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# THE EVALUATION OF THE RELIABILITY OF THE ACTIVITY CARD SORT – UNITED KINGDOM VERSION (ACS-UK)

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## Background: What is the Activity Card Sort?

The Activity Card Sort (Baum and Edwards, 2008) is a self-report outcome measure that provides insight into people's occupational history and participation recognized internationally as a useful tool in both clinical practice and research (e.g. Eriksson, et al, 2011). The Activity Card Sort - United Kingdom (ACS-UK; Laver-Fawcett and Mallinson, 2013; ) comprises 93 photograph activity cards and has three different versions for use in various settings: Recovery (Form A); Institutional (Form B); and Community Living (Form C). The ACS-UK is designed to measure changes in participation of older adults in four activity domains: instrumental (IADL); low demand leisure; high demand leisure; and social / cultural activities. This study aimed to evaluate the reliability of the ACS-UK community living version (Form C). The study was undertaken by three groups of occupational therapy students (n=13) for a third year research project.

**Aim:** to establish the inter-rater reliability and test-retest reliability of the ACS-UK (Form C). Inter-rater reliability determines how similar the data collected by different raters are (Gwet, 2014) and test-retest reliability measures the stability of an instrument in measuring the same construct overtime within a specific time interval (Portney and Watkins, 2009). **Method:** Two convenience samples of older people were recruited through local charity social groups. Participants completed the ACS-UK three times. To establish inter-rater reliability (IRR) ACS-UK was administered twice on the first day, with a break in between, by two different student researchers. To establish test-retest reliability (TRR), it was administered the third time, approximately two weeks later. Written consent was obtained prior to the initial data collection with verbal consent gained before each subsequent administration. Data for sample one was collected June 2014 - January 2015 and for sample two between November 2015 – January 2016. Changes were made to the administration and scoring instructions and, in response to the face validity study findings (Laver-Fawcett et al, 2016) written examples added to some ACS-UK cards between the data collection for the two samples.

## How is the ACS-UK (Form C) scored?

| Never Done | Not done in the past year (optional) | Do More (1) score as do now | Do Now (1) | Do Less (0.5) | Given Up (0) |
|---|---|---|---|---|---|

Scores are calculated for current activity, previous activity and activities retained. For form C current activity is the sum of all activities that are done less or are still continued / done now. 'Done previously' is calculated from activities categorised as continued/ done now or done less and is scored 1 per activity, if either category has been selected, and then summed. Retained activity is calculated by dividing the current activity total by the done previously total and it is expressed as a percentage. At the end of the assessment, the person is asked to identify the five activities they consider most important as a guide for intervention, these can be activities that are no longer done.

## Results

### Analysis

Intraclass correlation coefficients (ICC) from a one-way ANOVA random effects model between Test 1 and Test 2 (two different raters or same rater at two different times). ICC <.75 = poor to moderate and r ≥ .75 = good to excellent reliability (Bowers, 2014; Portney and Watkins, 2009).

### Inter-rater reliability

**Sample 1:** n= 8/17 completed the inter-rater reliability assessments. ICC for the Global Retained Activity Score (GRAS) of Sample 1 = moderate reliability (r=0.641), with a 95% confidence interval of 0.004 to 0.914, and a p-value of p=0.024.

**Sample 2:** n= 11/17 completed the inter-rater reliability assessments. ICC for the GRAS of Sample 2 = Excellent reliability (r=0.86) with a 95% confidence interval of 0.579 to 0.960 and with a p-value of p<0.000. p-values P<0.050 are statistically significant (Bowers, 2014).

### Test-retest reliability

**Sample 1:** n= 15/17 completed the test-retest assessments. ICC for the Global Retained Activity Score (GRAS) of Sample 1 = moderate test-retest reliability (r=0.75), (Portney and Watkins, 2009) with a 95% confidence interval of 0.422 to 0.909 with a p-value of p<0.000.

**Sample 2:** n= 13/17 completed the test-retest assessments. The ICC for the GRAS of sample 2 indicated excellent test-retest reliability (ICC=0.93) with a 95% confidence interval from 0.507 to 0.951 and p<0.000.

### Table 1: Demographic data

Participants were recruited from the North of England

| Variable | Sample One (n = 17) | Sample Two (n = 17) |
|---|---|---|
| **Gender:** | | |
| Male | 2 | 2 |
| Female | 15 | 15 |
| **Age: Mean (SD)** | | |
| | 85.2 (7.6) | 81.5 (10.2) |
| **Marital Status:** | | |
| Single | 3 | 3 |
| Married | 3 | 2 |
| Divorced | 0 | 1 |
| Separated | 0 | 0 |
| Widowed | 11 | 11 |
| Cohabiting | 0 | 0 |
| Other | 0 | 0 |
| **Highest Qualification Level:** | | |
| No Qualifications | 13 | 12 |
| GCSE or equivalent | 1 | 3 |
| A-Level or equivalent | 1 | 0 |
| Apprenticeship | 1 | 0 |
| Vocational Education/Training | 0 | 2 |
| Undergraduate Degree or Graduate Education | 1 | 0 |
| Post-Graduate Education | 0 | 0 |
| **Ethnic Origin:** | | |
| White or White British | 17 | 17 |

SD = Standard Deviation
GCSE = General Certificate of Secondary Education
A-Level = Advanced Level

### Table 2: Inter-rater and Test-retest Reliability for Samples One and Two

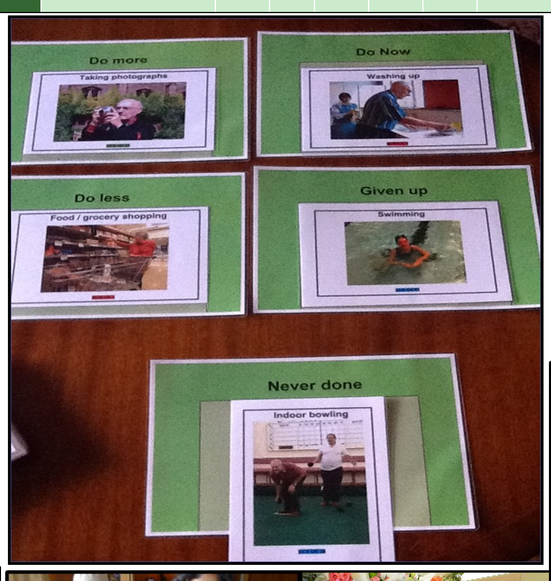
| | Inter-rater | | | |
|---|---|---|---|---|
| | Single Measure ICC | 95% CI Lower Bound | 95% CI Upper Bound | p value |
| **Sample 1** | | | | |
| Global | 0.641 | 0.004 | 0.914 | 0.024 |
| Instrumental | 0.705 | 0.121 | 0.932 | 0.012 |
| LDL | 0.564 | -0.116 | 0.892 | 0.047 |
| HDL | 0.625 | -0.022 | 0.910 | 0.028 |
| Social/cultural | 0.329 | -0.391 | 0.813 | 0.179 |
| **Sample 2** | | | | |
| Global | 0.859 | 0.579 | 0.960 | 0.000 |
| Instrumental | 0.915 | 0.730 | 0.976 | 0.000 |
| LDL | 0.554 | -0.006 | 0.855 | 0.026 |
| HDL | 0.554 | -0.006 | 0.855 | 0.026 |
| Social/cultural | 0.830 | 0.507 | 0.951 | 0.000 |

| | Test-retest | | | |
|---|---|---|---|---|
| | Single Measure ICC | 95% CI Lower Bound | 95% CI Upper Bound | p value |
| **Sample 1** | | | | |
| Global | 0.754 | 0.422 | 0.909 | 0.000 |
| Instrumental | 0.890 | 0.712 | 0.961 | 0.000 |
| LDL | 0.395 | -0.113 | 0.743 | 0.060 |
| HDL | 0.450 | -0.046 | 0.772 | 0.036 |
| Social/cultural | 0.866 | 0.655 | 0.952 | 0.000 |
| **Sample 2** | | | | |
| Global | 0.830 | 0.507 | 0.951 | 0.000 |
| Instrumental | 0.840 | 0.570 | 0.948 | 0.000 |
| LDL | 0.840 | 0.570 | 0.948 | 0.000 |
| HDL | 0.853 | 0.600 | 0.952 | 0.000 |
| Social/cultural | 0.667 | 0.228 | 0.884 | 0.004 |

95% CI = 95% Confidence Intervals
ICC = Intraclass Correlation Coefficient
LDL = Low Demand Leisure
HDL = High Demand Leisure

### Example of part of the ACS-UK scoring form

| ACS-UK card | ACS-UK Activity | Never Done | Do More | Do Now | Do Less | Given Up | Done Previously | Scores | Comments |
|---|---|---|---|---|---|---|---|---|---|
| | **High Demand Leisure** | | | | | | | | |
| 53 | Going to the Beach | | | | 0.5 | | 1 | | |
| 54 | Recreational Shopping | | | | 0.5 | | 1 | | |
| 55 | Dancing | | | | | 0 | 1 | | |
| 56 | Swimming | | | | | 0 | 1 | | |
| 57 | Indoor Bowling | X | | | | | | | |
| 58 | Outdoor Bowling | X | | | | | | | |
| 59 | Playing Golf | X | | | | | | | |
| 60 | Walking | | | | 0.5 | | 1 | | |
| 61 | Hiking / Rambling | X | | | | | | | |
| 62 | Exercising | | | | 0.5 | | 1 | | |
| 63 | Riding a Bicycle | | | | | 0 | 1 | | |
| 64 | Going on Holiday / Travelling | | | | 0.5 | | 1 | | |
| 65 | Attending a Hobby / Leisure Group | | X | 1 | | | 1 | | Joined a tai chi club |
| 66 | Going to Gardens / Parks | | | | 0.5 | | 1 | | Would like to go more |
| 67 | Fishing | X | | | | | | | Used to go with father as a child |
| | Total High Demand Leisure Activities | 5 | 1 | 1 | 3 | 0 | 10 | Current | 1 + 3 = 4 (CA) |
| | | | | | | | | Previous | 10 (PA) |
| | | | | | | | | % Retained | 4/10 = 0.4 x100 = 40% (RAS) |



## Discussion

The inter-rater and test-retest reliability findings suggested that the ACS-UK has moderate to excellent reliability (Portney and Watkins, 2009) with single measure ICC figures ranging from 0.64 to 0.86 for the GRAS of inter-rater reliability and 0.754 to 0.830 of test-retest reliability for Samples 1 and 2 respectively. It is hypothesised that the inter-rater and test-retest reliability ICC's for sample 2 were higher than those for Sample 1 owing to improvements being made to the administration and scoring instructions and to some of the ACS-UK photograph cards. For example, changes to cards included adding verbal explanations to some of the activity cards in order to clarify the activity and changing the images of some activities in order to depict the activity better (see the example 'Taking care of pets' card). ACS-UK's test-retest reliability for Sample 2 (ICC 0.86) was slightly lower than that of the ACS over a 1 week interval (ICC 0.89) but higher than the ACS test-retest reliability over a 2 week interval (0.79) (Baum and Edwards, 2008) and lower than ACS-NL (0.89) (Jong, van Nes and Lindeboom, 2012). The consistency of the five most important activities selected by the client at the end of the ACS-UK was also examined over-time and across raters, but was not found to have adequate levels of reliability. In a study examining the reliability of the Netherlands version of the ACS, the ACS-NL, Jong, van Nes and Lindeboom,(2012) also highlighted differences between the top five activities chosen for participants. Therefore, the selection of the top five activities should only be used as a guide for selecting meaningful activities when setting goals and not as part of the re-test for evaluation.

## Limitations:

The convenience sample was homogenous in terms of participants' ethnicity. There were few older adults around the age of 65. There were significantly more women than men included within the sample. The sampling strategy, recruiting participants through social clubs, may have produced a biased sample.

## Future research:

Only the community living version (Form C) of the ACS-UK was investigated. Future ACS-UK studies need to recruit from the wider community. Evaluation of the reliability of the ACS-UK Institutional version (Form A) and Recovery version (Form B) is required.

## Conclusion:

The ACS-UK has good inter-rater and test-retest reliability.

## Application to Practice:

ACS-UK enables occupational therapists to assess participation and plan interventions to support older people's activity engagement. It can be used to evaluate participation outcomes related to IADL, leisure and social / cultural activities in clinical practice and research.




**Ethical approval statement:** The York St John University Health and Life Sciences Ethics Committee approved both sets of data collection for this study 'The evaluation of the reliability of the Activity Card Sort – United Kingdom Version [ACS-UK].' The reference number for Sample 1: UG17 4 July 2014 ALF approved on 04.07.2014; for sample 2: 10910_Laver Fawcett_ACS-UKSCoRe_16Oct2015 approved on 16.10.2015.

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