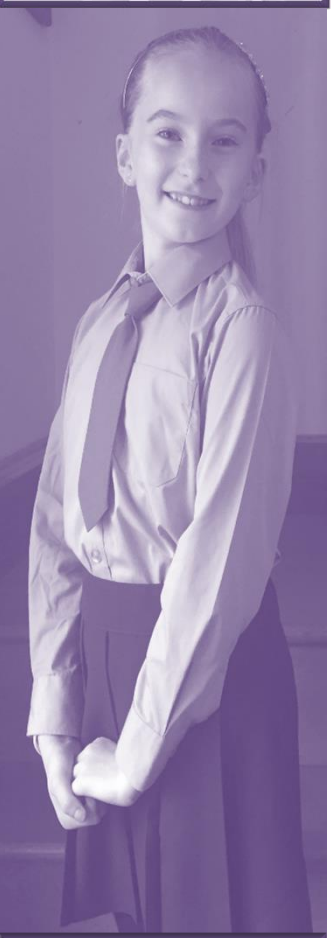
Growing Up in Ireland
National Longitudinal Study of Children



10th Annual Research Conference 2018

Semantic fluency vs traditional vocabulary

Aisling Murray
ESRI

ESRI ECONOMIC & SOCIAL RESEARCH INSTITUTE

Trinity College Dublin
The University of Dublin

An Roinn Leanaí agus Gnóthaí Óige
Department of Children and Youth Affairs

Key measures used

- Wave 1,2 and 3 from the Child Cohort of GUI was used in this study.
- There was 6,216 17/18-year-olds at wave 3 of the study.

- *Cognitive Tests*
- Semantic fluency: Young Person was asked to name as many animals as they could think of in one minute
  - Responses were called out by the participant and recorded by the interviewer.
  - Previously used by the Irish Longitudinal Study of Aging (TILDA)
- Vocabulary:
  - The task included 20 words that increase in difficulty
  - Choose word closest in meaning to the target word (multiple choice)
    - E.g Target: 'Run' – Choose from 'talk'/'sprint'/'rip'/'tidy'/'cheer'
  - Respondents completed the test on paper with a time limit of four minutes
  - The test was previously used in the Millennium Cohort Study and the BCS70

About vocabulary measures

- Vocabulary is a commonly used measure for cognitive ability
- Commonly one of the sub-tests in IQ batteries
  - Often with one of the highest correlations with measures of overall ability
- Why might vocabulary be a good proxy for general intelligence?
  - A wider vocabulary reflects wider knowledge and/or reading on other subjects
  - Starting with good language skills may help the individual to learn (e.g. read and understand text books) and to verbally encode/store new knowledge
- BUT
  - Vocabulary tends to be associated with socio-economic advantage from an early age
  - Traditional written tests may pose a disadvantage for individuals with specific learning disabilities (e.g. dyslexia)
  - Some students may be more practised at written/multiple-choice tests
  - Nerves about a formal test may put some people off

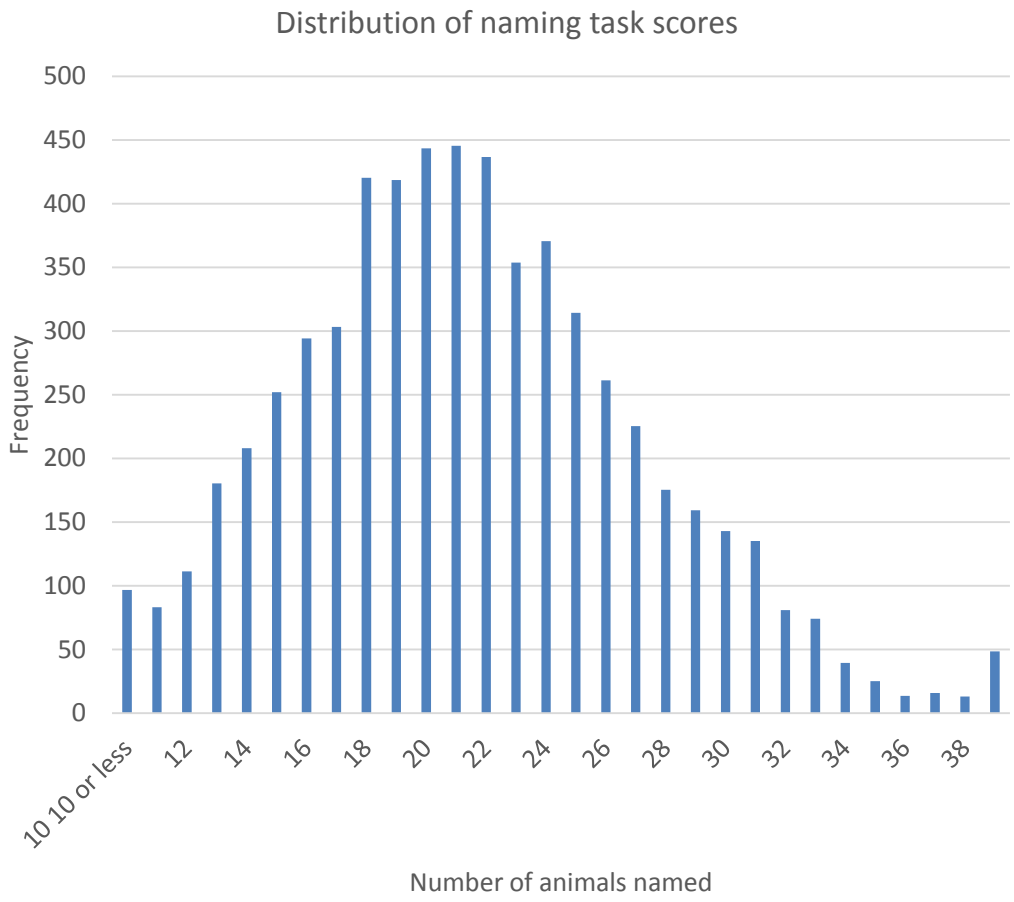
About semantic fluency measures

- Typically participants are asked to name as many ‘things’ in a particular category within a time limit
- Commonly ‘animals’ but could also be ‘fruit’, ‘colours’ or ‘words beginning with S’
- Obviously a high verbal component, but also:
  - Attention (keeping track of previous responses to avoid repetition)
  - Crystallised knowledge (how many animals do you know)
  - Processing (accessing knowledge under time pressure)

- Maybe more ‘fun’ and less test-anxiety than a written test
- Almost everyone should be able to name at least some animals – so unlikely to get a score of 0
- Don’t know what the expected score is
- Not reliant on written presentation
- BUT
  - Actual skills measured are less defined than with traditional vocabulary measures
  - Less widely used as a standard measure; fewer comparators available

DESCRIPTIVES

Naming task descriptives



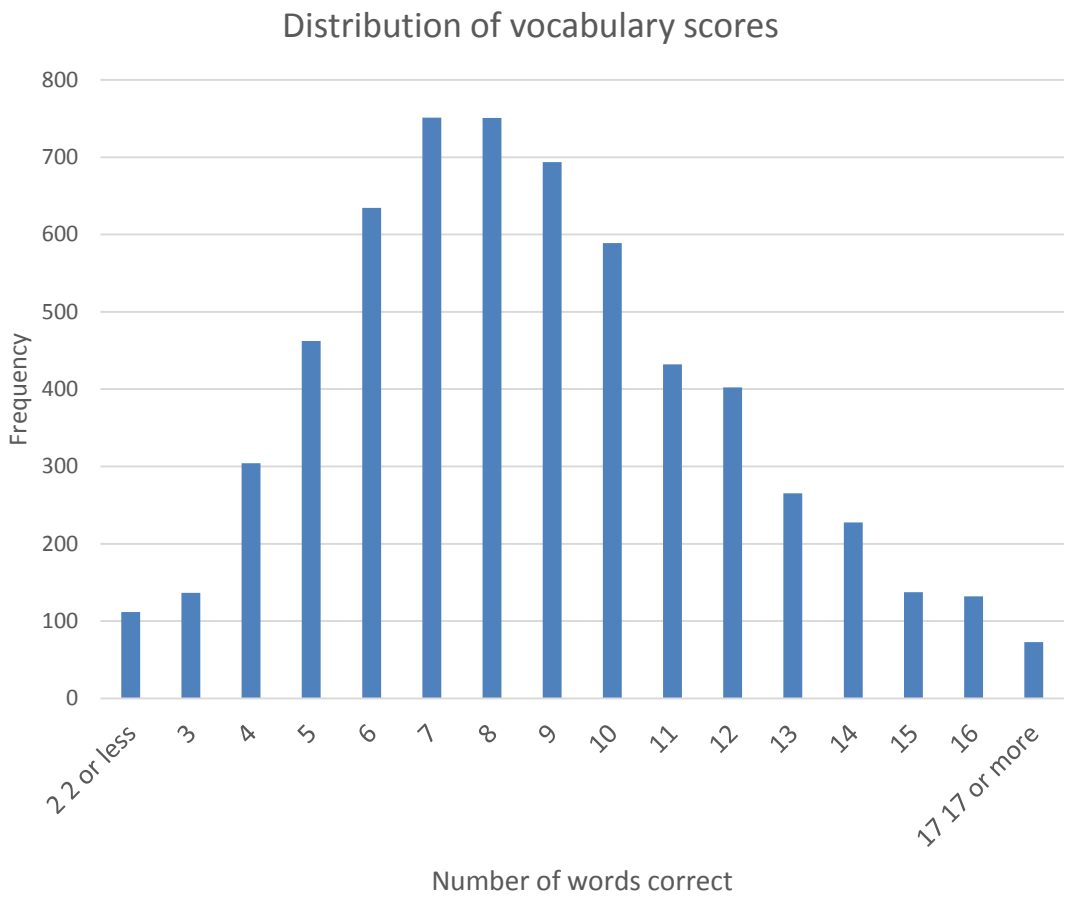
Normal dist.

- Mean = 21.5
- SD = 5.7
- Skewness = 0.37

Some socio-dem differences

- Boys higher than girls (21.8 v 21.3)
- Highest income group better than those in the lowest (22.6 v 20.0)

Vocabulary descriptives



Normal dist.

- Mean = 8.7
- SD = 3.3
- Skewness = 0.36

Some socio-dem differences

- Boys higher than girls (8.9 v 8.5)
- Highest income group better than those in the lowest (9.7 v 7.6)

Growing Up in Ireland
National Longitudinal Study of Children

RELATIONSHIP TO JUNIOR CERT RESULTS

Summarising Junior Cert scores

- Participants self-reported their Junior Cert subjects and grades in the 17/18 year interview
  - Summarised to give a Junior Cert score of 1-7

Grade – Higher Level	Score	Grade – Lower Level	Score
A	7	A	4
B	6	B	3
C	5	C	2
D	4	D	1
E	3	E	1

- Means: JC English = 4.8; Maths = 4.2; Science 5.0

Correlations with Junior Cert

	Vocabulary	JC English	JC Maths	JC Science
Naming Task	.32*** (n=6102)	.27*** (n=5982)	.31*** (n=6017)	.30*** (n=5429)
Vocabulary Multiple-Choice	-	.42*** (n=5956)	.46*** (n=5991)	.43*** (n=5414)
Z-score for differences between correlations		-11.26***	-11.40***	-8.93***

- Both tasks were significantly and positively correlated with Junior Cert results in English, Maths and Science
- However, the correlations between Junior Cert results and the vocabulary test were significantly higher
  - Vocabulary a better measure of ability or more similar to exam style?
- Strength of correlations was similar across different subjects (i.e. not higher for English)
  - Both may be picking up general ability as opposed to language specifically

Naming task - model

		Std. Coeff. Gender and income	Std. Coeff. Add JC
Gender (ref: female)	Male	0.018	**0.040**
Income (ref: highest)	Lowest income	**-0.168**	**-0.053**
	2nd income	**-0.085**	0.003
	3rd income	**-0.073**	-0.021
	4th income	**-0.037**	0.001
JC results	JC English		**0.069**
	JC Maths		**0.118**
	JC Science		**0.165**
Adj. R-squared		**.02**	**.11**

Junior Cert results are a better predictor of naming task scores than gender or income

Vocabulary - model

		Std. Coeff. Gender and income	Std. Coeff. Add JC
Gender (ref: female)	Male	**0.044**	**0.085**
Income (ref: highest)	Lowest income	**-0.205**	-0.026
	2nd income	**-0.158**	-0.020
	3rd income	**-0.085**	-0.003
	4th income	**-0.080**	-0.022
JC results	JC English		**0.182**
	JC Maths		**0.190**
	JC Science		**0.180**
Adj. R-squared		.04	**.24**

Junior Cert results are a better predictor of vocabulary scores than gender or income

LONGITUDINAL CORRELATIONS WITH TESTS AT 9 AND 13 YEARS

Summary of earlier tests

- At 9 years
  - Tests completed in school
  - Adaptation of Drumcondra Reading and Maths tests
  - Linked to the curriculum for class year
- At 13 years
  - Tests completed in the home
  - Drumcondra verbal and numerical reasoning
    - Not so linked to curriculum
  - Matrices sub-test from the British Abilities Scales
    - Non-verbal
    - Spatial/visual task

Correlations with 9 year tests

	Drumcondra Reading	Drumcondra Maths
Naming Task	.30*** (n=6013)	.24*** (n=6064)
Vocabulary Multiple-Choice	.54*** (n=5977)	.37*** (n=6028)
Z-score for differences between correlations	-18.75***	-9.15***

- Both tasks were significantly and positively correlated with performance on the Drumcondra Reading and Maths tests measured at age 9 years (logit scores)
- Again, the correlations between Drumcondra tests and the vocabulary measure were significantly higher
  - Although less of a gap between vocabulary and naming task in terms of correlation with Maths scores
- Vocabulary correlation higher with reading than maths

Correlations with 13 year tests

	Drumcondra Verbal Reasoning	Drumcondra Numerical Reasoning	BAS Matrices
Naming Task	.34*** (n=5661)	.28*** (n=5619)	.22*** (n=5779)
Vocabulary Multiple-Choice	.64*** (n=5642)	.43*** (n=5600)	.31*** (n=5753)
Z-score for differences between correlations	-25.13***	-10.31***	-5.95***

- Both tasks were significantly and positively correlated with cognitive tests at 13: verbal, numerical and spatial (matrices) reasoning.
- The vocabulary test had higher correlations than the naming task across all tests
  - Most noticeable for verbal reasoning (.64)
- The matrices test was less highly correlated with both 17/18 year tests as might be expected.

DIFFERENT PATTERNS FOR YOUNG PEOPLE WITH A SPECIFIC LEARNING DISABILITY?

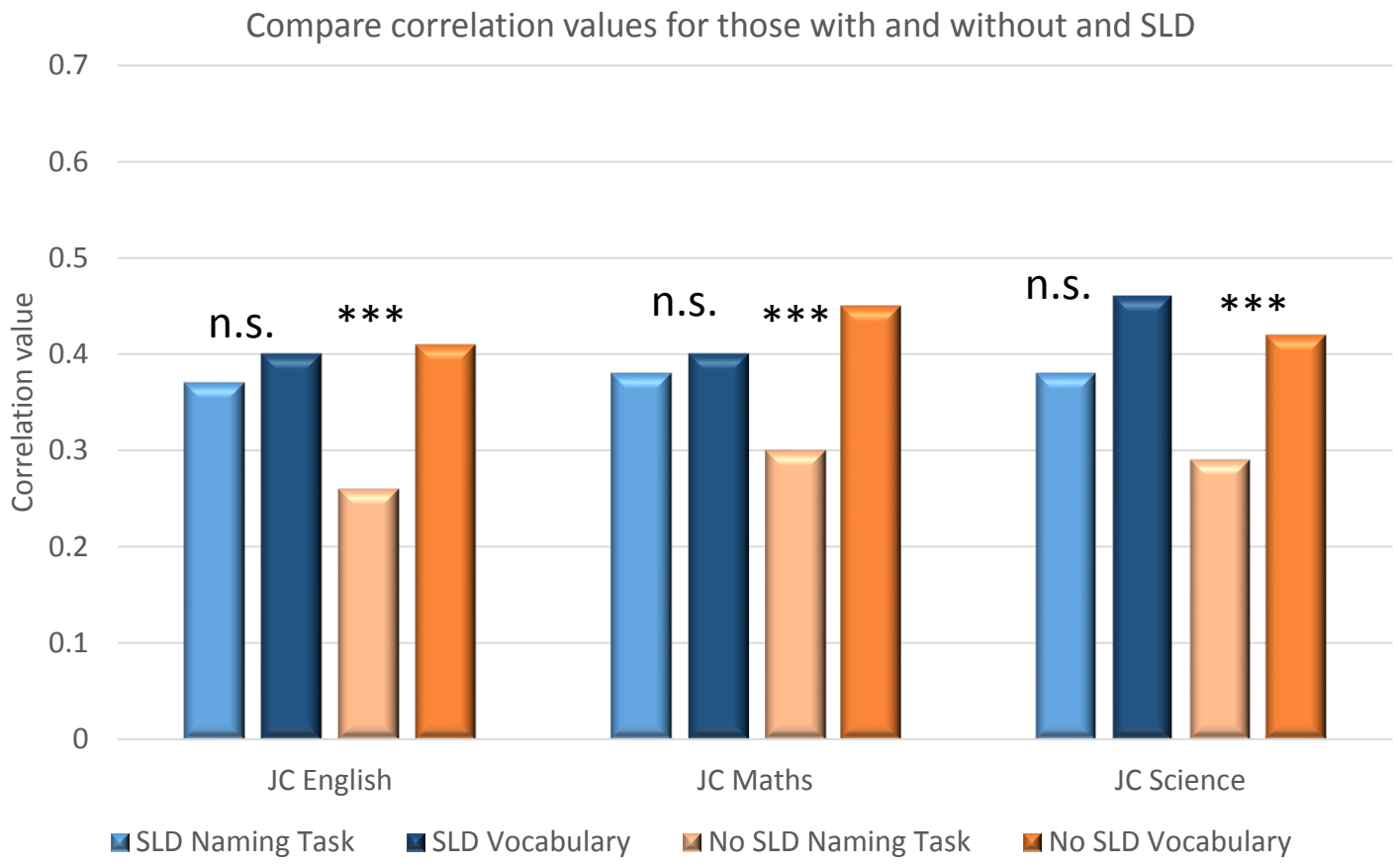
Comparing young people with and without an SLD

- Presence of a specific learning disability reported by primary caregiver at 17/18 years (n=621, 10%)
- Participants reported to have an SLD had lower mean scores on both the naming task and vocabulary measure

	With SLD	No SLD
Naming Task - Mean	20.2 (n=598)	21.6 (n=5457)
Vocabulary - Mean	7.1 (n=580)	8.9 (n=5435)

- Does the written format of the vocabulary test disadvantage young people with an SLD?
- For entire sample, the vocabulary measure was more strongly associated with Junior Cert results
- If the sample is split by parent-reported SLD, will the pattern of association be the same for both groups?

Different patterns for SLD



Conclusions

- Both naming task and vocabulary tests show a normal distribution
- Associations with other measures of cognitive ability are positive and significant, but stronger for the vocabulary task
- However, the 'advantage' for vocabulary is not as marked among young people reported to have an SLD
- Vocabulary probably a 'safer' bet in terms of association with other test performance, but:
  - Naming task also significantly correlated and may be more user-friendly for some groups
  - Potentially difficult to keep repeating same vocabulary test over time; easier to choose from an array of categories

Acknowledgments

- Thank you to all participants, their parents, Principals and teachers
- GUI colleagues and field interviewers
- Study is funded and overseen by the DCYA in association with the CSO
  - Steering committee, project team, REC, reviewers, Scientific Advisory group

- Correlation calculator:
  - Diedenhofen, B. & Musch, J. (2015). cocor: A Comprehensive Solution for the Statistical Comparison of Correlations. PLoS ONE, 10(4): e0121945. doi:10.1371/journal.pone.0121945