the authors administered a brief battery of common neuropsychological tests via VC technology (telecognitive) and traditional face-to-face methods to 14 older persons with mild cognitive impairment (MCI) and 19 persons with mild to moderate Alzheimer's disease (AD). Highly similar test scores were obtained when participants were tested in-person or via VC. Telecognitive assessment appears to be a valid means to conduct neuropsychological evaluation of older adults with cognitive impairment. Furthermore, continued development of VC technology has implications for expanding neuropsychological assessment options in underserved populations.

Keywords: neuropsychological testing; cognition; dementia; videoconferencing; telemedicine; telecognitive assessment

Teleneuropsychology: Larger Study Design

- Utilize common neuropsychological measures often used in assessment of dementia
- Tap multiple cognitive domains in brief fashion
- Tests amenable to videoconference environment
- Alternate test forms available for test-retest

Teleneuropsychology Study Aims

Investigate:

- Feasibility
- Utility
- Acceptability
- Reliability
- *Validity in different populations:*

Largest study to date, including:

- Urban Caucasians
- Rural American Indians
- With and without dementia



NIH R01-AG27776-01A2

Teleneuropsychology Testing Setup



Teleneuropsychology Study Design

- *100 Urban Ss:*
 - 50 healthy
 - 25 MCI
 - 25 AD
- *75 American Indians (Choctaw Nation):*
 - 50 healthy
 - 25 AD/MCI

Teleneuropsychology Battery

- Mini Mental State Examination (MMSE)
 - Hopkins Verbal Learning Test-Revised
 - Digit Span (Forward & Backward)
 - Letter Fluency
 - Category Fluency
 - Boston Naming Test (15-item version)
 - Clock Drawing
-
- *Alternate forms administered in counterbalanced fashion x condition*
 - *Average test time designed to be < 45 minutes*

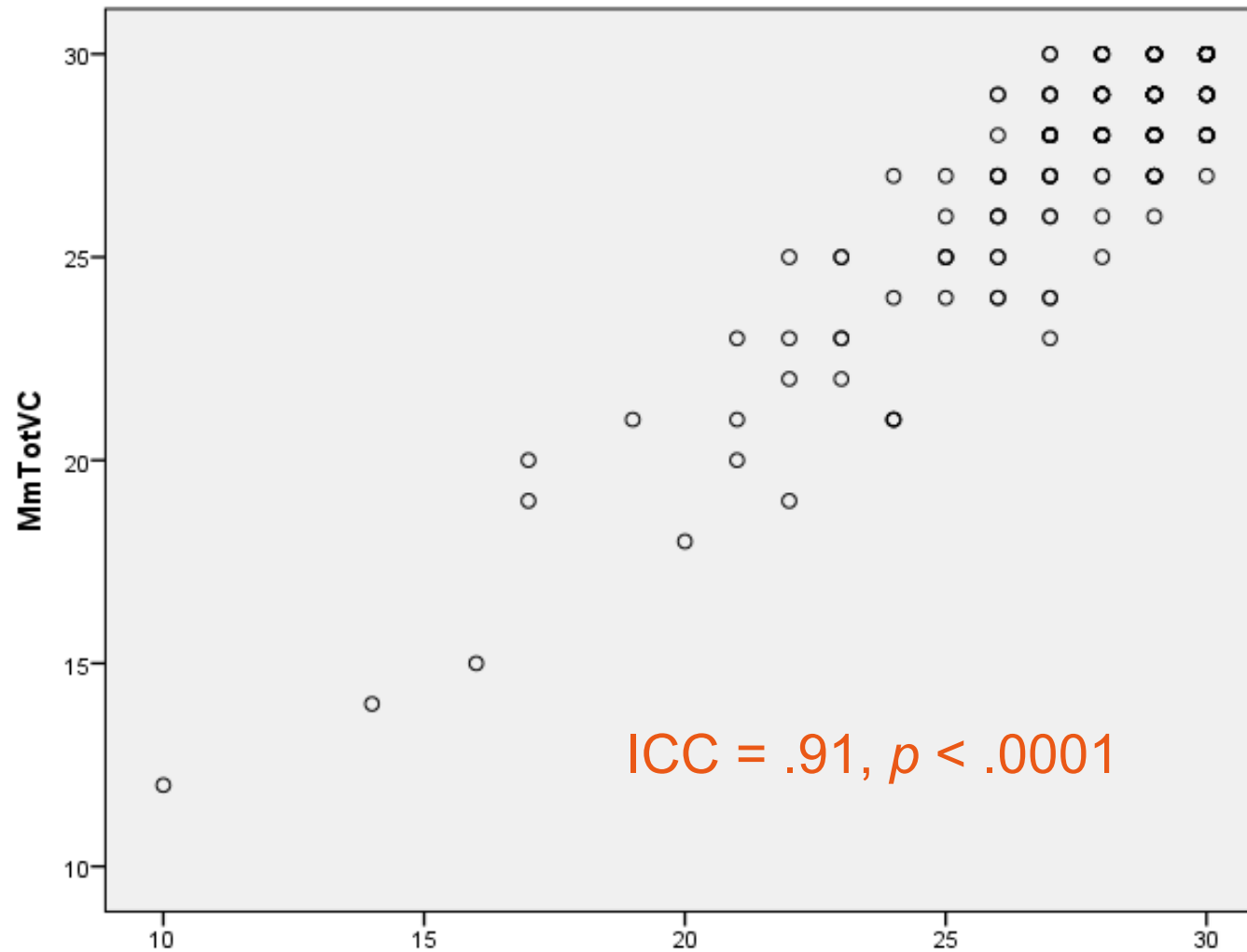
Subjects

- $N = 203$ (119 control, 84 MCI / AD)
- Age: 46-90 yr, $M = 68.4$ ($SD = 9.6$)
- Education: 6-20 yr, $M = 14.1$ ($SD = 2.3$)
- 63% Female

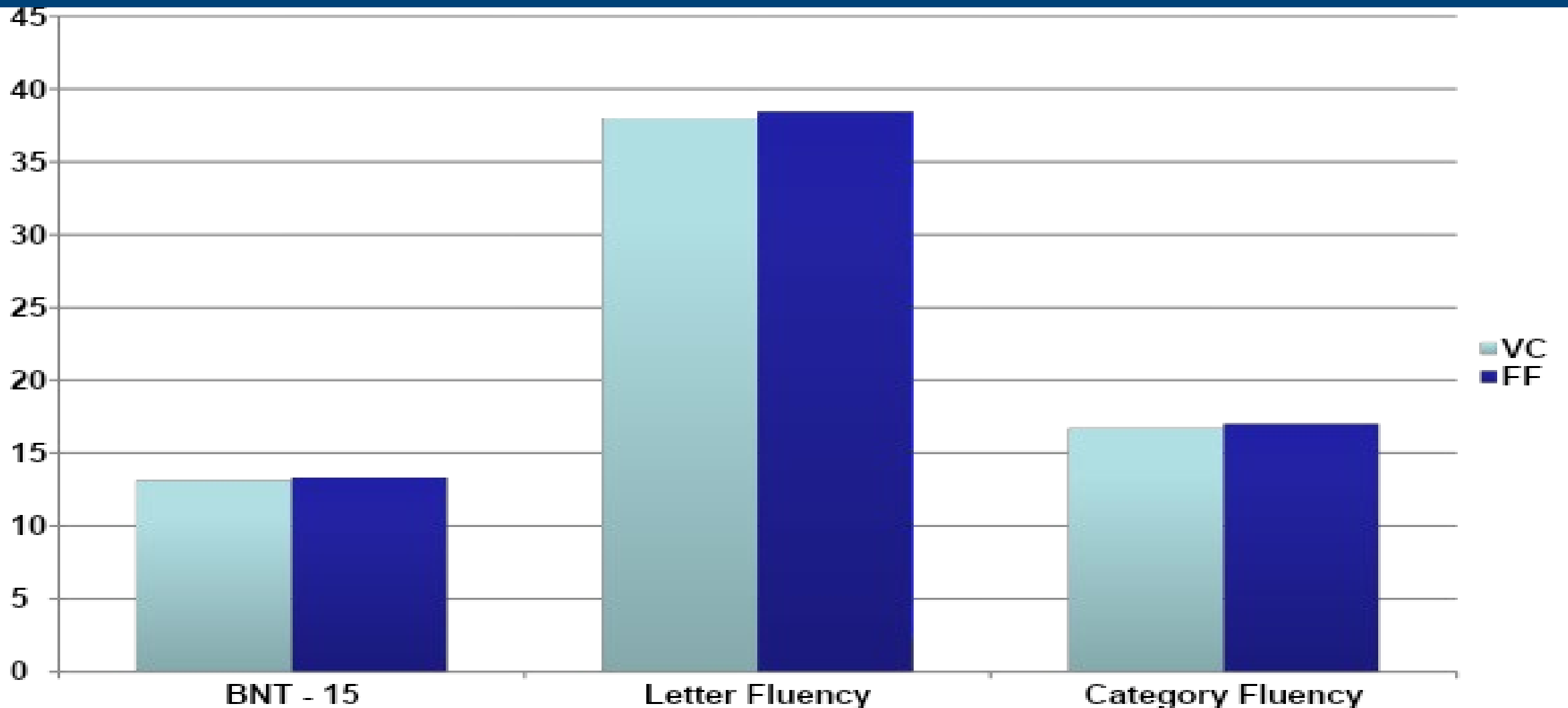
Results: Testing Time (Minutes) x Test Condition: Videoconference (VC) vs. Face-to-Face (FF)

	<u>Mean</u>	<u>SD</u>	<u>Min</u>	<u>Max</u>
VC Test Time	41.3	8.8	29	94
FF Test Time	36.3	7.1	24	74

Results: MMSE x Condition: Total Sample

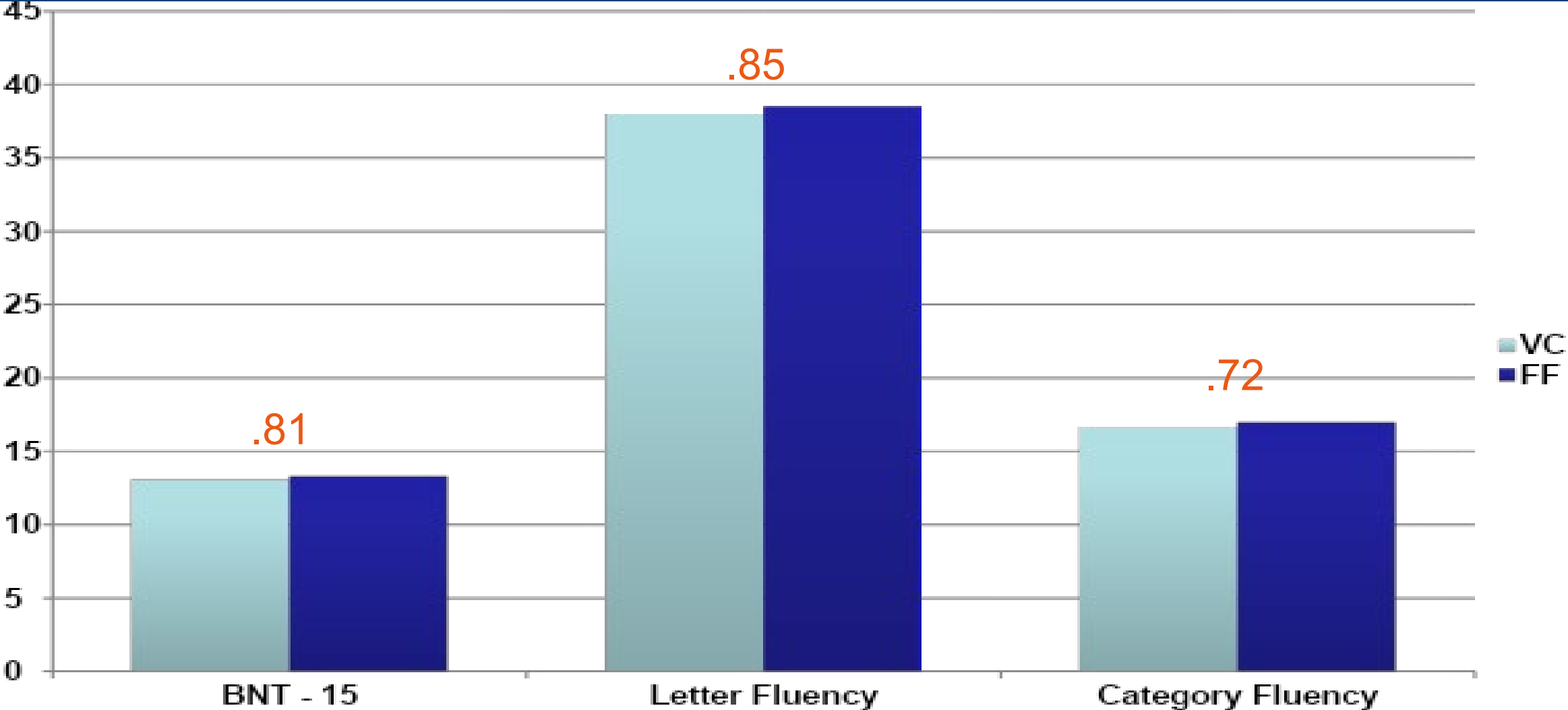


BNT-15, Letter & Category Fluency x Test Condition



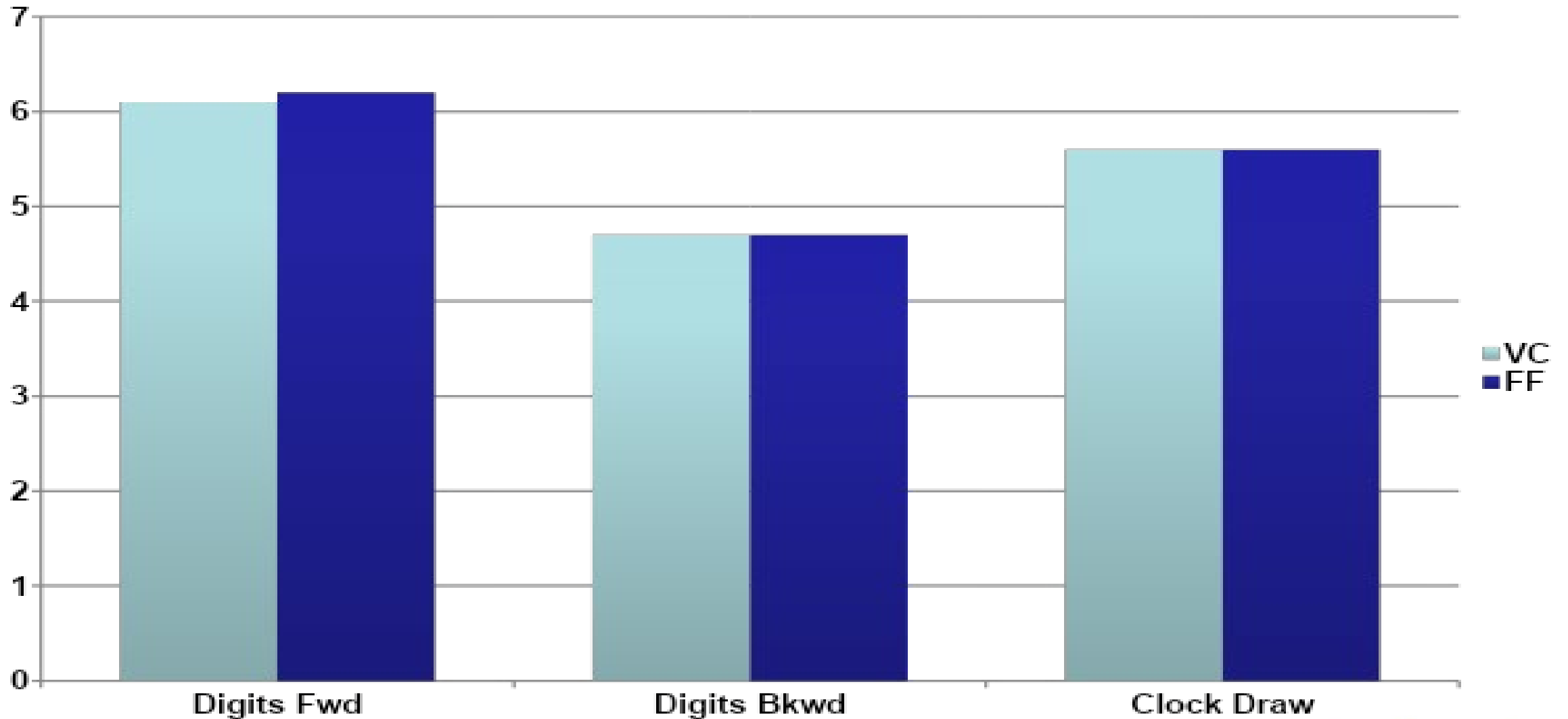
Cullum et al., JINS (2014)

BNT-15, Letter & Category Fluency x Test Condition



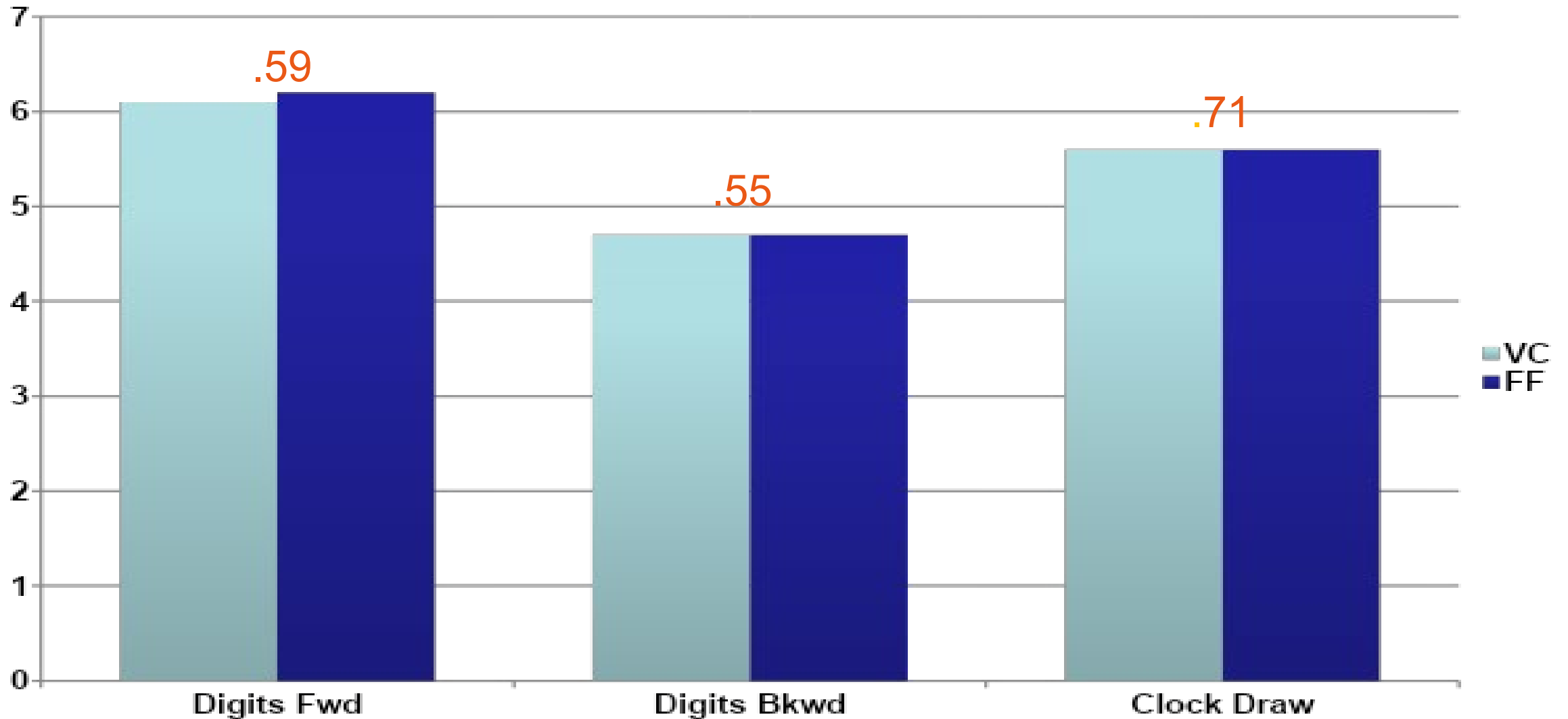
Cullum et al., JINS (2014)

Digit Span & Clock Drawing x Test Condition

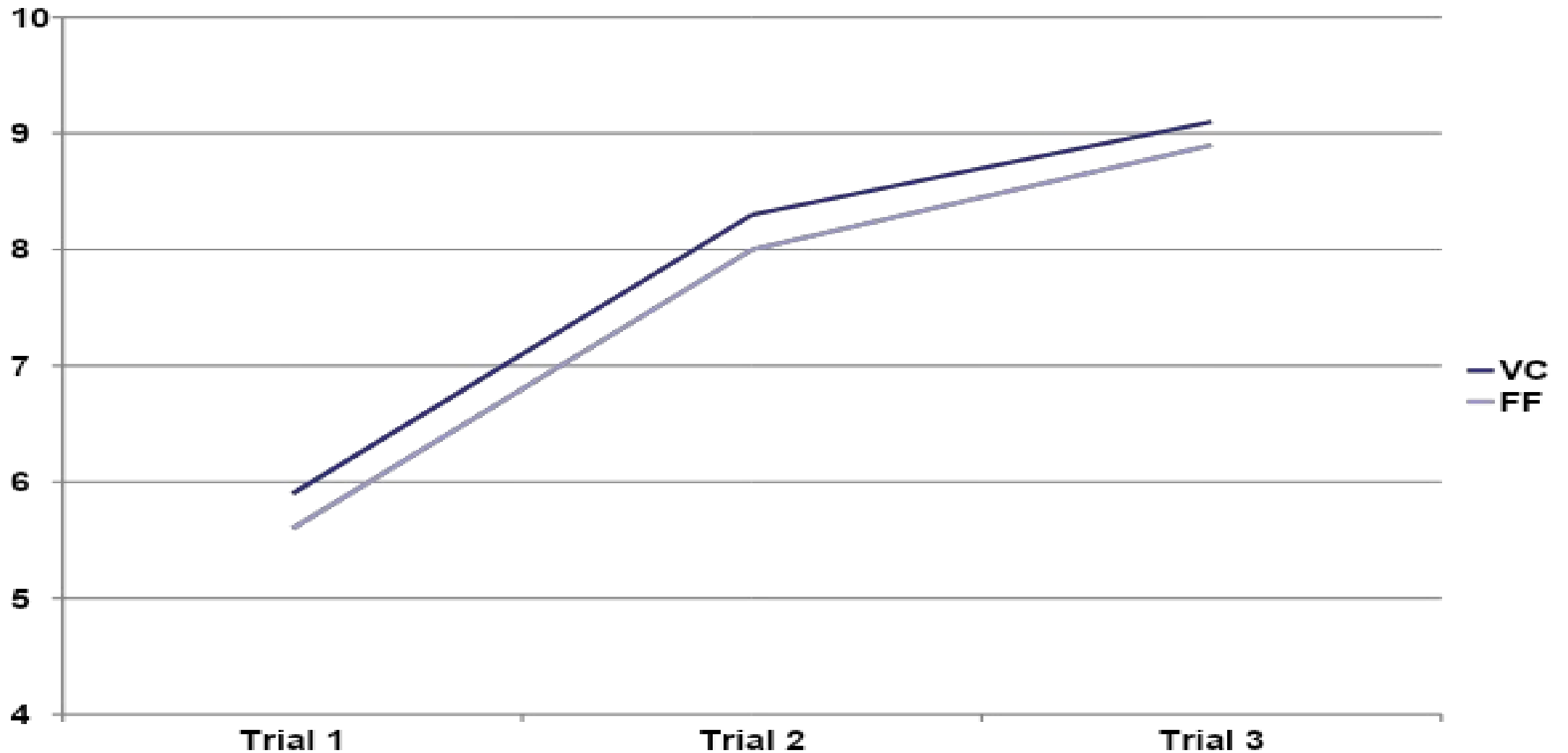


Cullum et al., JINS (2014)

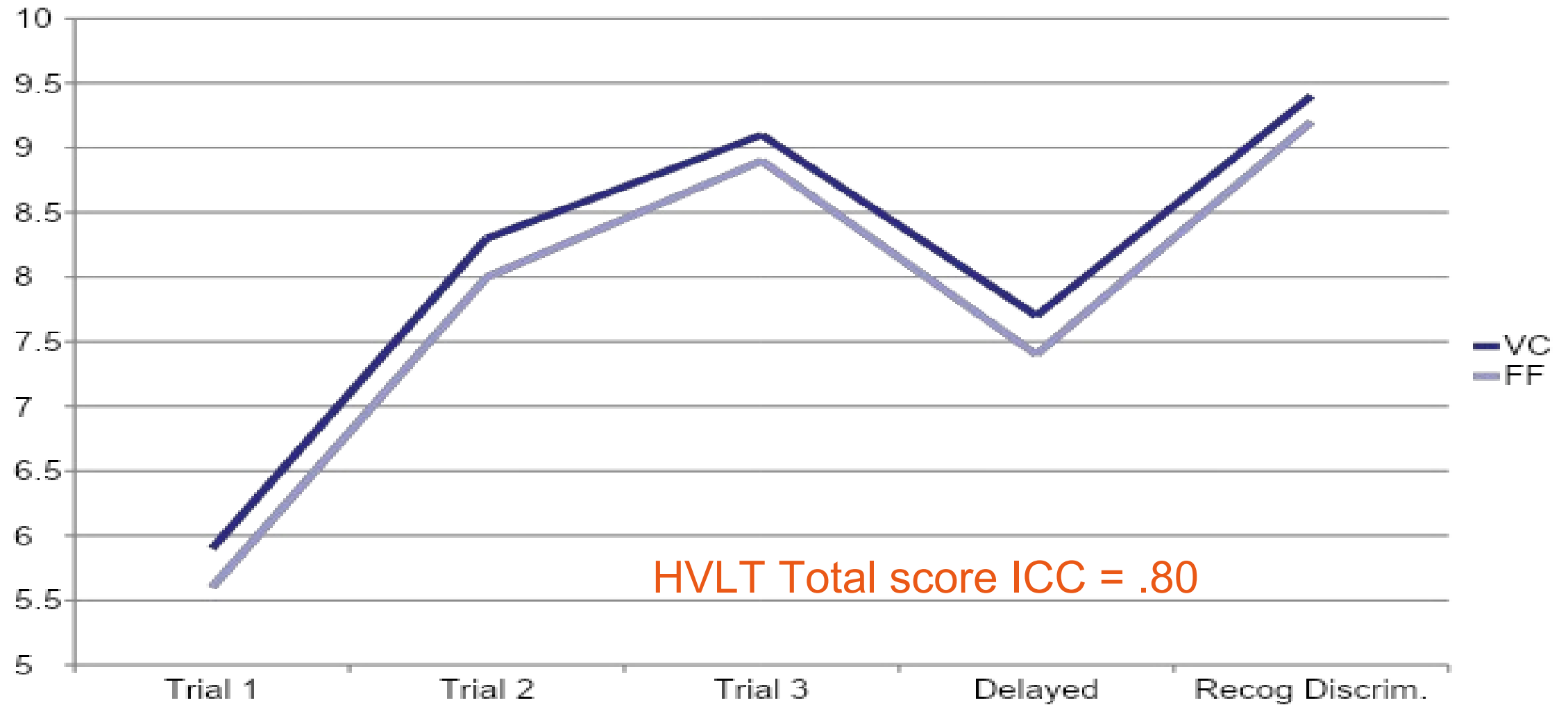
Digit Span & Clock Drawing x Test Condition



HVLT-R Learning x Test Condition



HVLT-R Learning x Test Condition



VC Administration of RBANS

Arch Clin Neuropsychol. 2016 Feb;31(1):8-11. doi: 10.1093/arclin/acv058. Epub 2015 Oct 6.

Video Teleconference Administration of the Repeatable Battery for the Assessment of Neuropsychological Status.

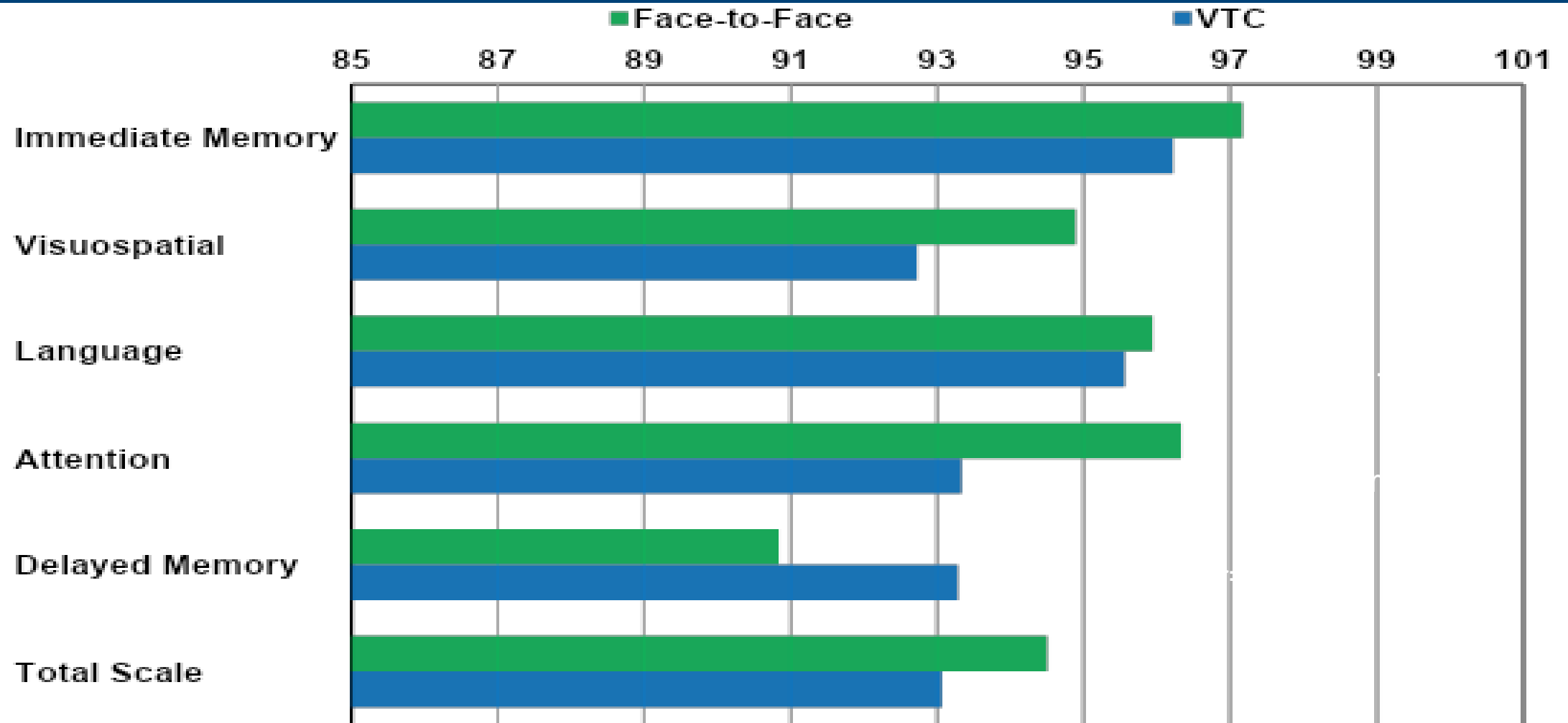
[Galusha-Glasscock JM](#)¹, [Horton DK](#)¹, [Weiner MF](#)², [Cullum CM](#)³.

Author information

Abstract

Teleneuropsychology applications are growing, but a limited number of assessment tools have been studied in this context. The present investigation was designed to determine the feasibility and reliability of the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) administration by comparing video teleconference (VTC) with face-to-face (FF) test conditions. Eighteen adult subjects over age 55 with and without cognitive impairment were administered Forms A and B of the RBANS in VTC and FF settings in counterbalanced fashion. Similar RBANS scores were obtained in both test conditions, with generally high correlations between administration methods. Results support the feasibility and reliability of remote administration of the RBANS via VTC.

RBANS Results – FTF vs VTC



Teleneuropsychology in American Indians

Arch Clin Neuropsychol. 2016 Aug;31(5):420-5. doi: 10.1093/arclin/acw030. Epub 2016 May 30.

Remote Neuropsychological Assessment in Rural American Indians with and without Cognitive Impairment.

Wadsworth HE¹, Galusha-Glasscock JM², Womack KB³, Quiceno M⁴, Weiner MF², Hynan LS⁵, Shore J⁶, Cullum CM³.

Author information

Abstract

OBJECTIVE: To determine the feasibility and reliability of a brief battery of standard neuropsychological tests administered via video teleconference (VTC) to a sample of rural American Indians compared with traditional face-to-face administration.

METHODS: The sample consisted of 84 participants from the Choctaw Nation in Oklahoma, including 53 females and 31 males [M age = 64.89 (SD = 9.73), M education = 12.58 (SD = 2.35)]. Of these, 29 had a diagnosis of mild cognitive impairment or dementia, and 55 were cognitively normal. Tests included the MMSE, Clock Drawing, Digit Span Forward and Backward, Oral Trails, Hopkins Verbal Learning Test-Revised, Letter and Category Fluency, and a short form Boston Naming Test. Alternative forms of tests were administered in counterbalanced fashion in both face-to-face and VTC conditions. Intraclass correlation coefficients (ICCs) were used to compare test scores between test conditions across the entire sample.

RESULTS: All ICCs were significant ($p < .0001$) and ranged from 0.65 (Clock Drawing) to 0.93 (Boston Naming Test), with a mean ICC of 0.82.

CONCLUSION: Results add to the expanding literature supporting the feasibility and reliability of remote videoconference-based neuropsychological test administration and extend findings to American Indians.

Teleneuropsychology Validity

OXFORD
UNIVERSITY PRESS

Archives
of
CLINICAL
NEUROPSYCHOLOGY

Butters Award, 2018

Validity of Teleneuropsychological Assessment in Older Patients with Cognitive Disorders

Hannah E. Wadsworth^{1,*}, Kaltra Dhima¹, Kyle B. Womack^{1,2}, John Hart, Jr^{1,2}, Myron F. Weiner¹,
Linda S. Hynan^{1,3}, C. Munro Cullum^{1,2,4}

¹*Department of Psychiatry, University of Texas Southwestern Medical Center, Dallas, TX, USA*

²*Department of Neurology and Neurotherapeutics, University of Texas Southwestern Medical Center, Dallas, TX, USA*

³*Department of Clinical Sciences, University of Texas Southwestern Medical Center, Dallas, TX, USA*

⁴*Department of Neurological Surgery, University of Texas Southwestern Medical Center, Dallas, TX, USA*

*Corresponding author at: Department of Psychiatry, University of Texas Southwestern Medical Center, Dallas, TX 75390, USA.

Tel.: +(214)-648-4675; fax: +(214)-648-4660.

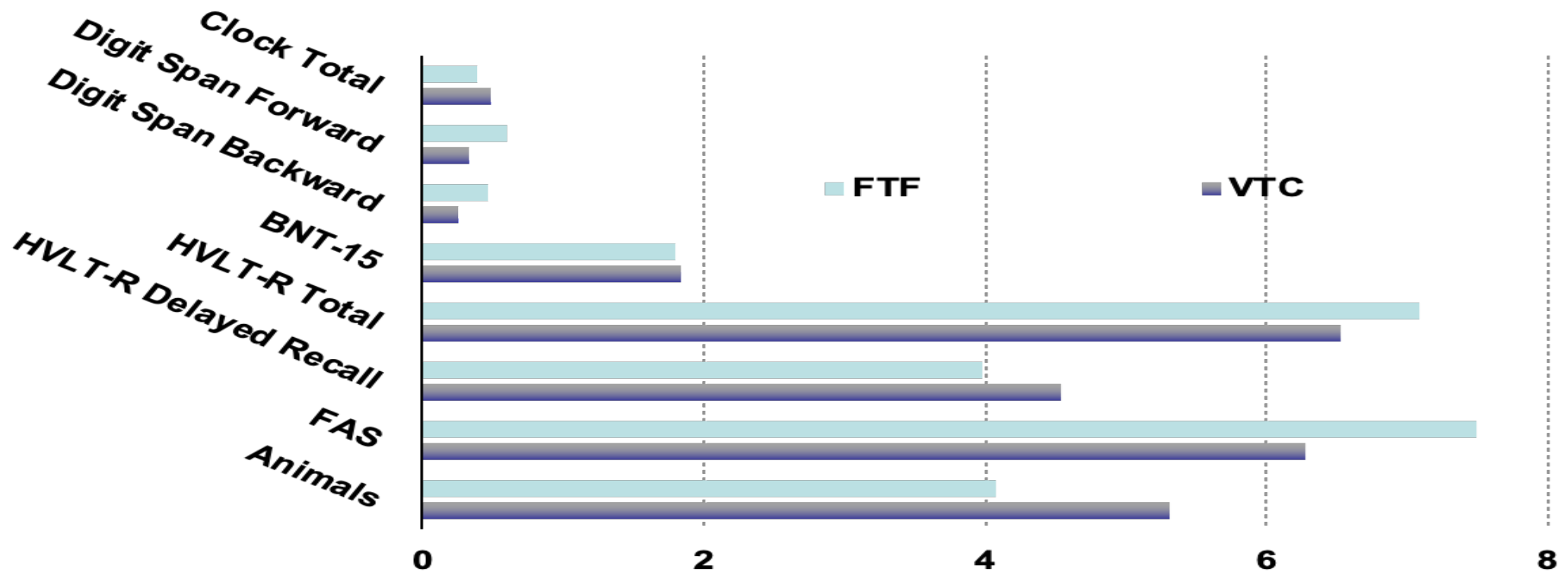
E-mail address: hannah.wadsworth@utsouthwestern.edu (H.E. Wadsworth)

Editorial Decision 11 December 2017; Accepted 16 December 2017

Teleneuropsychology Validity

FF and VC results from subjects with vs without cognitive impairment

FF vs VC Adjusted Mean Differences



From: Wadsworth et al., Arch. Clin. Neuropsychology, (2017)

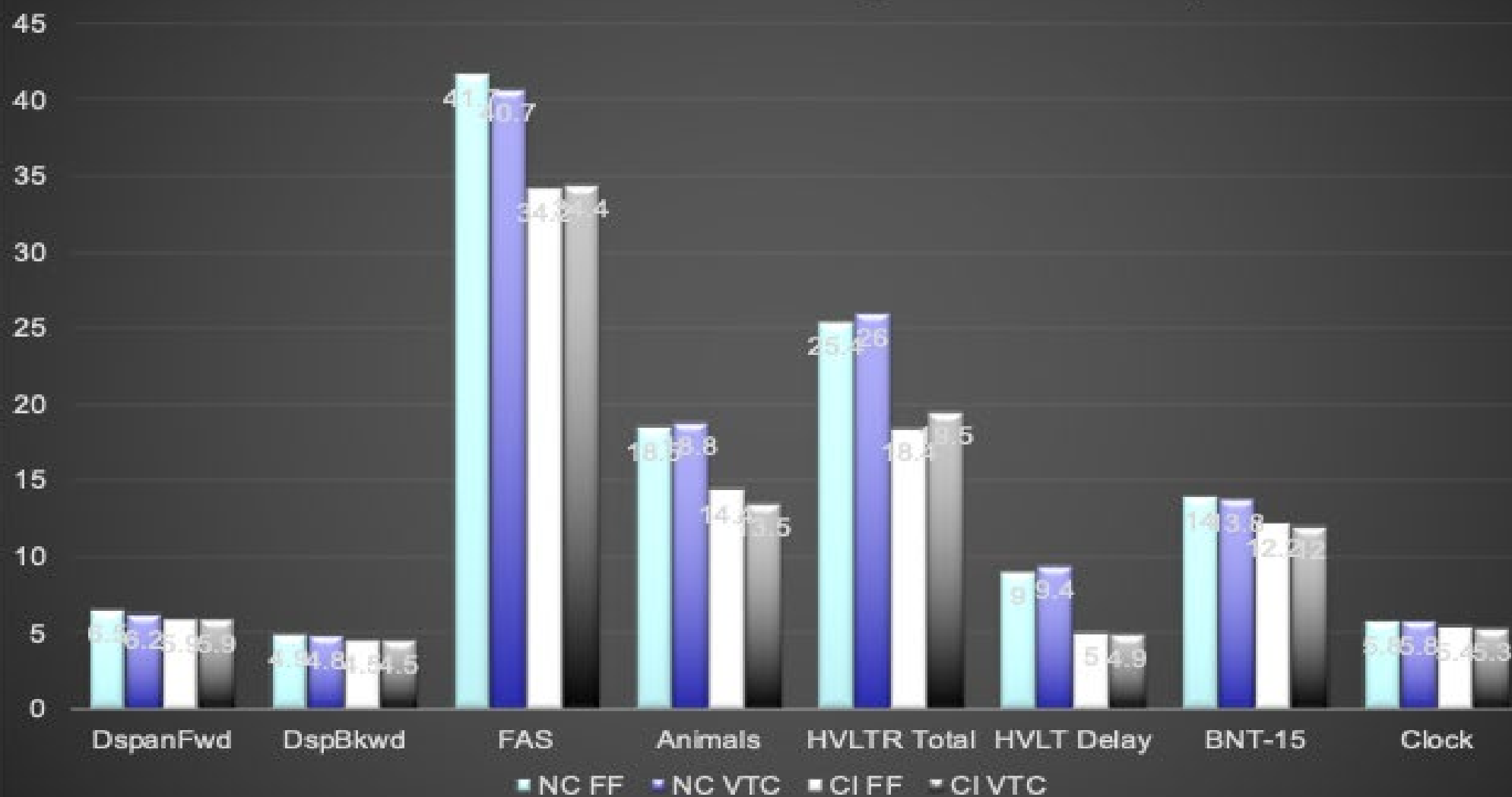
Teleneuropsychology Validity

FTF and VTC results from subjects with vs without cognitive impairment

Table 2. ANCOVA: healthy controls vs. cognitively impaired participants in FTF and VTC test conditions after control

Test	FTF Adjusted Means (SD)		VTC Adjusted Means (SD)		Administration Co
	Unimpaired	Impaired	Unimpaired	Impaired	
Clock Total ^a	5.79 (.81)	5.40 (.82)	5.81 (.85)	5.33 (.86)	.520
Digit Span Forward ^b	6.46 (1.39)	5.87 (1.40)	6.20 (1.33)	5.88 (1.33)	.276
Digit Span Backward ^c	4.91 (1.20)	4.45 (1.22)	4.76 (1.26)	4.51 (1.27)	.635
BNT-15 ^d	14.01 (1.85)	12.22 (1.86)	13.83 (2.18)	12.00 (2.19)	.806
HVLT-R Total ^e	25.43 (5.48)	18.35 (5.60)	26.02 (5.66)	19.50 (5.78)	.457
HVLT-R Delayed Recall ^e	8.96 (3.28)	4.99 (3.35)	9.44 (2.98)	4.90 (3.04)	.735
FAS ^f	41.69 (12.07)	34.19 (12.20)	40.68 (12.31)	34.40 (12.44)	.814
Animals ^e	18.46 (4.76)	14.38 (4.89)	18.76 (5.07)	13.45 (5.22)	<.001*

Test Condition x Cognitive Group



Teleneuropsychology Study Conclusions

- Telecognitive testing in older subjects is feasible with minimal support at far end (at least when MMSE ≥ 15)
- Testing in VC and FTF conditions yielded similar results across tests examined and in urban Caucasian and rural American Indian groups
- Validity supported by ability of tests to distinguish impaired vs non-impaired groups equally well in each condition (MCI + AD vs NC)

General Evidence for NP Tests Administered via VC

GLOBAL COGNITIVE

MMSE, Ammons Quick Test, CAMCOG, NART, SPMSQ, WASI, MoCA

ATTENTION / INFO PROCESSING

Digit Span, Symbol Digit Modalities, Trail Making Test, Brief Test of Attention, Seashore Rhythm Test, Adult Memory & Information Processing

EPISODIC MEMORY

HVLT, CVLT-II Short Form, RAVLT, Modified Rey-O Figure, WMS-R Logical Memory, Benton Visual Retention Test, Adult Memory & Information Processing

LANGUAGE

Phonemic & Category Fluency, Boston Naming Test, WAIS-III Vocabulary, BDAE Picture Description, MAE Aural Comprehension

VISUOSPATIAL

Clock Drawing, WAIS-III Matrix Reasoning, Beery VMI, Visual Object & Space Perception

PSYCHOMOTOR

Grooved Pegboard

Based on Cullum & Grosch, in Myers & Turvey (2012)

Evidence for NP Tests Administered via VC

Neuropsychol Rev (2017) 27:174–186
DOI 10.1007/s11065-017-9349-1



REVIEW

Neuropsychological Test Administration by Videoconference: A Systematic Review and Meta-Analysis

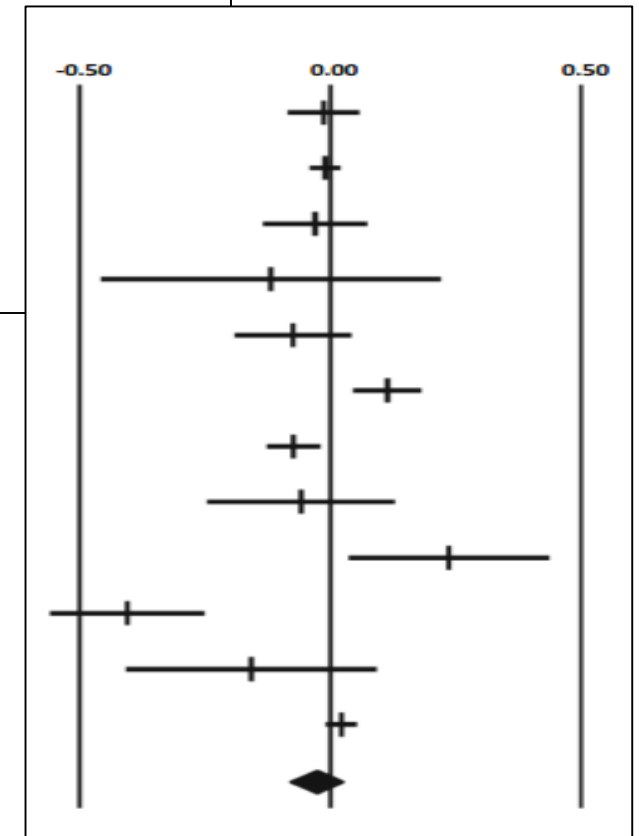
Timothy W. Brearly^{1,2,3} • Robert D. Shura^{1,2,3} • Sarah L. Martindale^{1,2,3} •
Rory A. Lazowski⁴ • David D. Luxton⁵ • Brian V. Shenal^{6,7} • Jared A. Rowland^{1,3,8,9}

12 Studies met criteria ($N = 497$)

Of 79 scores

- FTF > VTC in 61%
- VTC > FTF in 33%
- FTF = VTC in 6%

Conclusion: No effect of VC vs FTF ; 1/10th SD diff.



Consumer Acceptability of Teleneuropsychology

- 98% satisfied with videoconference testing N=40 (21 NC, 19 MCI/AD)
- Instructions during VC testing easy to understand
- Not concerned about privacy during VC testing
- 60% no preference for test condition (30% preferred FTF, vs. 10% VC)

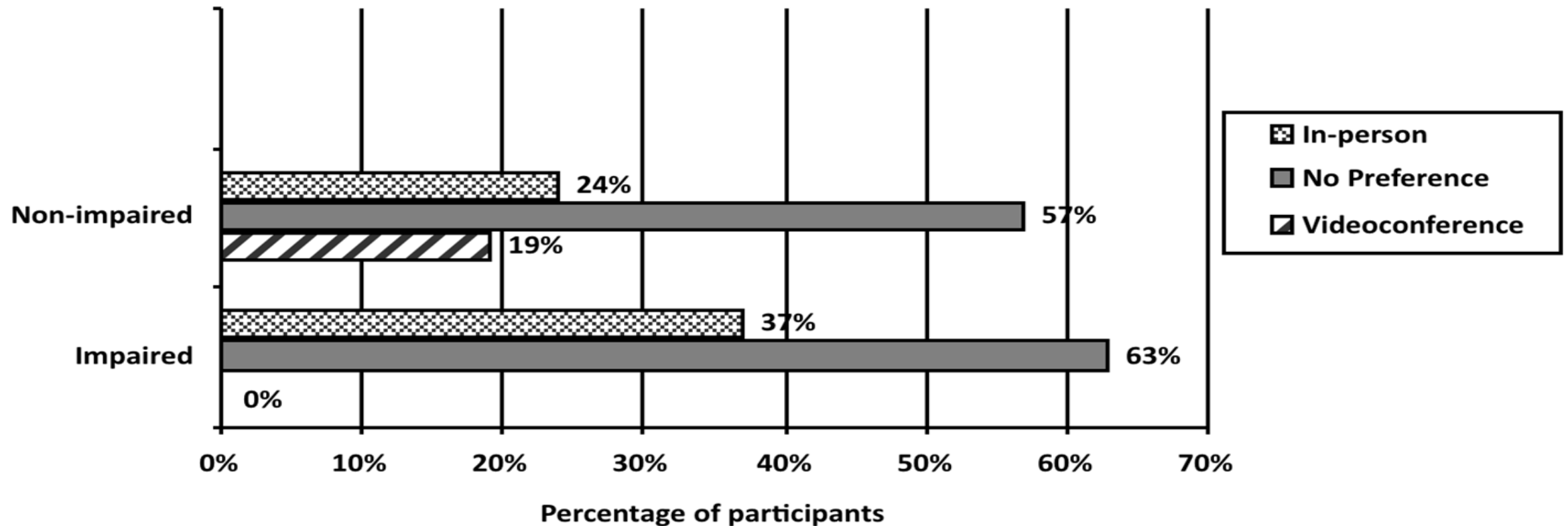
Parikh, Grosch, Graham, Hynan, Weiner, Shore, & Cullum, TCN (2013)

Consumer Acceptability of Teleneuropsychology

- 29% felt VC was more “fun”
- 34% felt it was easier to communicate with examiner FTF
- 15% felt VC made them less nervous
- What about effects of cognitive impairment on acceptability?

Parikh, Grosch, Graham, Hynan, Weiner, Shore, & Cullum, TCN (2013)

Consumer Acceptability of Teleneuropsychology



From: Parikh, Grosch, Graham, Hynan, Weiner, Shore, & Cullum, TCN (2013)

Teleneuropsychology Assessment: Summary

- Teleneuropsychology research results *suggest**:
 - *Feasibility*
 - *Applicable in rural and urban settings*
 - *Reliability*
 - *Validity*
 - *Accepted & well-tolerated by subjects*

**for those tests and groups studied to date, and with caveats*

Teleneuropsychology Assessment: Summary

- Research Caveats
 - *Much research done in controlled clinic settings*
 - *Good internet connectivity*
 - *Volunteer participants*
 - *Standard videoconference equipment*
 - *Screen size / view of examiner and stimuli*
 - *Distance from screen / mobile camera*
- *Brief assessments*
- *Detailed protocols & experienced examiners guiding testing*
- ***Many opportunities for TeleNP research!***

Acceptability of telehealth in post-stroke memory rehabilitation: A qualitative analysis

David W. Lawson^{a,c}, Renerus J. Stolwyk^{a,c}, Jennie L. Ponsford^{a,c}, Katharine S. Baker^b,
Joanna Tran, and Dana Wong^{a,b,c}

^a*Turner Institute for Brain and Mental Health, School of Psychological Sciences, Monash University, Clayton, Australia;*

^b*School of Psychology and Public Health, La Trobe University, Melbourne, Australia;*

^c*Monash-Epworth Rehabilitation Research Centre, Epworth Healthcare, Melbourne, Australia*

- **Aim:** To understand the experiences of clinicians who had delivered the same memory rehabilitation program in telehealth and face-to-face (F2F) formats ($n=9$), and participants with stroke ($n=25$), in order to explore:
 - Perceived benefits and challenges of the telehealth format
 - Potential barriers to clinical implementation of telehealth neurorehabilitation services

ROLE/BENEFITS OF TELEREHAB

• Clinician experience

- Higher demands on clinicians in TH compared to F2F*
- F2F was more confronting and draining for the clinician than TH
- No significant differences for clinicians between the three modes
- Clinician experience of TH was enjoyable
- Clinician open to working with TH in the future*

Clinician experience

“...when you are talking over the internet it's almost like you need to add a little bit more animation to make sure that it translates a bit more... often I would find that I would leave those sessions quite tired as a clinician”

"I would definitely not hesitate to do this type of intervention in the future”

RELATIONSHIP & CONNECTION

- **Building rapport**

- Rapport is positive or deeper in TH*
- Harder to create rapport in TH
- Rapport is more casual / less clinical in TH
- Relaxed rapport in TH associated with missed sessions/being late for sessions/not adhering to homework
- Overcoming technical issues to maintain rapport
- Technological issues can undermine rapport
- Sense of distance creates limitations for managing emotional content / risk cases*
- Clinician wanted to meet TH participant in person

Building rapport

“I was concerned going in but to be totally honest I did not have any issues building rapport with people over the internet”

“It was obvious that she was upset... if it was face to face, resolving it would have been a bit easier. I think that was the only time I really felt the distance and felt it would have been better to be there.”

RELATIONSHIP & CONNECTION

- **Communication**

- F2F provides more non-verbal communication than TH*
- Non-verbal communication demands are higher in TH than in-person
- TH delivery requires a different level of non-verbal containment of participants, or different levels of pacing
- Containment of participants was harder in TH compare to F2F; fewer non-verbal cues
- Though participants did not tend to note difficulties

Communication challenges

“... I found that sometimes it was harder to pick up on non-verbal cues and actually try and gauge how a person is feeling in the room”

“Yeah I found it fairly natural and I don’t see it as being anything different than if I was sitting in your office and we were talking across a table. So I feel it’s pretty well the same thing” (62 yo *stroke survivor*)

CONTENT & DELIVERY

- **Technological issues**

- Quality of internet access is more of a barrier / problem in TH*
- Technological issues in TH were mainly participant-end: e.g. logging in, getting camera or camera working
- Participant comfort with technology in TH
- Impact of clinician's own comfort levels with technology
- Did not encounter significant technological issues in TH
- Variety of technology (e.g. different types of smartphones owned by participants)

Technological issues

"I had a patient in North Queensland who had some pretty flaky internet, so we had a few times we had dropouts and had to reconnect."

"I found Zoom really easy to use and love that it allows us to connect even though you are in a different city to me." (*47 yo stroke survivor*)

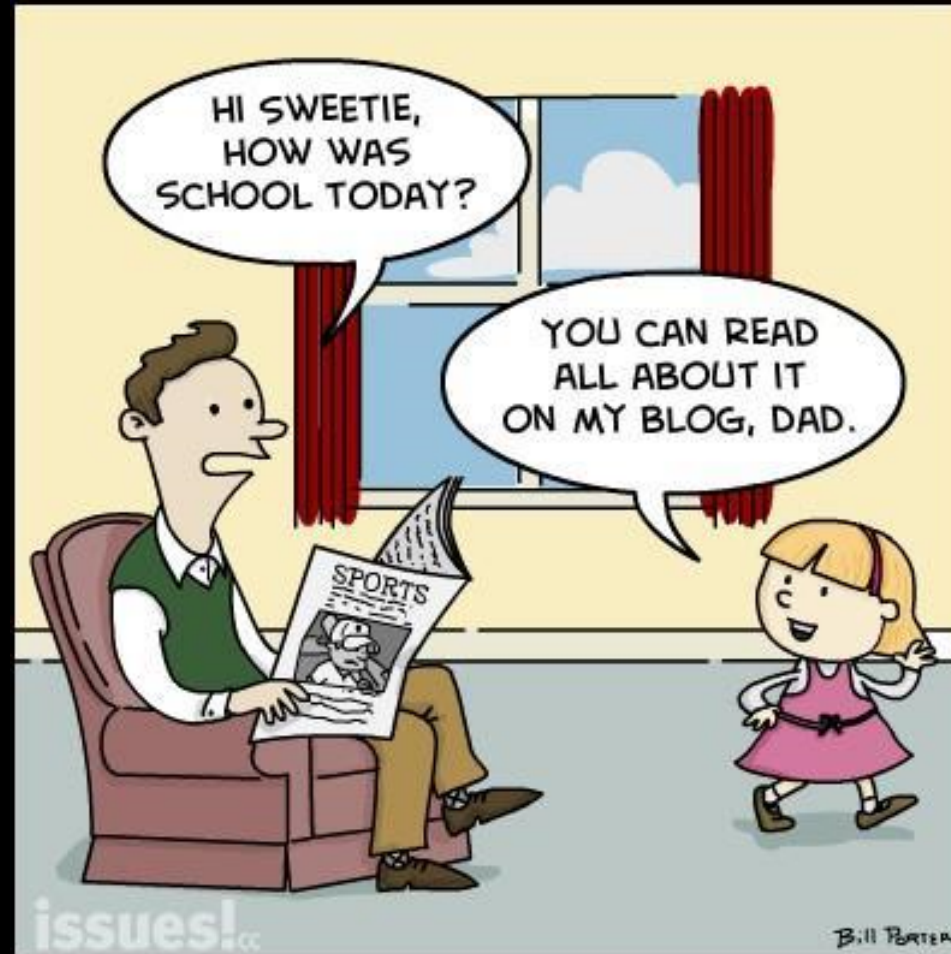
Patient Satisfaction from TeleNP in Stroke Rehabilitation

	N=19	
Previous Skype, Facetime or another videoconference program use	13	32%
Previous telehealth appointment with any health professional?	2	11%
I could see the neuropsychologist clearly	18	95%
I could hear the neuropsychologist clearly	17	89%
I could see all test/therapy materials presented on the screen clearly	16	84%
During the consultation, I felt comfortable interacting with the neuropsychologist	17	89%
Overall, I was satisfied with the consultation via telehealth	17	89%
In the future, I would prefer		
Telehealth consultation	1	5%
In-person consultation	3	16%
I do not mind either way	15	79%

Patient Satisfaction from TeleNP in Stroke Rehabilitation

How long would you be willing to wait to have an in person, face to face neuropsychology consultation rather than a teleneuropsychology consultation?		
I would rather receive a telehealth consultation	11	58%
1-7 days	3	16%
1-4 weeks	1	5%
I would wait as long as it takes to have a face-to-face consultation	2	11%
How long would you be willing to travel in order to receive an in person, face to face neuropsychology consultation rather than teleneuropsychology consultation?		
I would rather receive a telehealth consultation	15	79%
Less than 1 hour	1	5%
1-3 hours	2	11%

Pediatric Need



Pediatric Tele-Assessment

- Waite et al., 2010
 - Twenty-five participants ages 5-9 years
 - Internet-based assessment of language using the CELF-4
 - Split into videoconference (VC) and face-to-face sessions and had additional in person or remote raters simultaneously recording and scoring
 - No significant differences were found
- Hodge et al, 2019
 - Thirty-three participants age 8 to 12 years with LD in reading
 - WISC-V administered and scored by a remote psychologist
 - Simultaneous scoring by an in person psychologist
 - Ratings between psychologists were highly correlated
 - Determined telehealth is a feasible and reliable method

Goals of the Current Project

- Determine if neuropsychological assessment via *home-based* VC produces similar results as traditional face-to-face testing
- Examine feasibility
- Determine if this method is satisfactory to participants and parents

Method

- Recruited participants from Neurology clinic for demyelinating disorders
 - Outside 30 days of acute symptoms and/or steroid use
- Two sessions:
 - Brief neuropsychological battery administered once face-to-face at the clinic visit and via VC from participant's home
 - Counterbalanced groups for order of sessions:
 - Face-to-Face first (52%)
 - Video conference first (48%)
- Alternate forms used when available

Demographics (N=58)

- Age
 - Range 7 to 20 years
 - Mean = 13.11
- 61% female
- Race
 - 84% White
 - 5% Black or African American
 - 4% Asian
 - 7% Other
- Ethnicity
 - 42% Hispanic
 - 58% Non-Hispanic
- 16% Primary Caregiver Language Spanish
- Mileage from Children's
 - Range 3 to 2,033 miles
 - Mean = 147 miles

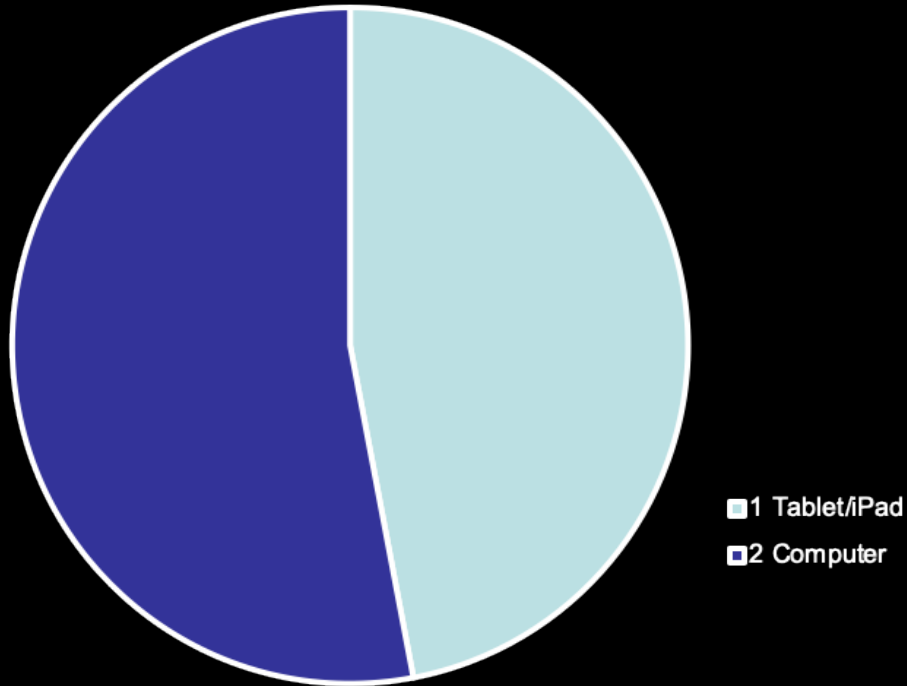


Sample Characteristics

	In Person First N=30	Video First N=28
Same Examiner	97%	96%
	Mean	Mean
Age	13.23	12.96
Days Between Sessions	18	15
Miles from Children's*	262	18

Participant Device

Device Used by Participant



- 67% had their own device
- 23% borrowed a study device (iPad)
- Examiner device below

Smartphones were not used



Video-Conference Platform

- Secure encryption
 - HIPAA Secure
- Point-to-point transmission
 - No recording of data
- Low bandwidth
- Participants provided with a generic login



Battery

Domains Assessed	Measures
Verbal Abilities	WISC-V/WAIS-IV Vocabulary
Processing speed	Symbol-Digit Modalities Test (SDMT)
Visual-motor integration	Beery-Buktenica Developmental Test of Visual-Motor Integration (VMI)
Visual perception	VMI Visual Perception (VP)
Simple auditory attention	WISC-V/WAIS-IV Digits Forward
Working memory	WISC-V/WAIS-IV Digits Backward
Verbal learning and memory	California Verbal Learning Test – Children’s Version (CVLT-C)/Second Edition (CVLT-II)
Verbal Fluency	D-KEFS Letter and Category Fluency
Rapid Naming and Inhibition	D-KEFS Color Word Interference
Academic Skills	WJ-III Achievement Letter-Word ID, Calculation, Math Fluency, Reading Fluency, Word Attack

Participant Instructions

Prior to VC visit

- Do not open the packet until you are instructed to do so
- You will need a quiet, distraction-free setting
- Seating at a desk or table with writing utensils
- Borrowed iPad: access is restricted until the session begins

Beginning of Session

- Access code to borrowed iPad provided
- Speak to parent and obtain a good contact number if needed
- Remind them to remove anything that could be a distraction

Following Assessment

- Place all materials in the addressed stamped envelope
- Seal the packet before finishing the session
- Drop it in the mail or bring to your next session

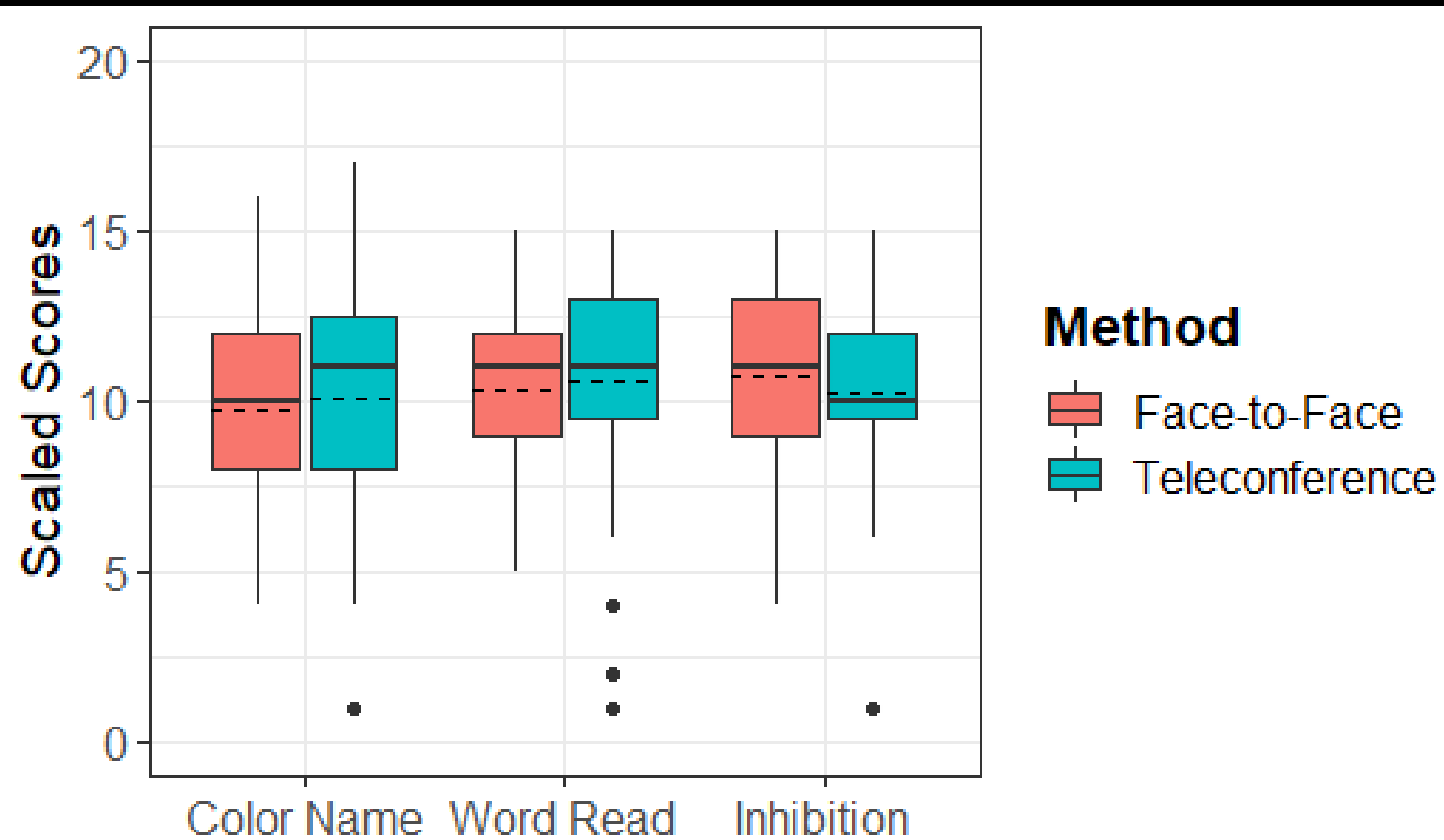
Threats to Collecting Quality Data

- Technical difficulty
 - 21% of VC-based sessions
 - Included
 - Freeze screen
 - “Choppy” connection
 - Loss of connection
 - Poor resolution
 - <1% invalidation of tests
- Brief distractions
 - Occurred in 47% of VC-based sessions

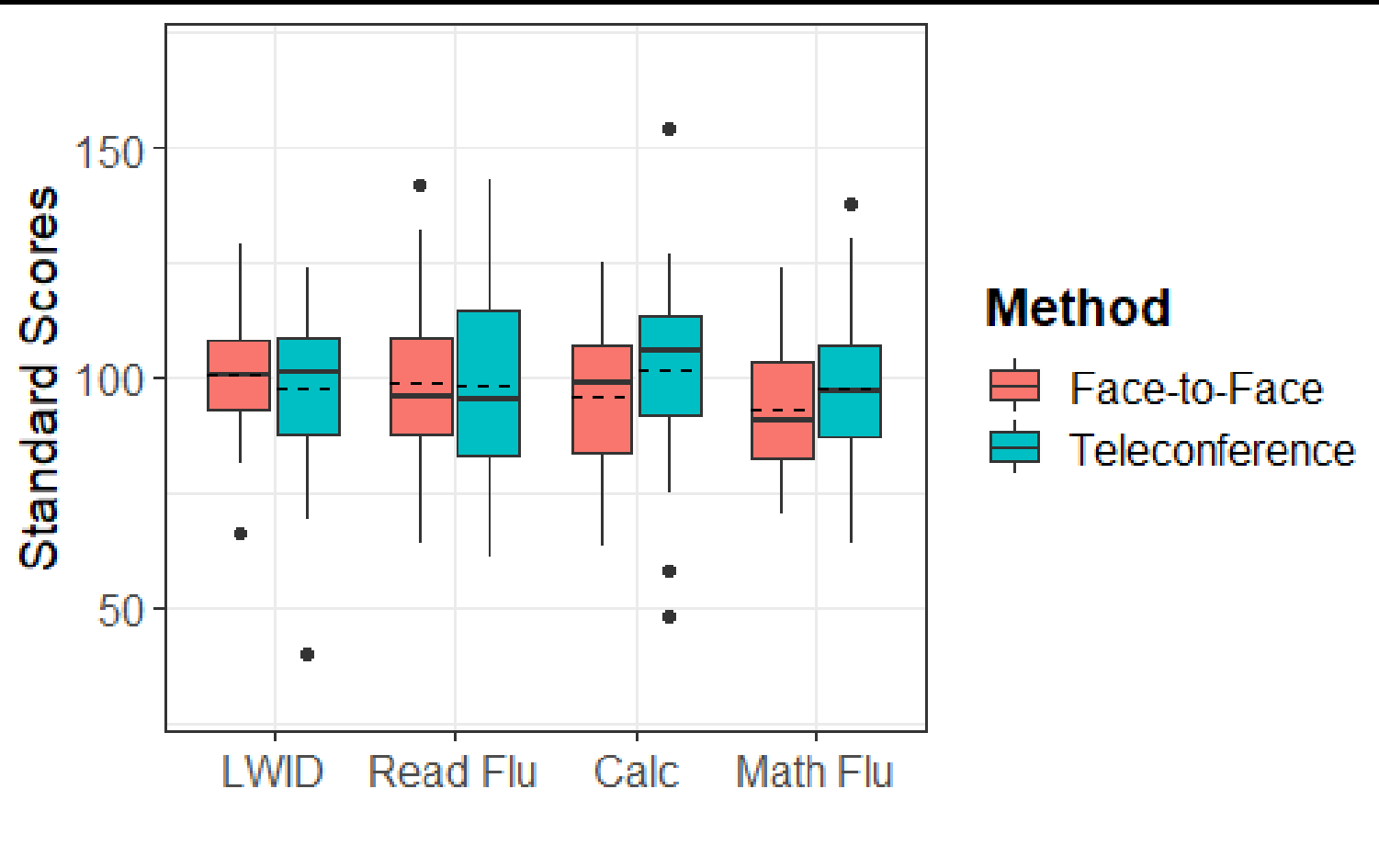


RESULTS

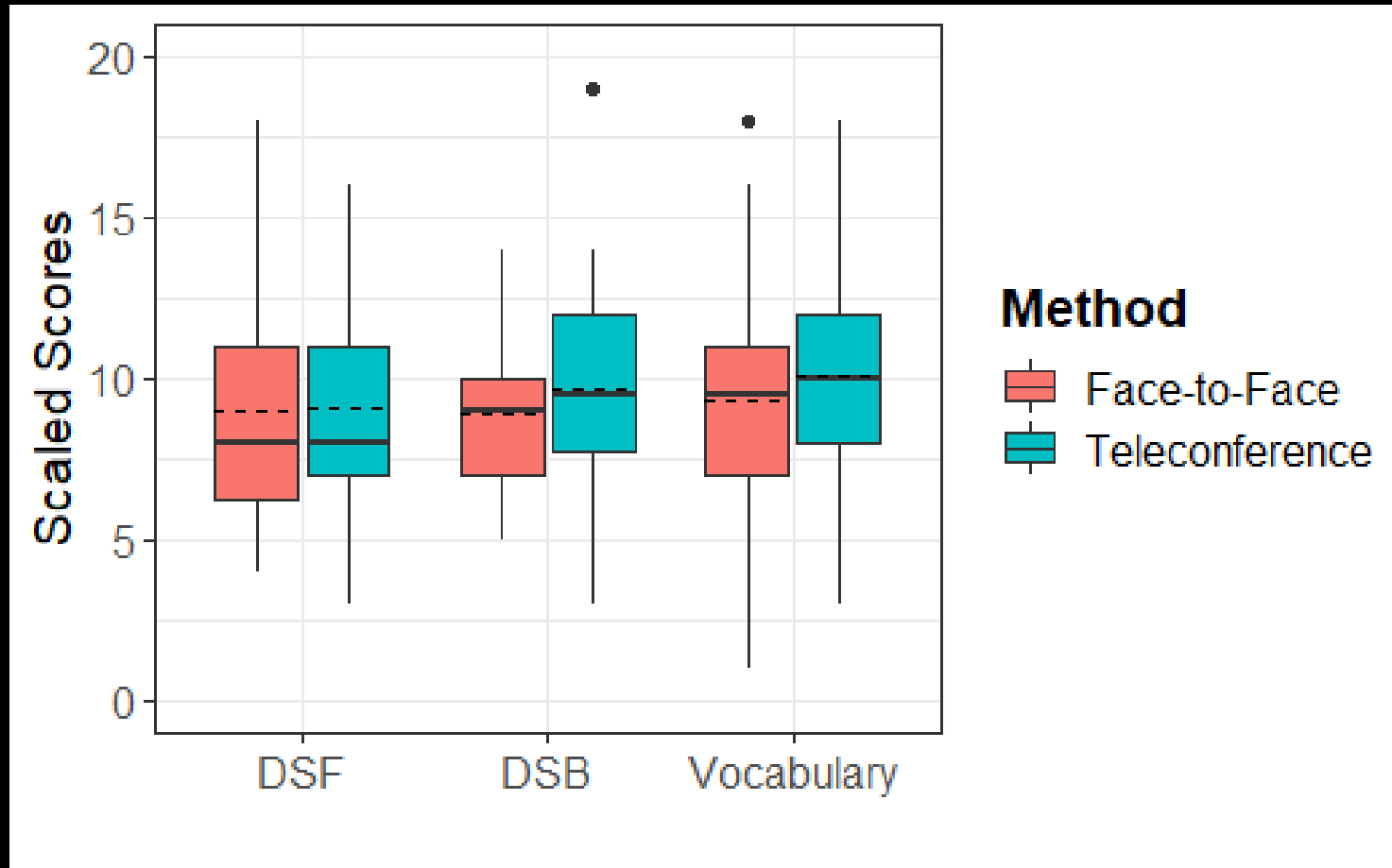
D-KEFS



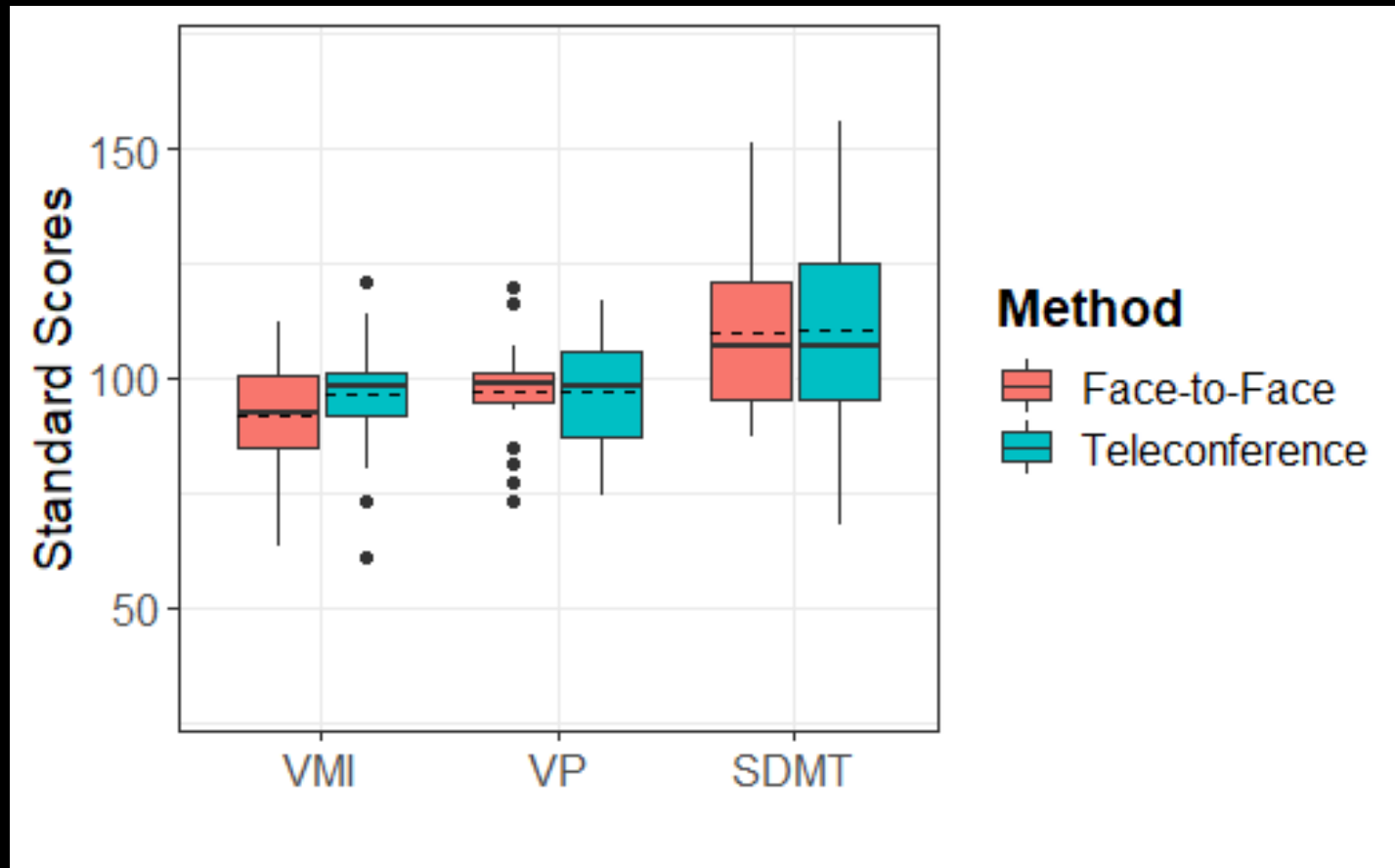
WJ-III Achievement



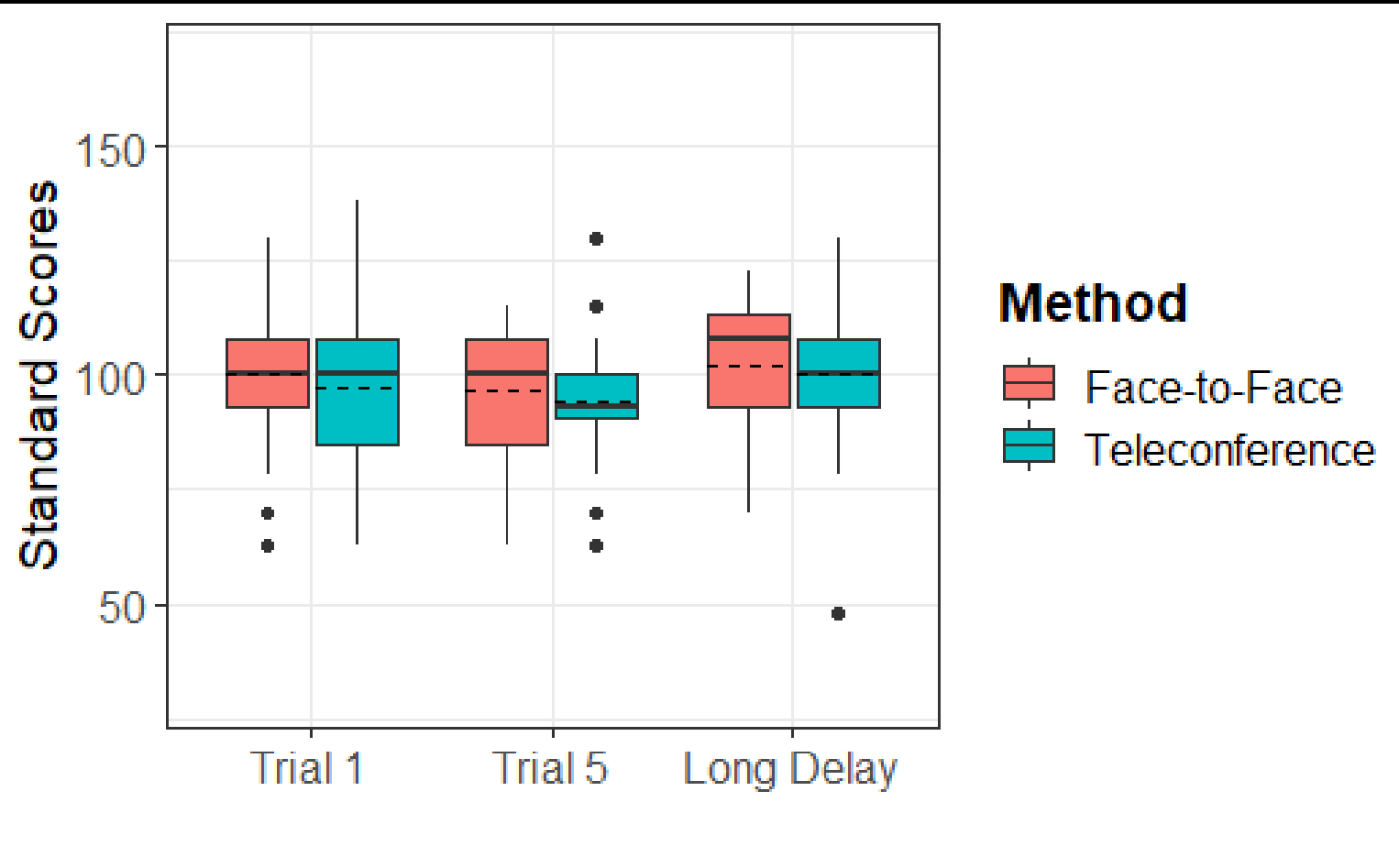
Wechsler: Digit Span and Vocabulary



VMI and SDMT



CVLT

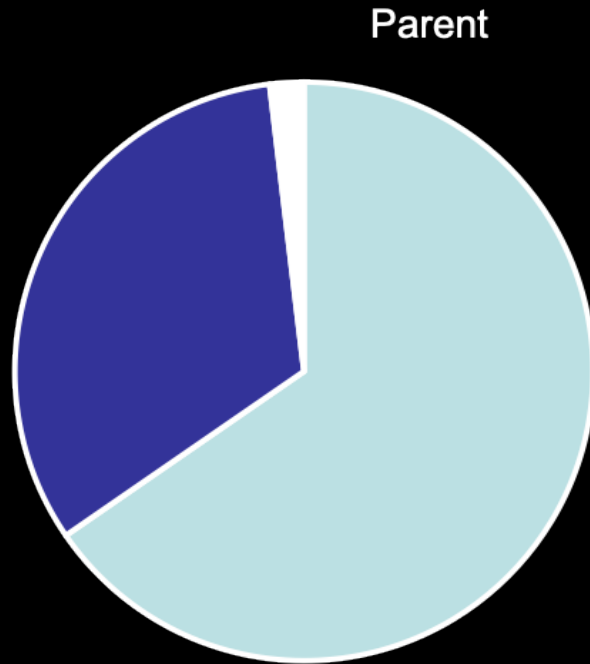




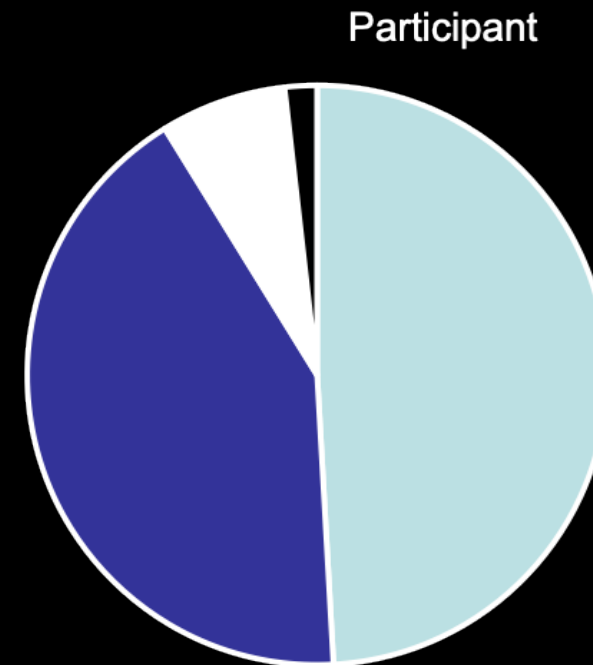
**PARENT AND PARTICIPANT
SATISFACTION**

Satisfaction:

I felt comfortable with the equipment used



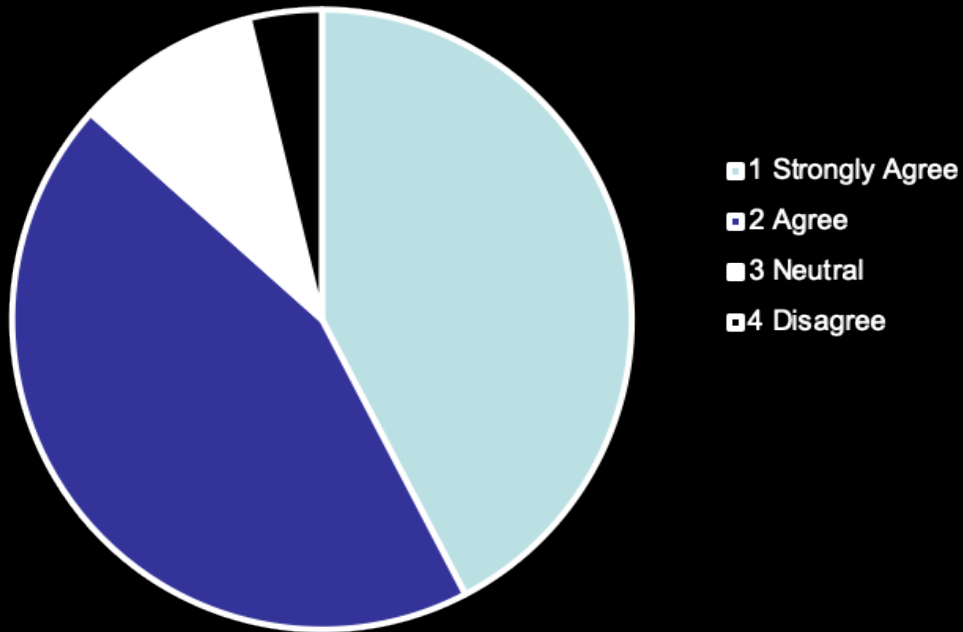
- 1 Strongly Agree
- 2 Agree
- 3 Neutral



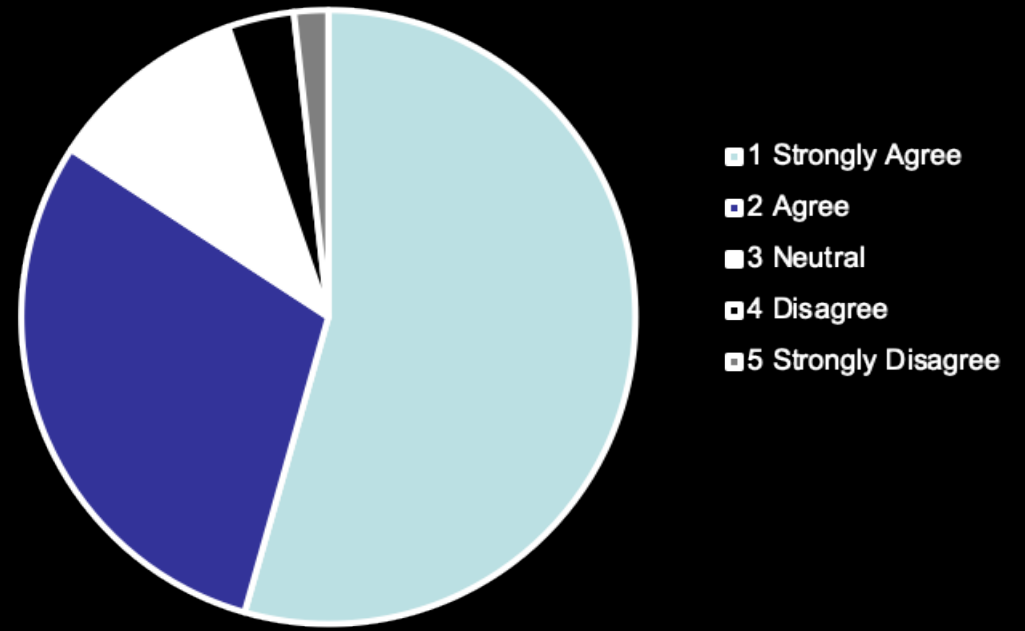
- 1 Strongly Agree
- 2 Agree
- 3 Neutral
- 4 Disagree

Satisfaction: VC-based cognitive testing was as acceptable to me as in- person testing

Parent



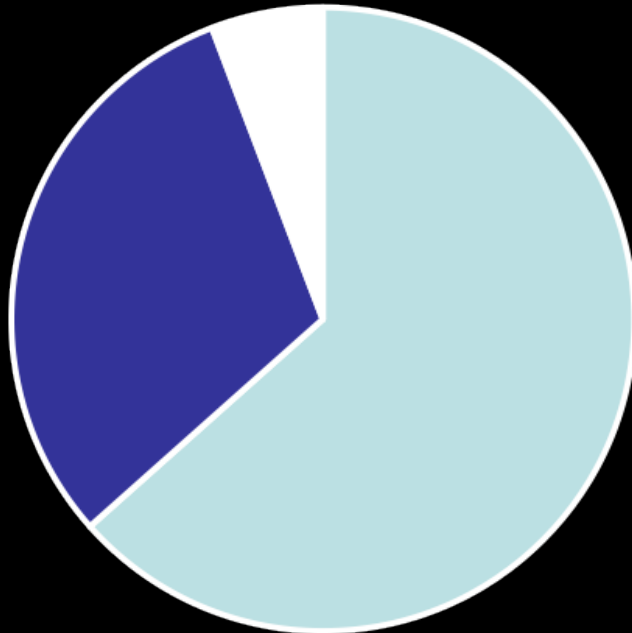
Participant



Satisfaction:

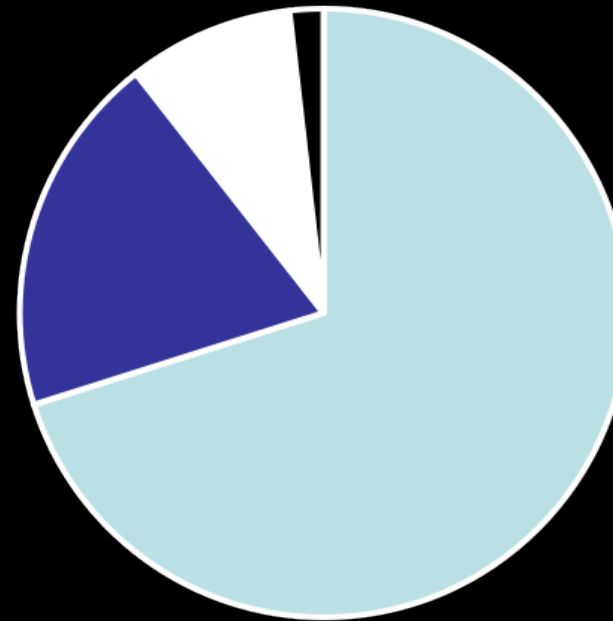
Overall, I was satisfied with the VC-based testing session

Parent



- 1 Strongly Agree
- 2 Agree
- 3 Neutral

Participant

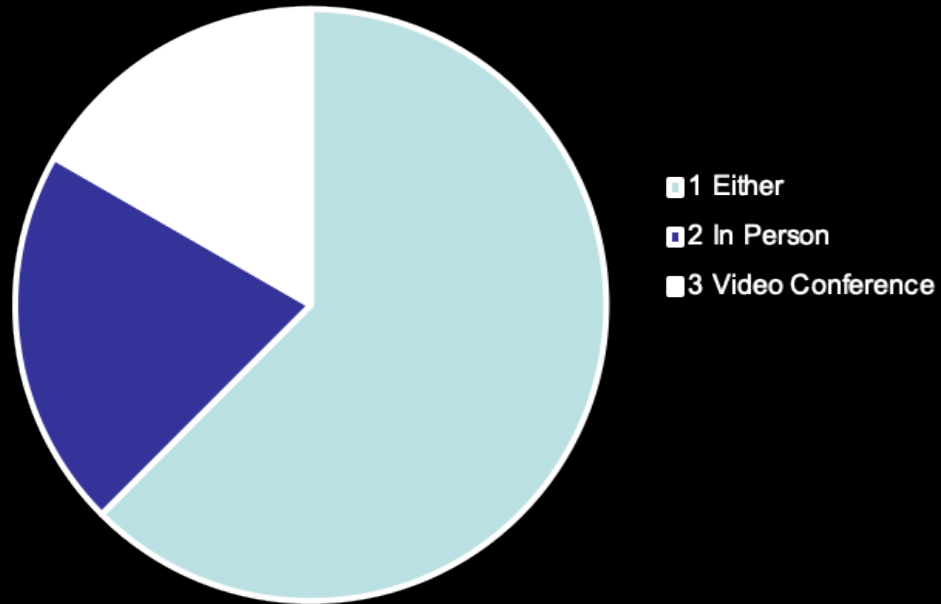


- 1 Strongly Agree
- 2 Agree
- 3 Neutral
- 4 Disagree

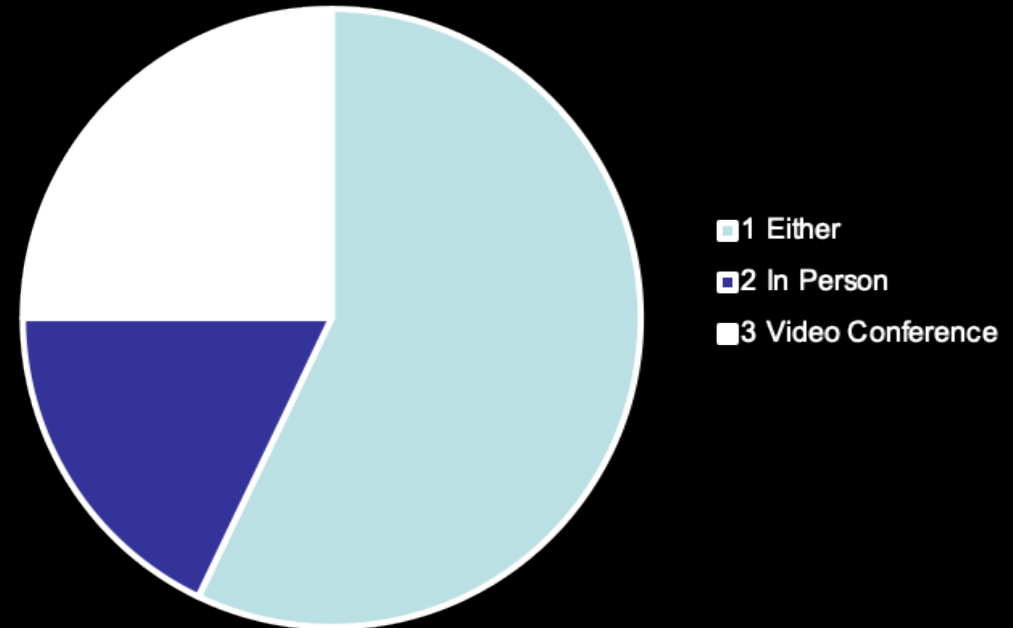
Satisfaction:

If given a choice, I prefer...

Parent



Participant



Limitations and Challenges

- Violation of standardized procedures
- Limitations of behavioral observations
- Distractions in remote (home) environment
- Reduced test options for VC setting
- Coordination and planning of VC sessions
- Patient access to technology
- Variability in technology performance



Conclusions

- Promising findings supporting the use of pediatric home-based VC-based neuropsychological assessment
- VC-based assessment may provide opportunities to patients, clinicians, and researchers
- Individual providers must give careful consideration of the limitations of this approach as well as ethical and practical challenges

Practical Considerations for Home-Based TeleNP

Goal – to simulate the in-person experience. Use this idea to guide your decisions as you set up and carry out sessions including who you bring into the room for each step of the evaluation.

Please refer to iopc.online

Pre-Session

- Utilize usual screening and triage procedures to determine most appropriate service and provider (language screening, age, medical diagnosis, etc.).
- Determine if patient is appropriate for video-based testing.
 - Patient's age, developmental level, cognitive functioning, level of independence, ability to regulate behavior, etc.
- Evaluate patient access to required technology (phone, computer, tablet, internet, service plan and data/minutes available). Consider ways to make technology available.
- Assist patient family in identifying a suitable device for the evaluation. If participant is expected to view stimuli, screen larger than a typical smartphone, such as a computer or tablet, is strongly recommended.
- If applicable, provide any needed materials ahead of time and instruct patient family not to open or view materials until instructed to do so during the session.

Beginning of Session

- Confirm location (address) of the patient.
- Obtain a phone number from the parent/guardian at the beginning of sessions in the event you need to make contact during the video session. Make sure parent/guardian also has your number.
- Ensure patient has all needed materials as well as glasses, hearing aids, etc., if applicable.
- Begin and end sessions with parent/guardian in the room. Remind parent/guardian to remain in the house, especially if patient is a minor or requires onsite supervision.
- Review what you will do if connection is lost with both parent/guardian and patient. For example, patient will be instructed to find caregiver and contact will be made by phone while attempts are made to reconnect the videoconference.

Environment

- Ensure a quiet, distraction-free space away from noise, pets, cell phones, etc. without expected interruptions. This may be particularly difficult in the context of the COVID-19 restrictions. Assist patient family in scanning the room for potentially distracting stimuli. Headphones connected to the videoconferencing device may assist in eliminating distractions.
- Consider having patient hide the self-view on their screen, as this could be a source of distraction.
- Arrange the camera in an optimal position to maximize viewing of the patient in order to observe the patient's work and make behavioral observations. This is likely to be limited compared to in person assessment.
- Patient family may consider placing a sign on the door as we do in our clinics.
- Instruct patient family to find a flat surface (i.e., table, desk) and writing utensils for the patient, especially if they are going to be asked to write anything.

Throughout the Session

- Important to track and document the following:
 - Technological problems such as lost connection, audio/visual outage, lag in video, etc.
 - Environmental interruptions and distractions including sounds, family member or pet walking in, etc.
 - Other threats to validity noted during the session

End of Session and Wrap Up

- Ask the patient to call parent/caregiver back to the room to conclude the session, if applicable. Call by phone, if needed.
- If applicable, instruct patient family to collect and place all materials in an envelope and seal it in preparation to mail it back to you as soon as possible. To minimize barriers, consider providing a self-addressed envelope with pre-paid postage.
- Provide patient family with information on next steps before signing off.

Summary and Our Final Thoughts

- A variety of models and platforms exist for the delivery of TeleNP services
 - “Tele-Interview” TeleNP model with in-person testing
 - Assistant Proctored “Full TeleNP” model with MA present in clinic
 - In-Clinic Hybrid “Full TeleNP” model
 - Direct- To- Home “Full Tele-Health” model directly in patient’s residence
- Preliminary evidence suggests equivalence between face-to-face and videoconference delivery for many, but not all, common cognitive tests
 - Feasibility, reliability, validity*, and generally accepted and well-tolerated
- If patients do not have the technology capacity (e.g., computer, internet, etc.), don’t forget that some verbal screenings can occur over telephone
 - TICS/mTICS, COGTEL, T-MOCA

- Practice of Direct-to-Home TeleNP appears to be a valid contribution - *for some patients and clinical presentations* - to the field during this time of COVID-19 quarantines
- For providers attempting Direct-to-Home TeleNP service provision, a myriad of potential challenges exist, with heightened responsibility on the provider for:
 - maintaining test security
 - maintaining standardization conditions
 - ensuring the maximum validity of data collection
 - ensuring no mis-interpretation or over-interpretation of findings
- It is strongly recommended that Direct-to-Home TeleNP is considered based solely on the urgent clinical need of the patient, as compared to the financial concerns of the provider or logistics of clinic

Funding Sources

- NIH
- National Multiple Sclerosis Society
- Children's Trust
- Safer Care Victoria, Australia

Resources

- Interorganizational Practice Committee (iopc.online):
 - Recommendations/Guidance for Teleneuropsychology (TeleNP) in Response to the COVID-19 Pandemic
- American Psychological Association
 - www.apa.org
- Australian Psychological Society
 - Ethical guidelines for providing psychological services and products using the internet and telecommunications
 - Ethical guidelines for psychological assessment and the use of psychological tests
- American Telemedicine Association
 - www.americantelemed.org
 - Telemental health scientific interest group
- Australian Telehealth Society
 - <http://www.aths.org.au/resources/guidelines/>
- American Psychiatric Association
 - www.psychiatry.org
- State Licensing Boards
- Association of State and Provincial Psychology Boards (ASPPB)
 - Psychology Interjurisdictional Compact (PSYPACT)
- Guidelines for the Practice of Telepsychology provided by the APA, ASPPB, APAIT Joint Task Force
- APA Advice for Caregivers of Children with Disabilities in the Era of COVID-19
- American Telemedicine Association
 - March 2017: Practice Guidelines for Telemental Health with Children and Adolescent