

BRIEF REPORT

Coins and Costs: A Simple and Rapid Assessment of Basic Financial Knowledge

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Introduction We describe a simple and rapid screening test for basic financial knowledge that is suitable for administration to people with mild intellectual disabilities.

Method The Coins and Costs test asks respondents to name coins, and to estimate prices of objects ranging between £1 (an ice cream) and £100K (a small house). The test was administered, alongside a battery of neuropsychological tests, to 40 people attending day services (mean Full-Scale IQ = 59.1).

Results Total scores were normally distributed, and correlated significantly with receptive language ability and performance on memory tests, but not with IQ or executive functioning.

Conclusion The test provides a rapid (<5 min) screening test that has good psychometric properties and appears very suitable for assessing basic financial knowledge of people with mild intellectual disabilities.

Keywords: executive functioning, financial knowledge, IQ, intellectual disability, receptive language ability

Introduction

There is a broad consensus in western societies that the appropriate way to assess capacity is by means of a functional test (Berghmans *et al.* 2004). For example, the Mental Capacity Act (2005), which applies in England and Wales, defines mental capacity as the ability to understand, retain and evaluate the relevant information, and communicate the decision. This definition rejects alternative approaches to capacity based on diagnosis (a person lacks capacity by virtue of membership of a particular diagnostic group) or outcome (a person lacks capacity because he or she makes an unwise decision) (Murphy & Clare 2003). One of the major areas in which assessments of mental capacity are undertaken concerns people's ability to manage their finances. Indeed, prior to the implementation of the Mental Capacity Act (2005), this was the only area in which a person at risk of losing capacity could donate a Power of Attorney in England and Wales; and all UK Social Services Departments provide a receivership service to manage the finances of people who are deemed incapable of doing this for themselves.

A comprehensive assessment of financial capacity, the Financial Capacity Instrument (FCI) has been developed and validated for older adults (Marson *et al.* 2000a; Marson 2001), and has been used quite extensively in this context (e.g. Griffith *et al.* 2003; Martin *et al.* 2008; Sherod *et al.* 2009), as well as with patients with traumatic brain injury (Marson *et al.* 2000b) and schizophrenia (Marson *et al.* 2006). The FCI involves a total of 21 assessments in 9 domains, of which 10 are classed as 'simple' and 11 as 'complex' abilities. Suto *et al.* (2005b, 2006, 2007) described a test of basic financial understanding, which includes a total of 14 subtests assessing five measures: familiarity with numbers and money, and the ability to order quantities, numbers and money. Between 47 and 90% of a sample of participants with mild intellectual disabilities (mean IQ = 62) achieved maximum scores on these five measures (Suto *et al.* 2006). They also developed a series of vignettes to assess the ability of people with intellectual disabilities to make financial decisions of increasing complexity (Suto *et al.* 2005a).

When assessing mental capacity it is helpful if there are standardized tests that can provide a rough initial

estimate of where the person stands in relation to the population as a whole. For example, it would be usual to include tests of IQ or receptive language ability, which do not provide direct information about capacity but are useful in providing a context to guide the assessment. The FCI, which has not been used with people with intellectual disabilities, serves a different, more detailed and much more comprehensive purpose, as does the set of assessment procedures developed for use with people with intellectual disabilities by Suto *et al.* (2005a,b, 2006, 2007).

Even more fundamental than understanding is knowledge, since information must be available before it can be understood. The Coins and Costs (C&C) test represents an alternative very simple and very rapid screening instrument focussed specifically on financial knowledge, rather than understanding or functional ability. Our aim in developing this test was to be able to ensure that participants in a larger study of financial decision-making by people with intellectual disabilities had a sufficient degree of very basic financial knowledge for the task to be meaningful. The test assesses the two most fundamental aspects of financial capacity: the ability to recognize coins, and knowledge of prices: and because people with intellectual disabilities need to make decisions not only about inexpensive everyday objects, but also potentially, about much more expensive objects (for example, buying a car or bequeathing a house), prices are sampled across a wide range. The coins element of the test is very similar to the money familiarity subtest in the Suto *et al.* (2005b, 2006, 2007) battery; the costs element is novel.

We describe here the psychometric properties of the C&C test, and its relationship to performance on a range of neuropsychological tests. Because the C&C test assesses knowledge, rather than reasoning or planning, it was predicted that performance on the test would correlate with receptive language ability and performance on memory tests, but perhaps not with tests of IQ or executive functioning.

Method

Participants

The participants were 40 people [52.5% male, with a mean (SD) age of 40.1 (10.8)], who attended day services for people with mild to moderate learning disabilities. All participants provided informed consent and the study was approved by the Local NHS Research Ethics Committee.

Cognitive ability

Participants were assessed for intellectual ability using the Wechsler Abbreviated Scale of Intelligence (WASI), and for receptive language ability using the British Picture Vocabulary Scale (2nd edition) (BPVS). Participants' mean (SD) scores were: Full-Scale IQ, 59.1 (5.1); BPVS raw score, 80.4 (27.3): age equivalent of mean raw score, 7:10.

Executive functioning (EF) was evaluated using the Cambridge Executive Functioning Assessment for people with Intellectual Disability (CEFA-ID: Ball *et al.* 2008), which includes six EF tests (CEFA-EF) and six memory tests (CEFA-M). Full details may be found in Ball *et al.* (2008); for a brief description of each task and an account of minor modifications to the presentation, see Willner *et al.* (2010).

Coins and costs (C&C)

The test is in two parts. In Part A (Coins), two of each of the eight coins of the realm (1p, 2p, 5p, 10p, 20p, 50p, £1, £2) were spread randomly on a table and the participant was asked to 'Please point to a 1p coin', followed by each of the other values in ascending order. In Part B (Costs) the participant was shown six clipart pictures, printed in colour on a single sheet of A4 paper, that were identified verbally as 'a small house', 'a CD' (compact disc); 'a nice holiday for two people'; 'an ice cream', 'a new car' and 'a small television'. The participant was then asked 'Now please show me which of these things would cost ... £1, £10, £100, £1000, £10 000, £100 000'; the costs were written across the centre of the stimulus sheet, and the experimenter pointed at each value when asking about it. Half a point was awarded for coins correctly identified and one point was awarded for costs correctly identified, making a maximum score of 10.

Procedure

After first obtaining informed consent, which was witnessed by a member of the day-service staff, tests were conducted over five sessions. The WASI, BPVS and C&C tests were administered in session 1, and the CEFA-ID in session 5. In sessions 2–4 other tests were administered which are reported elsewhere.

Statistical analysis

Descriptive statistics and tests for normality were calculated for Coins, Costs and the C&C total score.

Correlations between C&C scores and other measures were examined using Pearson product-moment correlations for Costs and Total scores, and Spearman rank-order correlations for Coins, because this score departed significantly from normality. As all correlations were expected to be positive, one-tailed tests were used. Significance was set initially at $P < 0.05$.

Results

Descriptive statistics for Coins, Costs and C&C Total scores are shown in Table 1. Coins scores were heavily skewed, with over 75% of participants achieving a maximum score, leading to significant departures from normality on all measures. Costs and Total scores were normally distributed. For the Total score: the mean was almost identical to the median; skew and kurtosis were close to zero; and in both directions, a single score (2.5% of the sample) was located more than two standard deviations away from the mean. Costs were correctly identified, in ascending order of item value, by 31, 24, 13, 11, 9 and 20 participants.

Correlations between C&C scores and cognitive measures are shown in Table 2. Total scores showed modest positive correlations with all measures, which were significant for receptive language (BPVS), and for CEFA total and memory scores, but not for IQ scores. Correlations of Costs scores with other measures were all lower than for total scores, and none of these associations was significant. Coins scores, which were assessed non-parametrically because they were not normally distributed, correlated significantly with CEFA total, executive functioning and memory scores, but not with receptive language or IQ. Coins and Costs scores were not significantly correlated ($\rho = 0.14$, NS).

Table 1 Descriptive statistics

	Coins	Costs	Total
Maximum score	4	6	10
Range of scores	1–4	0–6	3–10
No. at minimum	0	2	0
No. at maximum	31	2	1
Mean (SD)	3.74 (0.65)	2.73 (1.24)	6.46 (1.46)
Median	4	3	6.5
Skew	-3.00 **	-0.04	-0.22
Kurtosis	9.30 **	0.35	0.05
Kolmogorov-Smirnoff Z	2.73 **	1.08	0.91
Shapiro-Wilks W	0.47 **	0.92	0.95

** $P < 0.01$ for departure from normality.

Table 2 Correlations between C&C scores and cognitive measures

	Coins	Costs	Total
BPVS	0.17	0.22	0.29 *
Full-Scale IQ	0.18	0.10	0.24
Verbal IQ	0.13	0.14	0.21
Performance IQ	0.19	0.01	0.18
CEFA-ID	0.37 **	0.17	0.32 *
CEFA-EF	0.46 **	0.07	0.23
CEFA-M	0.28 *	0.21	0.33 *

Values shown are Pearson product-moment correlations for Costs and Total scores, and Spearman rank-order correlations for Coins. BPVS, British Picture Vocabulary Scale; CEFA-ID, Cambridge Executive Functioning Assessment for people with Intellectual Disability; CEFA-EF, CEFA executive functioning subtests; CEFA-M, CEFA memory subtests. * $P < 0.05$, ** $P < 0.01$.

Table 3 shows the correlations between C&C Total scores and the individual subtests of the CEFA-ID. In view of the possibility of type 1 errors with so many comparisons, a more stringent criterion of $P < 0.01$ was set for evaluating these data. C&C scores correlated strongly ($P < 0.01$) with scores on three subtests, Verbal Fluency, Immediate Memory and Prospective Memory, which were all significantly correlated with one another ($r \geq 0.48$, $P < 0.001$). There was also a strong correlation between the Coins score and a single executive functioning subtest, Cats and Dogs ($\rho = 0.46$, $P < 0.001$), which is a test of behavioural inhibition. No other relationships were significant at $P < 0.01$.

Discussion

Most participants could name all eight coins, though a significant minority could not, and most (a largely non-overlapping group) knew the approximate price of

Table 3 Correlations between C&C total scores and individual CEFA-ID subtests

	Executive functioning tests	Memory tests	
Cats and Dogs	0.19	Object Memory	0.27 *
Spatial Reversal	0.01	Prospective Memory	0.39 **
Weigl Sorting	0.21	Immediate Memory	0.44 **
Tower of London	0.02	Memory for Sentences	0.28 *
Scrambled Boxes	0.20	Delayed Recognition	0.17
Verbal Fluency	0.38 **	Delayed Recall	0.12

* $P < 0.05$, ** $P < 0.01$.

an ice cream, but other costs were rather poorly identified, notably the cost of a television and a holiday, both of which participants would typically purchase. Familiarity with coins (and perhaps, the price of an ice cream) would typically be shown by 6-year-old children (Berti & Bombi 1988), but the price of more expensive items would typically not be known until much older. The two components of the test were uncorrelated, meaning that they made independent contributions to the total score; the correlation between Coins scores and performance on a test of behavioural inhibition suggests that a poor performance in this part of the test may involve an element of impulsivity.

The normal distribution of C&C Total scores indicates that the test is very well suited to the target population, people with a diagnosis of 'mild learning disability', since it can detect individuals whose knowledge lies outside the normal range in either direction: a score of 9.5 or 10 would be significantly (>2 SD) above the mean, and a score of 3.5 or below would be significantly (>2 SD) below the mean. The present sample of 40 participants included one individual in each of these categories. As predicted, C&C Total scores were significantly related to receptive language ability and to performance on the CEFA memory battery, but not to IQ or executive functioning (Note that, unlike the other five CEFA-EF subtests, Verbal Fluency – 'Name as many animals as you can within one minute' – could equally well be considered a memory test).

The participants in this study were demographically comparable to those tested by Suto *et al.* (2005a, 2006) using their 'basic financial understanding' test battery. However, 75% of our participants achieved a maximum score on the Coins element of the test, compared with only 53% of participants who achieved maximum scores on the 'money familiarity' element of the 'basic financial understanding' battery (Suto *et al.* 2005b). The difference probably arises because the latter is a composite score that includes a more difficult element, recognition of money combinations, in addition to identification of single coins. Suto *et al.* (2005b) also reported a relatively high correlation ($r = 0.6$) between IQ and their composite 'basic financial understanding' score, which remained high when either decision-making opportunities or financial decision-making abilities were taken into account. This, alongside other data reported, supported a model in which intellectual ability determines understanding of basic financial concepts, which stands in a reciprocal relationship to decision-making opportunities and financial decision-making abilities (Suto *et al.* 2005b). However, in the present study, C&C

scores were unrelated to IQ. This suggests that the correlation with IQ reported by Suto *et al.* (2005b) arises from other, more functional, elements of the 'basic financial understanding' battery, such as the ability to make judgements about order, rather than the 'money familiarity' element.

In conclusion, Coins and Costs provides a rapid (<5 min) screening test that has good psychometric properties and appears very suitable for assessing basic financial knowledge of people with mild intellectual disabilities. An electronic copy of test, including the artwork, is available from the authors on request.

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