Research in Developmental Disabilities 37 (2015) 31–36

Contents lists available at ScienceDirect

Research in Developmental Disabilities

Evaluating the use of the Child and Adolescent Intellectual Disability Screening Questionnaire (CAIDS-Q) to estimate IQ in children with low intellectual ability

Karen McKenzie [a], Aja Louise Murray [b,*]

[a] Department of Psychology, Northumbria University, UK
[b] Centre for Cognitive Ageing and Cognitive Epidemiology, University of Edinburgh, UK

ARTICLE INFO

Article history:
Received 8 July 2014
Received in revised form 30 October 2014
Accepted 2 November 2014
Available online 20 November 2014

Keywords:
Estimating IQ
Intellectual disability
Child and Adolescent Intellectual Disability Screening Questionnaire (CAIDS-Q)

ABSTRACT

In situations where completing a full intellectual assessment is not possible or desirable the clinician or researcher may require an alternative means of accurately estimating intellectual functioning. There has been limited research in the use of proxy IQ measures in children with an intellectual disability or low IQ. The present study aimed to provide a means of converting total scores from a screening tool (the *Child and Adolescent Intellectual Disability Screening Questionnaire*: *CAIDS-Q*) to an estimated IQ. A series of linear regression analyses were conducted on data from 428 children and young people referred to clinical services, where FSIQ was predicted from *CAIDS-Q* total scores. Analyses were conducted for three age groups between ages 6 and 18 years. The study presents a conversion table for converting *CAIDS-Q* total scores to estimates of FSIQ, with corresponding 95% prediction intervals to allow the clinician or researcher to estimate FSIQ scores from *CAIDS-Q* total scores. It is emphasised that, while this conversion may offer a quick means of estimating intellectual functioning in children with a below average IQ, it should be used with caution, especially in children aged between 6 and 8 years old.

1. Introduction

Children with an intellectual disability have significant limitations in their cognitive and adaptive functioning, which means that they are likely to require additional support (British Psychological Society [BPS], 2001). In order to diagnose an intellectual disability, formal assessment of intellectual and adaptive functioning is required, and the former needs to be undertaken by an appropriately qualified applied psychologist (BPS, 2001). There are, however, a number of situations where undertaking formal intellectual assessment may not be feasible. These include difficulties using standardised assessments with very young children or those with associated disabilities that preclude the administration of an assessment in a standardised way (Kurita, Osada, Shimizu, & Tachimori, 2003). The child may be uncooperative, display behaviours that

Abbreviations: (FSIQ), full scale IQ; *(CAIDS-Q)*, *Child and Adolescent Intellectual Disability Screening Questionnaire*.

* Corresponding author at: Centre for Cognitive Ageing and Cognitive Epidemiology, Department of Psychology, University of Edinburgh, 7 George Square, Edinburgh EH8 9JZ, UK. Tel.: +44 0131 651 5002.
E-mail address: s0785823@staffmail.ed.ac.uk (A.L. Murray).

http://dx.doi.org/10.1016/j.ridd.2014.11.001
0891-4222/

challenge, or be experiencing physical or mental ill health that impacts significantly on performance (Moss & Hogg, 1997). There may also be practical difficulties such as limited or no access to an appropriately qualified psychologist to conduct the assessment, or long waiting times and heavy case-loads which prevent timely assessment (Crawford, Allan, & Jack, 1992).

At times, the professional may also feel that a reasonable estimate of IQ is all that is required. This may be on an individual basis, for example, where the individual is being followed up after undergoing previous comprehensive assessment or where a global estimate of IQ forms only one aspect of a full evaluation (Kaufman & Kaufman, 2001). There will also be occasions where estimates of IQ will be used for estimating and describing population characteristics (Moss & Hogg, 1997) or to identify those potentially at risk, such as screening children in educational settings (Sonnander, 2000). Clinical researchers may also utilise IQ estimates (Spinks et al., 2009) in order to stratify participants appropriately or match groups in terms of participants' intellectual functioning. Here, conducting full intellectual assessments on large populations is unlikely to be practicable because of the time and resources required. In all of the above situations, clinicians and researchers may need alternative or interim methods of estimating IQ (Kaufman & Kaufman, 2001).

There have been several suggestions for estimating IQ in situations where full intellectual assessment is not possible, desirable or practical. One is to use demographic information, e.g. age, gender, years of formal educational, and occupation, to form a prediction equation that converts this information into an estimate of IQ (Crawford, Millar, & Milne, 2001). This method is often used in the context of estimating pre-morbid functioning in clinical settings, however, is associated with large standard errors of prediction. This method is also not likely to be particularly useful in estimating IQ in children for whom many demographic characteristics are effectively those of their parents. Another suggestion is to use academic performance, for example, SAT scores to derive IQ prediction equations (Frey & Detterman, 2004). While academic performance is a strong predictor of IQ in general population samples, it is unlikely to be as discriminating in those with lower intellectual abilities where academic performance may exhibit a floor effect. Furthermore, few standardised measures of academic achievement may be available in younger age groups.

In terms of methods appropriate to the estimation of IQ in individuals with low IQ, two methods have been previously employed. These consist of using either adaptive functioning information, such as age appropriate verbal communication, cleaning and dressing self, and expressing needs to others (e.g. Bakare, Ubochi, Okoroikpa, Aguocha, & Ebigbo, 2009); or using short forms of intellectual assessments (e.g. Crawford, Anderson, Rankin, & MacDonald, 2010) or brief intellectual assessments (Saklofske, Caravan, & Schwartz, 2000), such as the *Wechsler Abbreviated Scale of Intelligence- Second Edition (WASI-II*: Wechsler, 2011). A number of authors have discussed the relative advantages and disadvantages of these methods in general (e.g. Kaufman & Kaufman, 2001; McKenzie, Murray, Murray, & Murray, 2013; McKenzie, Murray, & Murray, 2013; Spinks et al., 2009), but with relatively less attention on their utility when used with people with an intellectual disability. Research with adults suggests that such measures overestimate the IQ of those with an assessed FSIQ of below 85 (Spinks et al., 2009). There has, however, been very limited research examining the performance of such tools with children with an intellectual disability.

In this paper, therefore, we evaluate the possibility that a screening tool for intellectual disability could serve as an alternative predictor of IQ in a prediction equation for those with low intellectual functioning. A series of studies have begun to explore the use of screening tools as indicators of intellectual disability in children and young people referred to clinical services. Previous research has found the *Child and Adolescent Intellectual Disability Screening Questionnaire (CAIDS-Q)* to have favourable psychometric properties in relation to construct, convergent and discriminative validity, and inter-rater reliability (McKenzie, Paxton, Murray, Milanesi, & Murray, 2012). The *CAIDS-Q* was initially developed purely as a screen for intellectual disability, meaning that the intention was for the scale to be used to make dichotomous 'likely to have intellectual disability' versus 'not likely to have intellectual disability' discriminations. The use of the scale in this way has been supported by studies reporting sensitivity and specificity values at the cut-off point for intellectual disability of 82 to 97% and 83 and 85% respectively, depending on the age of the child (McKenzie et al., 2012; McKenzie, A.L. Murray, et al., 2013; McKenzie, G.C. Murray, et al., 2013).

Subsequent research has explored the use of the scale for other research and clinical applications beyond its initially intended purpose as a screening tool. Based on non-parametric item response theory analyses, Murray, McKenzie, Booth, and Murray (2013) found evidence that the *CAIDS-Q* scores can be used to order individuals according to level of functional ability. In terms of BPS intellectual disability severity classifications, Murray and McKenzie (2014) found that although the scale could provide a heuristic for estimating which category young people aged 12–18 would be placed in, it could not do so with a degree of accuracy required for higher stakes decisions such as final clinical diagnosis or resource provision.

McKenzie, A.L. Murray, et al. (2013) and McKenzie, G.C. Murray, et al. (2013) also compared the performance of the *CAIDS-Q* in a population of clinically referred children to a 7-subtest short form of the *Wechsler Intelligence Scales for Children – fourth edition (WISC-IV*: Wechsler, 2003) which was proposed by Crawford et al. (2010). It was found that both the *CAIDS-Q* and the *WISC-IV* short form performed well at correctly classifying the individuals as having an intellectual disability or not (as assessed according to the three diagnostic criteria), showing similar levels of accuracy of 88 and 91% correct classification respectively. The authors concluded that both methods can offer clinically useful indices of whether a young person had an intellectual disability or not. A perceived advantage of the *CAIDS-Q* was that, unlike the *WISC-IV* short form, the administrator was not required to have a particular qualification or level of training.

Collectively these studies would suggest that the CAIDS-Q could have utility in situations where a quick estimate of FSIQ is required, for example in clinical research, but where restricted or no access to an appropriately qualified psychologist precludes the use of short form intellectual assessments. Further impetus for exploring this question formally comes from