


# The development of a cognitive screening protocol for Aboriginal and/or Torres Strait Islander peoples: the Guddi Way screen

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## ABSTRACT

**Background.** Many Aboriginal and/or Torres Strait Islander peoples are exposed to risk factors for cognitive impairment. However, culturally appropriate methods for identifying potential cognitive impairment are lacking. This paper reports on the development of a screen and interview protocol designed to flag possible cognitive impairments and psychosocial disability in Aboriginal and/or Torres Strait Islander adults over the age of 16 years. **Methods.** The Guddi Way screen includes items relating to cognition and mental functions across multiple cognitive domains. The screen is straightforward, brief, and able to be administered by non-clinicians with training. **Results.** Early results suggest the Guddi Way screen is reliable and culturally acceptable, and correctly flags cognitive dysfunction among Aboriginal and/or Torres Strait Islander adults. **Conclusions.** The screen shows promise as a culturally appropriate and culturally developed method to identify the possibility of cognitive impairments and psychosocial disability in Aboriginal and/or Torres Strait Islander adults. A flag on the Guddi Way screen indicates the need for referral to an experienced neuropsychologist or neuropsychiatrist for further assessment and can also assist in guiding support services.

**Keywords:** Aboriginal people, assessment, Australia, brain injury, cognitive impairment, cognitive screen, Indigenous health, Torres Strait Islander people.

## Introduction

The Guddi Way screen (GWS) is a culturally developed cognitive screen and interview protocol designed to identify possible cognitive impairments and psychosocial disability in Aboriginal and/or Torres Strait Islander<sup>1</sup> adults over the age of 16 years. Development of the GWS was part of a broader project focused on brain injury in marginalised Aboriginal and/or Torres Strait Islander peoples. The project was undertaken with the blessing of Traditional Owners and Elders associated with the original site, and development has continued in partnership with Aboriginal and/or Torres Strait Islander stakeholders.

Cognitive disability is believed to be high among marginalised Aboriginal and/or Torres Strait Islander peoples, including those experiencing homelessness, domestic violence, and people engaged with the criminal justice system (Baldry *et al.* 2016; LoGiudice *et al.* 2016; White *et al.* 2019). It is important for support services and other agencies to be aware of the cognitive capacity of service users, to make decisions about necessary adjustments, and provide tailored supports. Services typically rely on client self-report, but issues such as lack of awareness and non-disclosure mean self-reporting can be unreliable (Kondziella and Waldemar 2017). Although a full neuropsychological assessment can help facilitate accurate diagnosis of brain disorders (Walsh and Darby 2002; Lezak *et al.* 2012), these can be difficult to access, expensive, and are

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<sup>1</sup>The term Aboriginal and/or Torres Strait Islander peoples is respectfully used in this article to collectively refer to peoples who are descendants of the original inhabitants of Australia, while recognising the heterogeneous nature of Aboriginal and/or Torres Strait Islander clans and communities.

often limited by the normative samples used to interpret scores. The use of a brief screening process can be beneficial to identify possible cognitive impairment, and to guide referral, support strategies, and further testing (Maruff *et al.* 2009).

However, culturally appropriate methods for identifying a broad range of cognitive impairments in Aboriginal and/or Torres Strait Islander peoples are lacking (Dingwall *et al.* 2017). A lack of guidance regarding appropriate tools and administration processes contributes to a reluctance in clinicians to undertake cognitive assessment with Aboriginal and/or Torres Strait Islander clients (Hindman *et al.* 2023). Moreover, historically and to this day, the assessment of Aboriginal and/or Torres Strait Islander peoples through methods based on Western knowledge systems is inherently problematic, and has served to objectify, marginalise, and racialise those peoples (Meekosha 2011; Dudgeon and Walker 2015). The GWS was designed to resolve the tension between the potential benefits of identifying cognitive problems among Aboriginal and/or Torres Strait Islander adults and the challenges of conducting a screen in ways that do no harm and lead to better outcomes. Development of the GWS was done in partnership with Aboriginal and/or Torres Strait Islander stakeholders and included consideration of the cultural sensitivity and appropriateness of the GWS items, as well as the engagement and administration processes. In this paper we report on the development of the GWS, a brief (15–20 min), culturally sensitive, and culturally acceptable cognitive screen and protocol designed to identify the possibility of a broad range of cognitive problems that might be missed by other tools. The purpose of the screen is to enhance the capacity of services to better understand, refer, and support individuals who may have cognitive impairment arising from a range of causes.

## Background

In Australia, the ongoing impacts of colonisation, including the dispossession of lands and culture, intergenerational trauma, and racism, have perpetuated health and social disadvantage for Aboriginal and/or Torres Strait Islander peoples (Australian Human Rights Commission 2022). Consequently, many Aboriginal and/or Torres Strait Islander peoples are disproportionately exposed to risk factors for cognitive impairment related to traumatic brain injury, stroke, nutritional deficiencies, chronic illnesses, assaults, and alcohol and substance misuse (Jamieson *et al.* 2008; Thrift *et al.* 2011; Dingwall *et al.* 2017; Esterman *et al.* 2018). Other conditions associated with cognitive impairment such as dementia, and fetal alcohol spectrum disorders (FASD) have also been found to be high in Aboriginal and/or Torres Strait Islander communities (Henderson and Broe 2010; O'Leary *et al.* 2013). Cognitive impairment is the defining characteristic of neurocognitive

disorders which include dementia, traumatic brain injury, cerebrovascular disease, and substance-related brain injury (Sachdev *et al.* 2014).

Despite the risks of cognitive impairment in marginalised Aboriginal and/or Torres Strait Islander communities, culturally appropriate cognitive assessment methods are lacking, and the need for culturally developed assessment tools is well recognised (Bohanna *et al.* 2013; Dingwall *et al.* 2013; Armstrong *et al.* 2017; Rock and Price 2019). Different concepts about illness and disability, and other cultural differences can bias cognitive tests and inhibit engagement (Dingwall and Cairney 2010). Inappropriate assessment methods can affect results and cause adverse consequences such as increased stigma, discrimination, and misunderstandings about people's capabilities and needs (Dingwall *et al.* 2014; Rock and Price 2019).

Tools intended to be used with Aboriginal and/or Torres Strait Islander groups are considered more appropriate and valid when developed with and accepted by these communities. Culturally developed tools such as the Kimberley Indigenous Cognitive Assessment (KICA; LoGiudice *et al.* 2006), the Aboriginal Communication Assessment After Brain Injury (ACAABI; Armstrong *et al.* 2017), and the Westerman Aboriginal Symptom Checklist Youth (WASC-Y; Westerman 2003) provide useful examples of development processes needed to ensure culturally appropriate and culturally secure assessment tools and processes. Commonly used cognitive screening tools such as the Mini-Mental State Examination (MMSE; Folstein *et al.* 1975), Addenbrooke's Cognitive Examination III (ACE III; Mioshi *et al.* 2006; Hodges and Lerner 2017), and the Montreal Cognitive Assessment (MoCA; Nasreddine *et al.* 2005) are heavily reliant on Western concepts and educational processes (Dingwall *et al.* 2017). The use of mainstream cognitive tools can disadvantage populations where English is not the first language, or marginalised groups where poor English literacy and a lack of formal education are common (Rosselli and Ardila 2003; Dingwall *et al.* 2017).

The Rowland Universal Dementia Assessment Scale (RUDAS; Storey *et al.* 2004) is a validated cognitive screen developed for use in culturally and linguistically diverse (CALD) populations. A small pilot study ( $n = 19$ ) found the RUDAS to be a reliable cognitive test for Aboriginal hospital patients in the Northern Territory, although some problems with language understanding were found (Dingwall *et al.* 2017). The KICA is the only cognitive assessment tool validated for use in Aboriginal and/or Torres Strait Islander adult populations (Dingwall and Cairney 2010). The KICA was developed to assess dementia in older (over 45 years) Aboriginal people in Australia's remote Kimberley region. The KICA has been validated in other areas and modified for use in urban populations (mKICA) (Smith *et al.* 2007; LoGiudice *et al.* 2011). An adapted version has also been validated for Torres Strait Islander peoples (Russell *et al.* 2024). Radford and colleagues (2015) found that both the

mKICA and the RUDAS were culturally acceptable in a large sample of older urban and regional Aboriginal Australians ( $n = 235$ ). These studies notwithstanding, culturally developed tools that assess the range of cognitive domains relevant to disorders other than dementia are not available (Bohanna *et al.* 2013; Rock and Price 2019).

## Underpinning principles and cultural protocol

Fundamental to any health intervention involving Aboriginal and/or Torres Strait Islander peoples is that it is experienced as culturally safe and secure (Kendall and Marshall 2004). However, for many Aboriginal and/or Torres Strait Islander people health assessments can feel unsafe and traumatic (Adams *et al.* 2014). Fear, mistrust, and past negative experiences create anxiety and hesitation to engage (Shahid *et al.* 2009; Artuso *et al.* 2013). In addition to the clear ethical issues of subjecting people to distressing processes, this reaction to assessments can also affect cognitive performance, meaning results may be unreliable (Girotti *et al.* 2018). Cultural protocols are needed to guide the engagement of Aboriginal and/or Torres Strait Islander peoples in health interventions to minimise the risk of harm, and ensure methods and processes are culturally safe and secure (Coffin 2007; Dudgeon and Walker 2015). Cultural security necessitates embedding the knowledge and cultural values of Aboriginal and/or Torres Strait Islander peoples through extensive consultation, and formalising protocols around culturally secure practices (Coffin 2007). Central to the GWS is a cultural protocol that was developed in partnership with Elders and respected cultural advisors, and informed by the Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS) (2012, 2020), and the National Health and Medical Research Council Australia (2018a, 2018b).

The GWS cultural protocol includes a culturally sensitive framework for engaging with Aboriginal and/or Torres Strait Islander communities using 'Proper Way' methods, and culturally appropriate methods and processes for administering the screen. Proper Way is a colloquial term relating to the carrying out of any business with Aboriginal and/or Torres Strait Islander peoples according to the wishes, values, and customs of those peoples and communities (Somerville *et al.* 2017). The principles of Proper Way engagement guided the project from the outset including waiting to be invited, seeking advice on how to proceed, coming back to report results, and capacity building.

Capacity building involves creating training and knowledge-sharing opportunities, and building capacity in communities and services to understand and better support people with brain injury and cognitive impairment. Proper Way principles also inform engagement with participating services, with extensive consultation and collaboration taking place before the GWS is used. Guidance is sought from local

Elders and other stakeholders in relation to any language and/or cultural considerations and preferred processes for engagement with clients.

An integral component of the GWS cultural protocol is the *yarning* approach which underpins administration of the screen. Yarning has been described as an Indigenous cultural form of conversation (Bessarab and Ng'andu 2010), and is considered a culturally appropriate way to collect personal and health-related information, promote discussion, and build a relationship (Walker *et al.* 2013; Lin *et al.* 2016). Assessor training includes guidelines for using a yarning approach to build a trusting relationship with the client and instruction on administering the items in a conversational way. The conversational style is less formal and less clinical than a typical assessment process. The warm and friendly approach supports a two-way respectful exchange and facilitates a strengths-based and culturally responsive dialogue (Hewlett *et al.* 2023). The yarning method also allows for information to be gathered during the acute screen about the client's circumstances and possible unmet needs, giving a more comprehensive picture of the person. This holistic perspective was stressed by cultural advisors as an important aspect of the cultural protocol.

## Development of the screen

Preliminary work undertaken by the GWS developers (an organisation supporting people with brain injury) identified a gap in services supporting Aboriginal and/or Torres Strait Islander peoples in contexts such as homeless shelters and community justice organisations for better understandings of possible brain injury and cognitive impairment in their clients, and strategies for improved supports. Initial discussions with these stakeholders guided the development of the screen and administration protocol. Use of the GWS is restricted to partner organisations with whom an agreement is established in relation to appropriate use of the screen. The GWS will have a commercial status for agencies and organisations who are eligible. Through a social enterprise business model (Queensland Government 2019), the commercial use of the GWS means that any financial benefits are re-invested in the community. This enables training and use of the GWS within Aboriginal and/or Torres Strait Islander communities.

The GWS was developed to be administered by non-clinicians with training. Caveats to the use of the screen are included as part of the GWS training, which state that the GWS is not valid unless (i) local Elders have invited its use and/or agreed to its use, (ii) the participant is not acutely unwell, and (iii) administration is done by an Aboriginal and/or Torres Strait Islander person or someone with adequate relevant cultural training. Specific caveats to the appropriate use and interpretation of the GWS are also included to guard against potential misuse. Assessor training

involves face-to-face training delivered by Aboriginal and/or Torres Strait Islander facilitators and covers the technical aspects of screen administration as well as issues related to informed consent, ethical use, and risk management. Guidelines and recommendations for further training in relation to trauma-informed practice, the yarning methodology, and cultural security are included.

The development of the GWS occurred over a 6-month period following preliminary work to understand the need and demand for the screen. All development activities occurred in collaboration with Aboriginal and/or Torres Strait Islander partners and advisors. The components of test development described by Lane and colleagues (2016) provided a framework to guide screen development. Table 1 describes the components of the development process as discrete stages, however, in reality this was an iterative process including review and revision of items.

The GWS was not designed to be specific to a single disorder but rather to pick up potential cognitive impairments associated with multiple origins (e.g. traumatic brain injury, stroke, dementia, alcohol and drug misuse). Selection of items was undertaken by the core project team including two non-Indigenous researchers, an Aboriginal psychologist, a non-Indigenous psychologist (all with expertise in brain injury and cognitive assessment, including experience

working with Aboriginal and/or Torres Strait Islander peoples), a clinical neuropsychologist with expertise and experience with cognitive assessment tools and screening processes, and an Aboriginal project advisor who oversaw the development process. The process involved firstly reviewing extant literature related cognitive assessment tools, and culturally appropriate tools and processes. This guided initial decisions around the inclusion of cognitive domains. The domains representative of cognitive impairment associated with neurocognitive disorders were established based on extant research and clinical guidelines (e.g. Lezak *et al.* 2012; American Psychiatric Association 2013; National Academy of Sciences 2015). Items representative of these cognitive domains which were determined to be culturally appropriate were then chosen by the project team. GWS items include performance-based measures from validated tools and standard neuropsychological tests. Potential items were first reviewed by cultural and/or cognitive assessment expert panels through multiple processes described in the review processes section below. Items were adapted from tasks commonly used in neurological bedside assessments and cognitive screens and were drawn from a range of cognitive screens. Table 2 outlines the items and sources from which they were drawn, as well as information about scoring.

**Table 1.** Guddi Way screen development process.

Components	Activities
Planning	Identification of service needs. Exploring utility/feasibility of approach. Cultural input-community needs and preferred methods explored through meetings and community Elders focus group.
Definitions and claim statements	Defining cognitive impairment in the context of neurocognitive disorders; articulating purpose, function, and scope of the screen. Reviewing scholarly literature related to cognitive assessments for Aboriginal and Torres Strait Islander peoples.
Content specifications	Identification of range of cognitive domains with relevance to neurocognitive disorders.
Choice of items	Development of 12-item cognitive screen. Development of yarning method & cultural protocol. Iterative process with project team and cultural advisors. Decisions informed through expert and cultural review and feedback.
Format and design	Design of screen as pen and paper instrument with flexibility to be administered electronically; focus on clear instructions for administration and scoring.
Production	Production of prototypes of the screen and supporting materials.
Administration	Development of instruction and training manuals to ensure standardisation of administration.
Scoring	Determined by neuropsychologist.
Reporting	Development of a report format outlining individual results and possible implications for individuals.
Security	Development of processes and procedures to ensure participant confidentiality and safety.
Documentation	The current paper describes development and testing.

Adapted from Lane *et al.* (2016).

An acute screen is also administered before the cognitive screen. The acute screen assesses wellbeing and current capacity to undertake the cognitive screening process. Any acute problems that may affect answers or require immediate attention are identified. Self-report questions in the acute screen relate to current wellbeing (e.g. physical pain or emotional distress), possible stroke, head injury history, medication needs, alcohol and drug problems, hearing, vision, fine motor skills, speech problems, and any language barriers. Additional questions related to social and emotional wellbeing and any other unmet needs are included at the end of the cognitive screen. This allows for a holistic process which looks at any areas where people may need additional support across multiple life areas.

## Guddi Way screen items

The GWS assesses functioning across seven broad cognitive domains including orientation, language, memory, visuospatial skills, praxis, attention, and executive function. For each item errors flag concern in one or more areas of cognitive function. Results generate a report that flags any areas of concern, informing support strategies and recommendations for referral to further assessment. The screen is not intended to be diagnostic and does not result in a total score. Rather, a score is given for each task individually.

### Orientation

Following the acute screen, item 2 assesses orientation to self, place and time of year. This indicates whether a person is alert enough to complete the full screening protocol. Orientation difficulties are frequent symptoms of brain disease and neurocognitive disability (Lezak *et al.* 2012), and could indicate an acute problem or intoxication (Razani *et al.* 2009).

### Language/verbal communication

Language skills are crucial to social functioning, and language deficits are typical in people with neurocognitive disorders (Kipps and Hodges 2005). Language and verbal communication items in existing cognitive tests tend to be heavily reliant on literacy (e.g. backwards spelling), and have been found to be culturally biased (Dingwall *et al.* 2017). The choice of language/verbal communication tasks was guided by the KICA (LoGiudice *et al.* 2006), and literacy-based language tasks were excluded. Language skills are assessed using repetition, naming, and verbal comprehension tasks.

#### Repetition

The repetition task requires participants to repeat four words of increasing complexity spoken by the assessor. The

test determines whether attention and concentration are impaired, and highlights problems with language (aphasia) (Lezak *et al.* 2012).

#### Naming

Verbally naming an object or item is an important aspect of language, and involves the use of semantic memory to recognise, retrieve and apply a name to an item (Kipps and Hodges 2005). Skills in object recognition involving the use of visual processing systems are also a requirement of this task. Objects were chosen for the naming task based on familiarity as determined by the cultural advisory group, and practicality in diverse settings such as homeless shelters, or criminal justice contexts. Objects may be adapted to local contexts, based on local advice.

#### Verbal comprehension

Comprehension of verbal communication involves the ability to attend to and comprehend spoken words, and the relationships between words. The GWS uses the same verbal comprehension tasks used in the KICA which involve following verbal instructions. Errors on this task may be associated with difficulties understanding the meaning of instructions, and following instructions.

#### Object use praxis

Praxis relates to learned, skilled motor movements. Praxis tasks can be an effective alternative to written tasks in cognitive assessments because they require cognitive functions associated with writing such as planning and sequencing (Cassidy 2016). Apraxia or dyspraxia are often associated with stroke, hypoxia, and head injury (Lezak *et al.*, 2012). The object-use praxis task follows the naming task utilising the same three objects, which streamlines administration and creates familiarity. This reduces anxiety for people undertaking the screen. The GWS praxis task includes a three-level graded paradigm allowing participants the opportunity to score points by either miming object use, copying the assessor, or using the object.

#### Memory

People with substance use disorders, traumatic brain injury, and FASD often experience problems with memory and new learning (Vakil 2005; Cairney *et al.* 2007; Kodituwakku 2009). Memory is assessed in two stages with a memory registration (encoding) task and delayed recall task. The memory registration task flows on from the naming and praxis tasks using the same three objects, which again adds to the efficiency of administering the screen. Scoring of the recall task differentiates between participants who benefited from cueing, and those who failed the task with cueing.

**Table 2.** Guddi Way screen items.

Item	Scoring	Sources adapted from
1. Acute screen Overall wellbeing screen	Not applicable	Developed by the GWS developers (an organisation supporting people with brain injury)
2. Orientation To self, place, time of year/ season	3 points possible <3 flags concern	KICA MMSE
3. Repetition Repeating words spoken by assessor	4 points possible <4 flags concern	MoCA ACE-III
4. Naming Naming of familiar objects held up by assessor	3 points possible <3 flags concern	KICA; MMSE; RUDAS D-KEFS <sup>A</sup>
5. Object use praxis Trial 1: mime object use Trial 2: copy assessor demonstration (if needed) Trial 3: demonstrate use with object (if needed)	Graded paradigm: 9 points possible; score 3 each correct mime @ trial 1 Score 2 each correct copy @ trial 2 Score 1 each correct use @ trial 3 Score 6 or less flags concern	KICA; RUDAS
6. Memory registration Registration of hidden objects	3 points possible <3 after two trials of learning flags concern	KICA; MMSE
7. Verbal comprehension Following verbal instructions	2 points possible <2 flags concern	KICA
8. Verbal fluency Animal naming task	2 points possible <2 flags concern	KICA; ACE-III; RUDAS
9. Motor sequence Hand movement copy	1 point possible (for 5 correct sequences) <1 flags concern	RUDAS; FAB <sup>B</sup>
10. Visuospatial copy Line drawing	3 points possible <3 flags concern	KICA; ACE-III
11. Conceptual reasoning Colour form sort with shift	11a Initial sort = 1 point 11a Score <1 flags concern 11b Shift = 2 points if correct; 1 point correct with prompt 11b Score <1 flags concern (reliance on prompt noted but does not = fail)	Colour Form Sort Task <sup>C</sup>
12. Recall Recall of hidden objects	3 correct answers no cueing needed = score 2 3 correct with cueing = score 1 1, 2, or 3 incorrect, with no benefit of cueing = score 0 Score <2 flags concern	KICA; MMSE

<sup>A</sup>Delis-Kaplan Executive Function System (D-KEFS; *Delis et al. 2004*).<sup>B</sup>Frontal Assessment Battery (FAB; *Dubois et al. 2000*).<sup>C</sup>Colour Form Sort Task (*Hobson et al. 2007*).

## Visuospatial skills

Visuospatial skills involve the processing and organisation of visual detail, and deficits in visuospatial processing are commonly associated with dementia and other brain disorders (Chatterjee and Coslett 2010). Visuospatial skills are assessed using a visuospatial copy task which requires participants to replicate a horizontal line with details such as a triangle. The item is scored in terms of the sequence, the orientation, and the overall arrangement of the drawing. Results are considered to reflect a capacity for executive regulation and flexibility skills, as well as visuospatial skills. Drawing tasks are typically used by neurologists as bedside tools to assess cognitive functioning (Kondziella and Waldemar 2017).

## Executive function

Executive dysfunction is often associated with frontal lobe lesions which are common in people with brain injury, substance misuse problems, and FASD (Green *et al.* 2009; Kondziella and Waldemar 2017). The GWS assesses executive functions over four items including the visuospatial copy task described above, as well as verbal fluency, motor sequencing, and conceptual reasoning tasks.

### Verbal fluency

The GWS assesses verbal fluency using an animal naming task. Verbal fluency tasks are widely used in neuropsychological assessments to assess executive control skills (Shao *et al.* 2014). Fluency tests have been found to be sensitive to cognitive impairment of multiple origins including frontal and temporal lobe lesions, Alzheimer's disease, and traumatic brain injury (Tombaugh *et al.* 1999).

### Programmed motor sequence

The GWS includes a programmed motor sequence task utilising a watch, copy, continue paradigm. The executive functioning aspect of the task is the need for participants to plan, adapt and monitor their own movements, to regulate the sequence and meet the goal. Frontal lobe lesions have been associated with impaired capacity to execute motor programming tasks (Dubois *et al.* 2000).

### Conceptual reasoning

The conceptual reasoning task in the GWS assesses a person's ability to sort items by a consistent grouping principle, and to change to a different grouping principle (shift set). This task also assesses capacity to initiate problem-solving behaviour and transfer concepts into action. Mental flexibility is needed to switch from one category to another.

## Attention

Attention is another important area to consider in relation to cognitive impairment, and the ability to attend is required

for most cognitive and problem-solving tasks. Problems with attention are flagged across multiple items of the GWS including repetition, memory encoding, verbal comprehension, verbal fluency, and visuospatial copy.

## Review processes and validation

Multiple clinical and cultural expert review processes were used to confirm the face, content, and cultural validity of the screen. The face validity and content validity of the screen were assessed by the core research team who were subject area experts and determined that the instrument appeared to be a valid measurement of the concept being measured (Bolarinwa 2015). Expert opinion from a clinical neuropsychologist during project team working panels ensured that screen items were relevant and representative of the constructs of interest (Koller *et al.* 2017). Content validity was further determined through an expert review process with a panel ( $n = 4$ ) including an Aboriginal psychologist, and non-Indigenous researchers with experience in brain injury and cognitive disability in Aboriginal and/or Torres Strait Islander peoples. Items were sent to the panel for independent review, and all agreed that the items were valid as indicators of the construct under consideration.

Ensuring the cultural appropriateness of the screen was a primary focus of development, and decisions about items and processes were guided by cultural advisors at every stage. A stakeholder group of Elders and respected Aboriginal and/or Torres Strait Islander peoples provided guidance and feedback at the development stage and participated in a cultural review workshop. Eight cultural advisors participated in the cultural review workshop and were asked the following questions in relation to the screen: 'Is the language of the question culturally appropriate?', 'Is the question culturally safe?', and 'Any changes recommended?'. The suitability of the three objects used in the naming, praxis and memory tasks was also discussed. Participants endorsed the items with the caveat that options would need to be provided in different contexts. Changes that were recommended included a need for a more natural flow to questions and greater emphasis on building rapport and trust. The need for language about supporting rather than assessing a person was emphasised. Use of casual language and colloquialisms was recommended. As a result the existing interviewer script was discarded and a yarning framework was developed.

A second workshop was held with a group of Aboriginal and/or Torres Strait Islander peoples ( $n = 7$ ) and non-Indigenous people ( $n = 4$ ) who work in brain injury support services in urban and regional Queensland. The workshop involved training and practice with the GWS, and a reflection and feedback process. Participants were asked: 'Is the question adequately explained?', 'Do you understand

how to administer this question?’ and ‘Is the scoring clear?’. Participants endorsed the clarity, readability, and relevancy of the items with minor changes in terms of clarity assessor instructions, and the use of visual cues for assessors. Aboriginal and/or Torres Strait Islander participants were also asked: ‘Is the question adequately explained?’, ‘Do you understand how to administer this question?’ and ‘Is the scoring clear?’. Feedback primarily concerned the yarning method, which was further developed as a result. Participants felt that the language used to introduce the screen was too structured and overly clinical, so adjustments were made to allow for a more natural flow to the yarn.

## Validation

Although the primary aim of the GWS is not diagnosis, it was pertinent to explore the reliability of the screen to flag potential cognitive problems. The GWS was evaluated in comparison with a detailed clinical interview conducted by a psychologist trained in culturally appropriate clinical practice. A cross-sectional study design was utilised with the GWS assessment occurring before the culturally appropriate clinical interview. Clinicians were blind to the results of the GWS. A convenience sampling method was used to recruit Aboriginal and/or Torres Strait Islander peoples receiving care from a health and social service provider in Queensland. Participants were referred from the service, with written consent obtained prior to the interview. Capacity to consent was assessed as part of the consent process, and immediate capacity to undertake the screen was determined as part of the acute screen. A total of 20 participants were recruited, including 18 clients of the service and two staff members. All recruited participants completed a GWS assessment with either a male or female assessor who were experienced administering the GWS. Of the 20 participants, 19 participated in a clinical interview, with one male client who was Aboriginal dropping out after the GWS. A clinical interview with a second Aboriginal male client was incomplete, so results were inconclusive, leaving 18 complete cases. (Table 3 details participant demographics.)

Other than the two staff members, all participants were experiencing, or at risk of, homelessness. The age of the participants ranged from 18 to 65 years ( $M = 42.7$ ,  $s.d. = 10.4$ ). Education ranged from 6 to 12 years of formal schooling ( $M = 9.5$ ,  $s.d. = 1.8$ ). Just over half (11 participants, 55%) had undertaken additional training or study after leaving school. Only two were working (the staff members) and two were studying. Participants came from a broad range of locations and language groups including 17 from Queensland, one each from the Northern Territory and Western Australia, and two from Papua New Guinea. Most, 70% ( $n = 14$ ) of the participants identified as Aboriginal,

**Table 3.** Participant demographic characteristics ( $n = 20$ ).

Characteristic	<i>n</i>	%
Gender		
Female	9	45
Male	11	55
Non-binary	0	0
Cultural Identity		
Aboriginal	14	70
Torres Strait Islander	3	15
Both Aboriginal and Torres Strait Islander	2	10
Other	1	5
Education		
Year 6 or 7	4	20
Year 8 or 9	4	20
Year 10	6	30
Year 11	3	15
Year 12	3	15
Employment		
Currently working	2	10
Currently studying	2	10
Not currently working or studying	16	80
English as first language	16	80

15% ( $n = 3$ ) as Torres Strait Islander, 10% ( $n = 2$ ) as both, and one participant (5%) identified as a Torres Strait Islander with Papua New Guinean heritage. Only eight participants (42%) reported that they were born on Country. In this context ‘Country’ refers to an area recognised by Aboriginal and/or Torres Strait Islander peoples as a homeland or traditional country, which has a spiritual association and sense of deep connection and belonging (Dudgeon et al. 2014).

Of the 18 complete cases, 11 received a flag for concern in one or more area of cognitive function on the GWS. Of those flagged participants, 10 were also determined as having a possible cognitive impairment in the clinical interview. From the seven participants who showed no flags for cognitive impairment on the GWS, five of these were also determined by the clinician as unlikely to have a cognitive impairment (see Table 4 where classification of cases has been detailed).

The GWS produced two false negatives and one false positive compared to clinical interview, confirming substantial agreement between the two methods (Cohen’s Kappa ( $\kappa$ ) = 0.64,  $P < 0.01$ ) with a positive predictive value of 0.91 (i.e. 91% of people who show a flag for cognitive issues on the GWS, would have been assessed by a clinician as likely having a cognitive impairment).



**Table 4.** Classification of cases on GWS by clinical interview.

		GWS		Total
		Positive	Negative	
Clinical interview	Positive	10 90.9%	2 28.6%	12 66.7%
	Negative	1 9.1%	5 71.4%	6 33.3%
Total		11 61.1%	7 38.9%	18 100%

## Discussion

This paper outlines the development and preliminary validation of a screening process to identify possible cognitive impairment and psychosocial disability in Aboriginal and/or Torres Strait Islander peoples. Aboriginal and/or Torres Strait Islander peoples are overrepresented in groups where cognitive impairment is common including those who experience poor mental health, substance use problems, homelessness, and criminal justice system contact (Sotiri and Simpson 2006; Burra *et al.* 2009; Baldry *et al.* 2016). For many marginalised Aboriginal and/or Torres Strait Islander peoples, engagement with these systems may be the first opportunity for cognitive impairments to be identified. Even when identified, it is rare for appropriate assessment to be conducted or for referrals to be made for suitable treatment and rehabilitation. Determining the presence of cognitive impairment is challenging when available assessment processes are culturally inadequate, and access to a lengthy clinical assessment is not possible. A full clinical assessment involves multiple formal interviews with a health professional, access to medical and hospital records, and interviews with third parties to corroborate information about injuries or observed changes over time. While a full clinical assessment may not be available, results from a screen such as GWS can suggest the possibility of a cognitive problem, helping support services to better understand people's capabilities and needs (Rock and Price 2019). GWS results can inform necessary adjustments, interventions, and support plans, leading to actions that may be overlooked when cognitive impairments are not considered (Bates *et al.* 2002).

Beyond the cultural sensitivity of assessment tools, the safety of people being assessed is vital not only from an ethical perspective, but also for ensuring the reliability of results. Any cognitive assessment process experienced as unsafe, or traumatic must be considered invalid. The cultural protocol attached to the GWS addresses these risks through the yarning method and cultural protocols. Crucially, these methods acknowledge the need for flexibility, taking account of the cultural context, and allowing for local advice about appropriate language and culturally safe

engagement. The authors acknowledge the risks of this approach to the standardisation of the screen. However, these risks must be weighed against the need for cultural sensitivity to ensure engagement and valid responses, and to minimise harm. Moreover, this process recognises the right to self-determination for Aboriginal and/or Torres Strait Islander peoples in making decisions about things that affect them, and it places value on Aboriginal and Torres Strait Islander knowledge.

## Limitations

The authors acknowledge that results of the validation study may not be generalisable beyond the context in which the study was conducted. Further testing is needed in different populations, and with larger sample sizes. Measures of accuracy are affected by the prevalence of the condition in the population. In most studies, the proportion of people in any single sample with a target condition is quite small. However, the prevalence of positive cases in this sample was elevated due to the recruitment method. In a larger and more diverse sample with a greater distribution of positive and negative cases, the negative predictive value may have been higher. This requires exploration. Additionally, a full clinical assessment was not available for the validation study, so it will be important in the future to validate and substantiate the GWS flags for cognitive impairment using additional methods such as medical documentation (e.g. hospital records, neurological examination) and informant interview (e.g. family, friends, support staff).

## Conclusion

The culturally developed GWS shows promise as a culturally appropriate method to identify possible cognitive impairments and psychosocial disability in Aboriginal and/or Torres Strait Islander adults. The screen is straightforward and brief, appropriate for people with low educational levels, and able to be administered by non-clinicians with training. In circumstances where clinical assessment is impractical or inappropriate, the GWS offers a useful tool for health and human services contexts where Aboriginal and/or Torres Strait Islander people are over-represented. Early testing suggests the screen has utility and is culturally acceptable in Aboriginal and/or Torres Strait Islander communities in urban and regional settings.

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**Data availability.** The data that support this study cannot be publicly shared due to ethical or privacy reasons and may be shared upon reasonable request to the corresponding author if appropriate.

**Conflicts of interest.** The Guddi Way screen is a commercial product associated with a Social Enterprise. The authors declare no conflict of interest that could inappropriately influence this work.

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