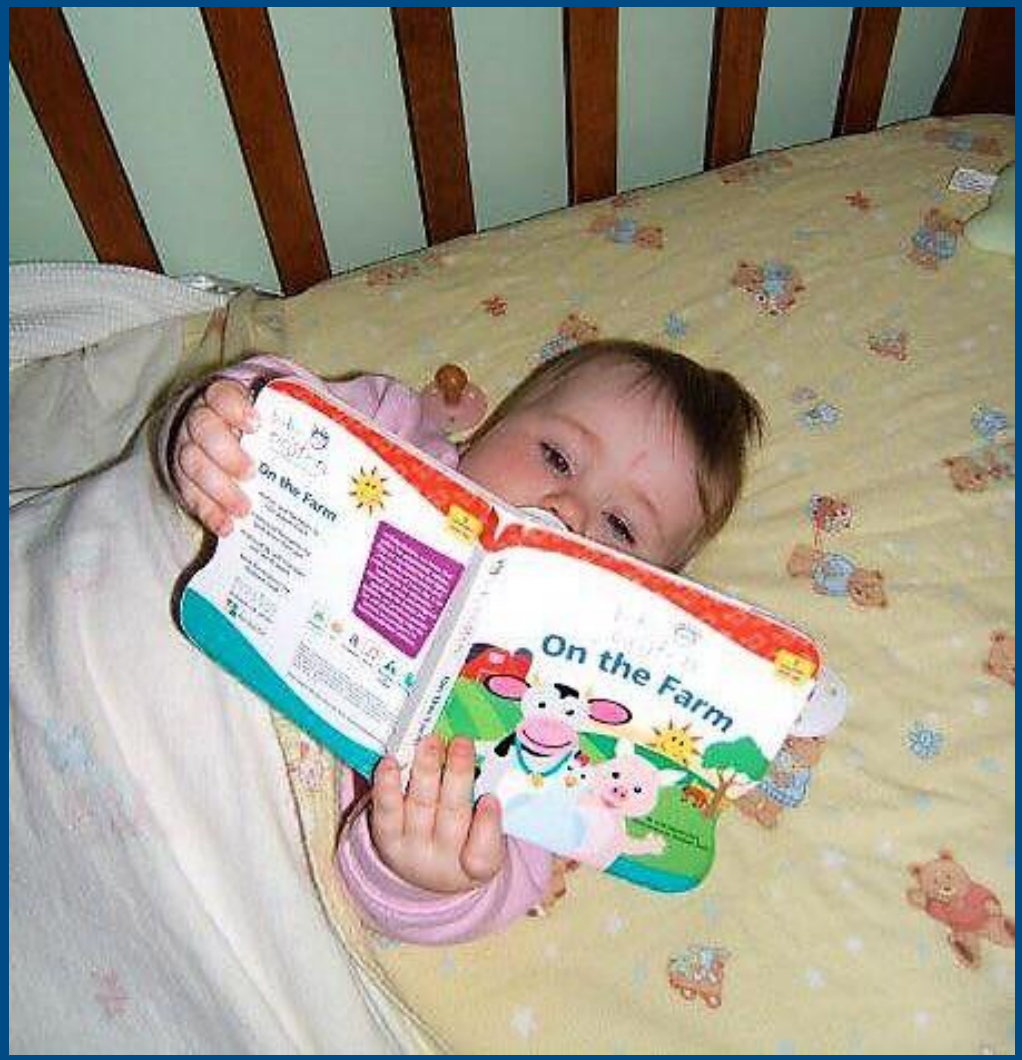


Identification: Maximum benefit with minimum resources

The identification of young gifted children in the classroom.

Axiology

Background

- Southwell PS, Hamilton SHS
- PEAC kid
- Science Teacher, HoLA
- Curriculum Manager, Deputy
- DCC Science
- GaTE Coordinator
- Mum (3)

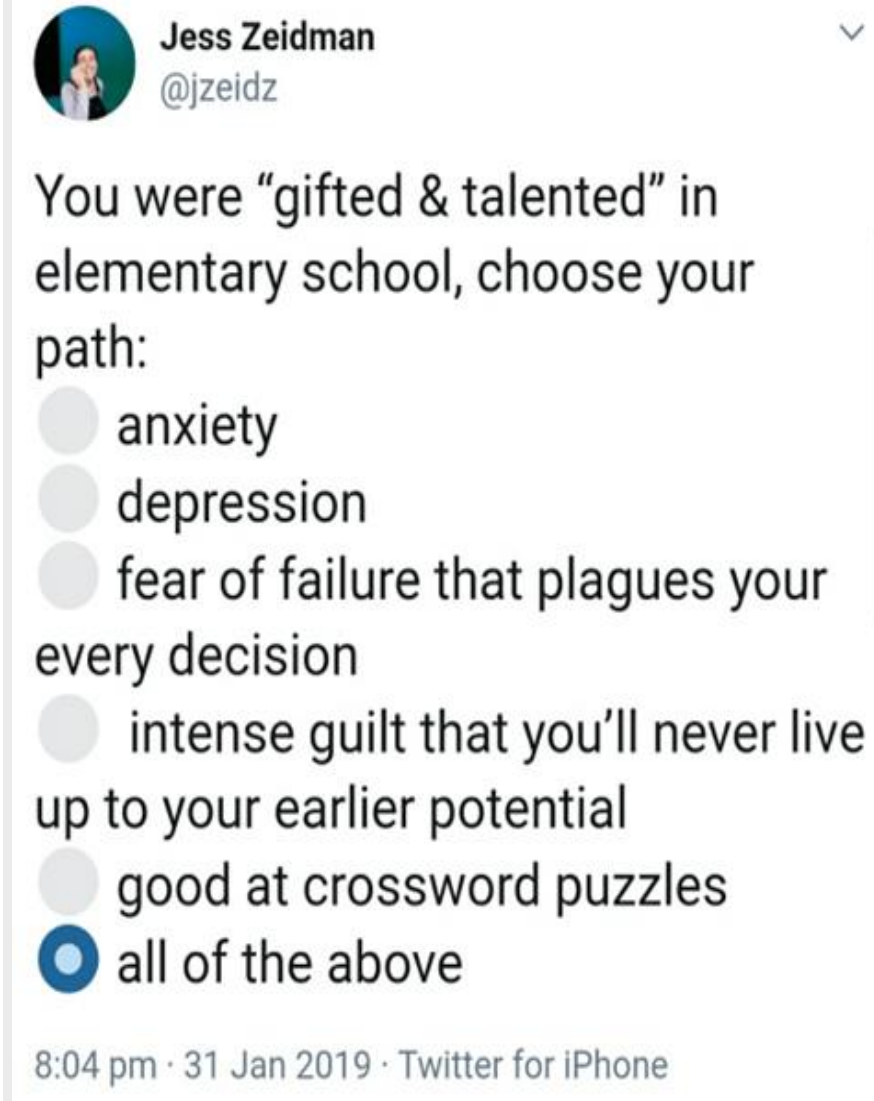
Current

- Research Fellow, Edith Cowan University, School of Education

Contacts

Mob: 0407914569
Mount Lawley: 17:227
e.slater@ecu.edu.au

Why Identify Gifted Children?



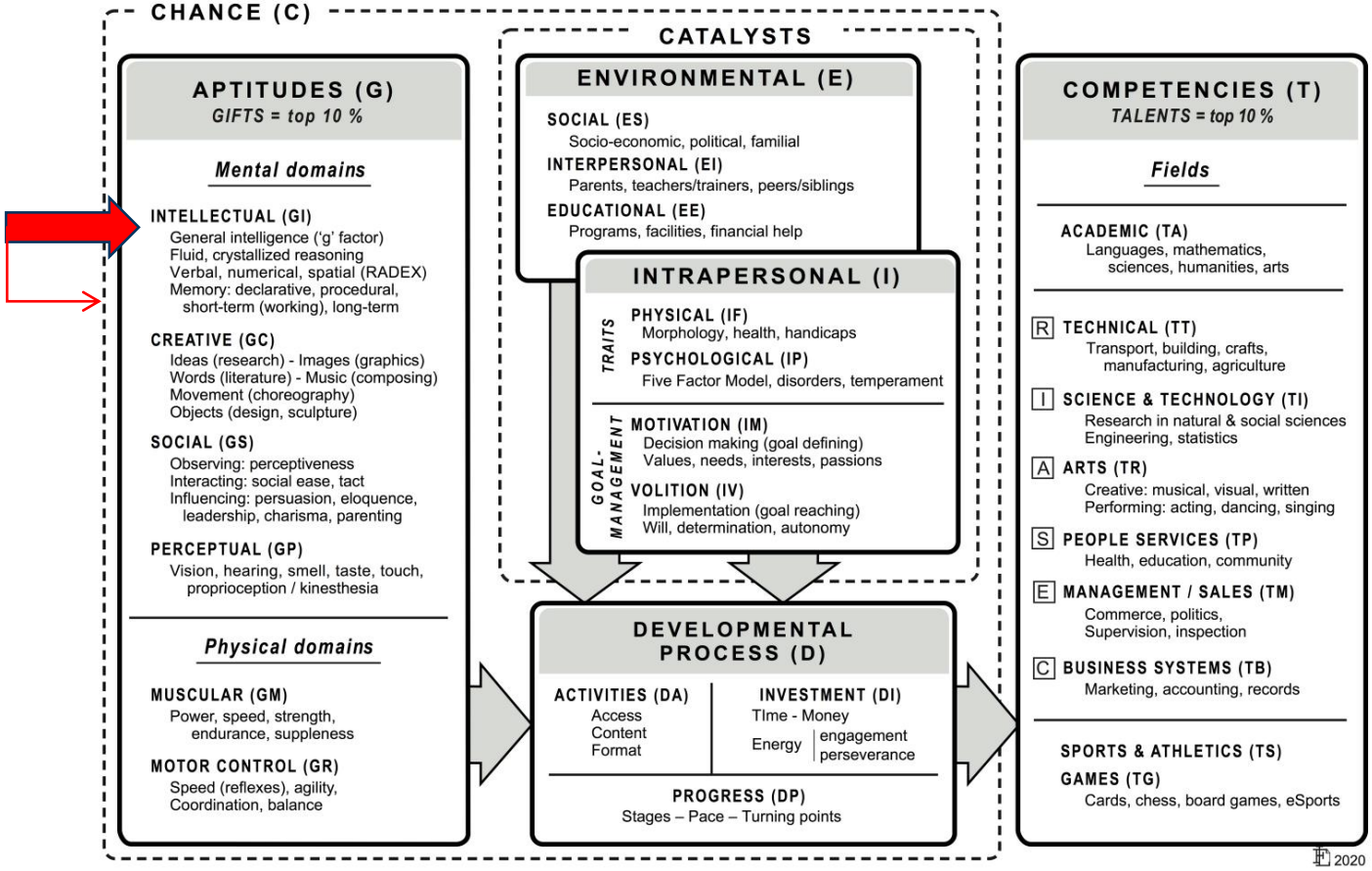
The purpose of identifying gifted children is to ensure appropriate educational provisions so that every child has the opportunity to learn and reach their potential (Convention on the Rights of the Child (CRC), 1989) while being supported in their social and emotional development.

When these unique needs are not met, negative consequences may include: underachievement, disengagement, poor behaviour, school refusal, social isolation, lack of study skills, issues with guilt, perfectionism, black and white thinking, lack of resilience…

Why Identify?

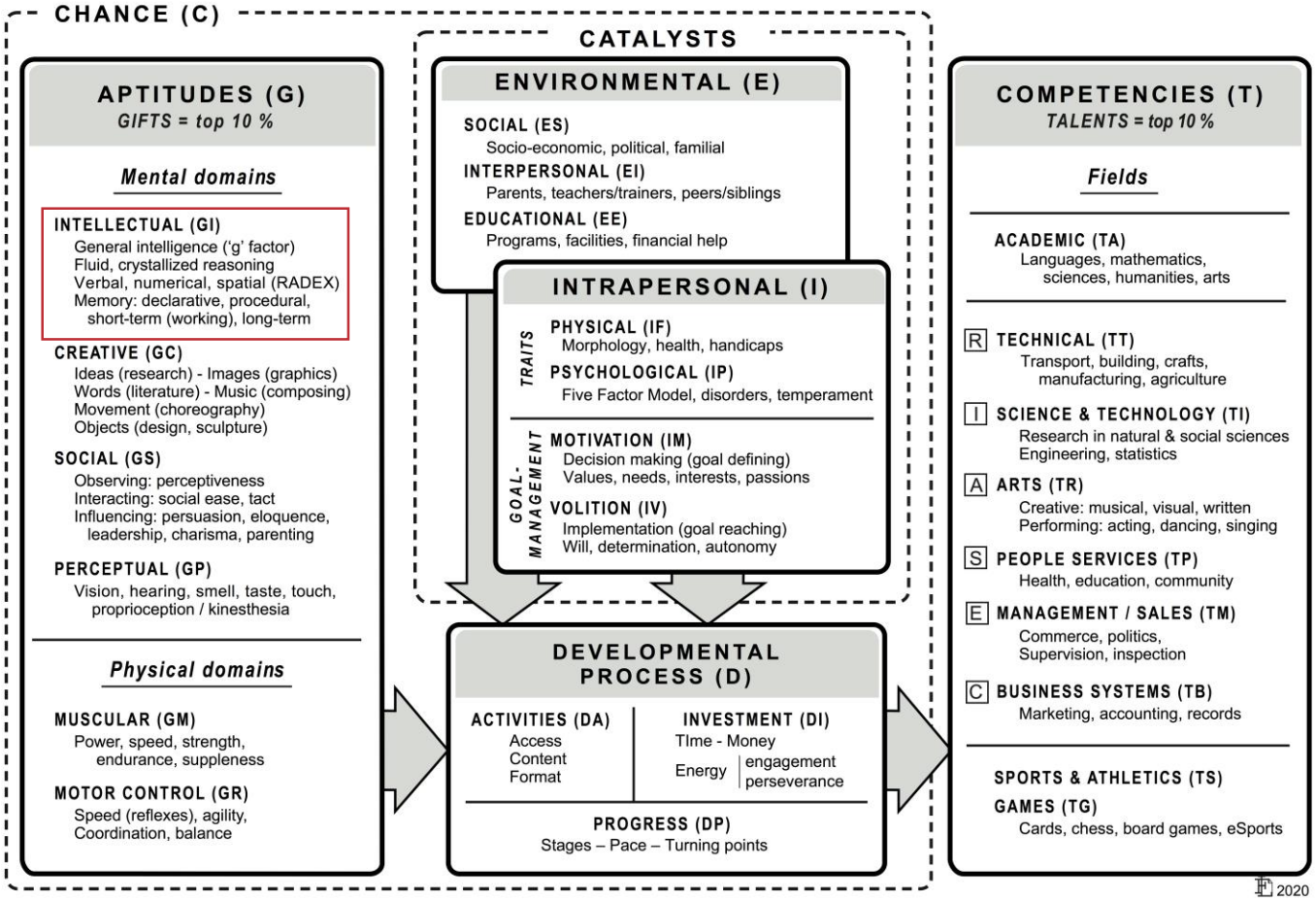
In Roland Persson's (2010) study of 287 gifted (IQ 98th percentile or above) adults in Sweden, 76% reported that they learned very little at primary school, with the level of intellectual stimulation gradually increasing for participants from primary to tertiary education. In addition to the lack of intellectual stimulation, respondents also revealed an increasingly more accepting and supportive environment as they moved from primary through secondary to tertiary education. In the words of the participants, primary school was perceived as "hell" (Persson, 2010, p. 555).

The Process Must Match Our Definition



The Differentiating Model of Giftedness and Talent (Gagné, in press)

Gagné's definitions are common across Australia and across educational sectors. It is referenced in both Catholic Education and Department of Education documents. It is eluded to by ACARA.



The Differentiating Model of Giftedness and Talent (Gagné, in press)

The GI Domain

"General Intelligence ('g' factor) Fluid, Crystallized Reasoning, Verbal, Numerical, Spatial (RADEX) and Memory: declarative, procedural, short-term (working), long-term."

What is CHC Theory?

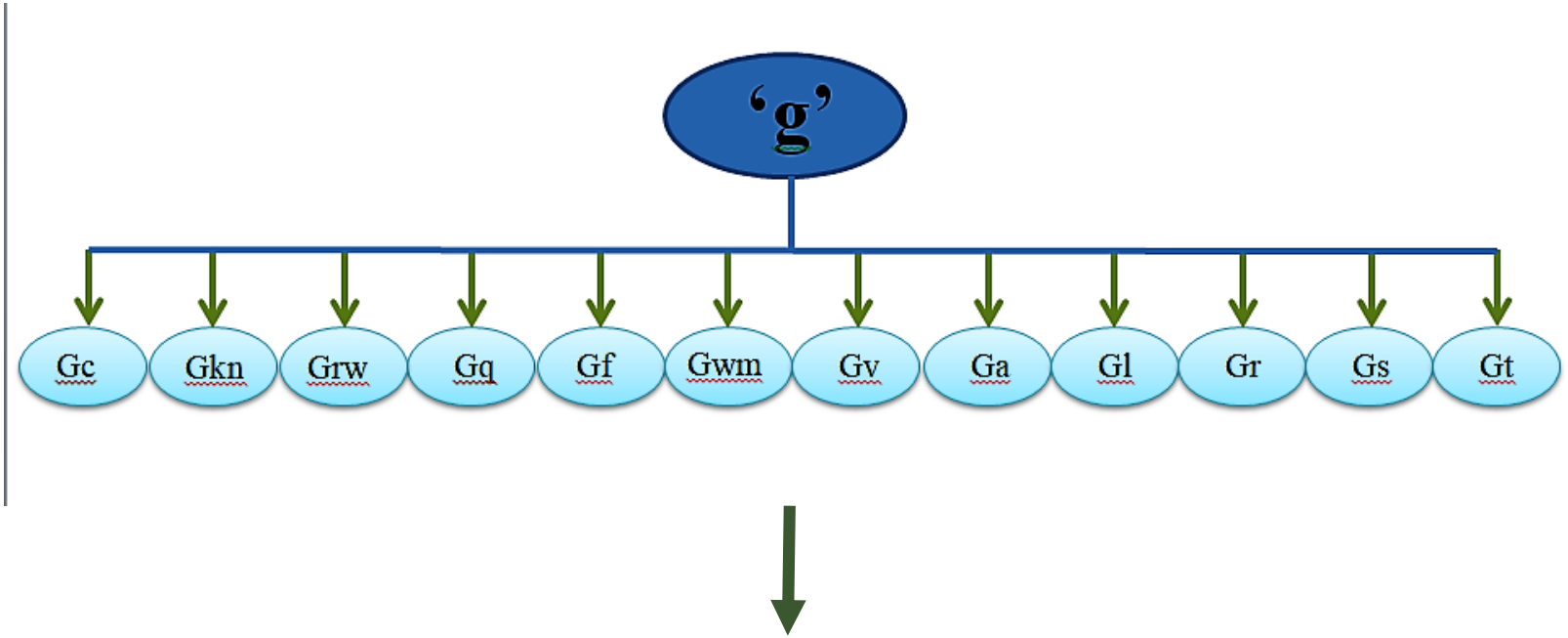
Based on the work of three psychologists, Raymond B. Cattell, John L. Horn and John B. Carroll, the Cattell–Horn–Carroll theory is widely regarded as the most influential theory in the contemporary study of human intelligence.

The Cattell–Horn–Carroll (CHC)theory combined two previously established theoretical models of intelligence: the Gf-Gc theory of fluid and crystallised intelligence and Carroll's Three-Stratum theory, a hierarchical, three-stratum model of intelligence.

CHC theory represents the distinct individual differences in cognitive ability in three strata: stratum I, "narrow" abilities; stratum II, "broad abilities"; and stratum III, consisting of a single "general ability" (or g).

What is CHC Theory?

Schneider & McGrew (2018).



More than 70 Narrow Abilities

CHC Theory

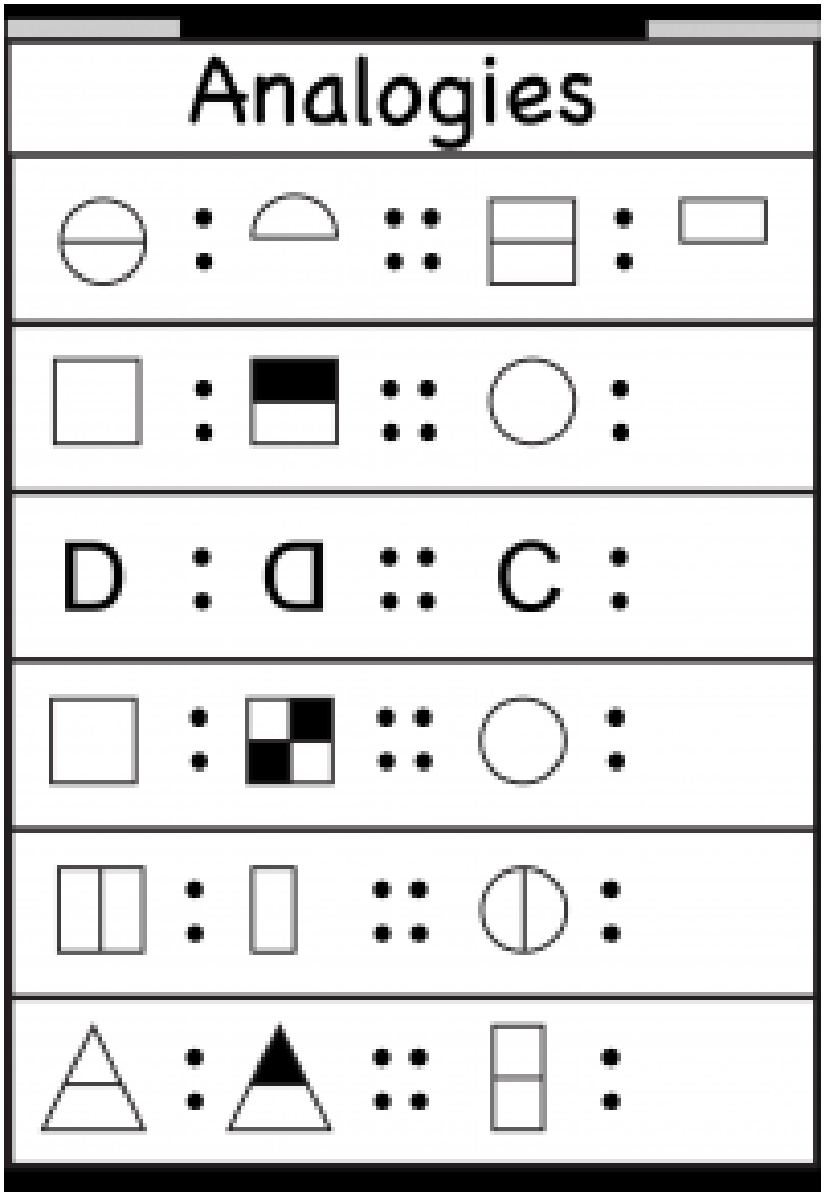
Stratum 3:

'g' General Intelligence

Stratum 2: Broad Abilities

1. Comprehension Knowledge (Gc)
2. Fluid Reasoning (Gf)
3. Short Term Working Memory (Gwm)
4. Retrieval Fluency(Gr)
5. Visual-spatial Processing (Gv)
6. Learning Efficiency (Gl)
7. Auditory Processing (Ga)
8. Processing Speed (Gs)
9. Reaction & Decision Speed (Gt)
10. Reading & Writing (Grw)
11. Quantitative Knowledge (Gq)

Measuring ‘g’: Woodcock Johnson (IV)



Woodcock Johnson (IV)

- Standard Battery 10 Test
- General Intellectual Ability Composite (7 sub tests)
- Cf-Gc Composite (4 sub tests)
- Brief Intellectual Ability Composite (3 sub tests)

Comprehension Knowledge (Gc)

Fluid Reasoning (Gf)

Short Term Working Memory (Gwm)

Auditory Processing (Ga)

Processing Speed (Gs)

Retrieval Fluency(Gr)

Visual-spatial Processing (Gv)

Research on Identification

Earlier is better.

Multiple opportunities to identify across time.

Multiple instruments both subjective and objective:

- Responses to Classroom Activities
- Self Nomination
- Peer Nomination
- Teacher Nomination
- Parent Nomination
- Competition Results
- Off Level (above level)Tests
- Standardised Cognitive Assessments (i.e. IQ Tests)
- Observations and Anecdotes
- Checklists of Characteristics
- Interviews (child or parent)
- Academic Grades

The Research

Aim

To establish validity evidence for a potential screening process with the WJ(IV), as a measure of ‘g’, general intelligence, where giftedness is demarcated at the **97th percentile and above.**

Mildly (115-129)	• **Enrichment in regular classroom** • **Modified curriculum** • **Curriculum compacting**
Moderately (130 – 144)	• Advanced work • Challenges within content • Some form of ability grouping • Mentorships • Single subject acceleration • Single grade skip or early entrance to school

(Feldhusen 1993, cited by Gross 2004)

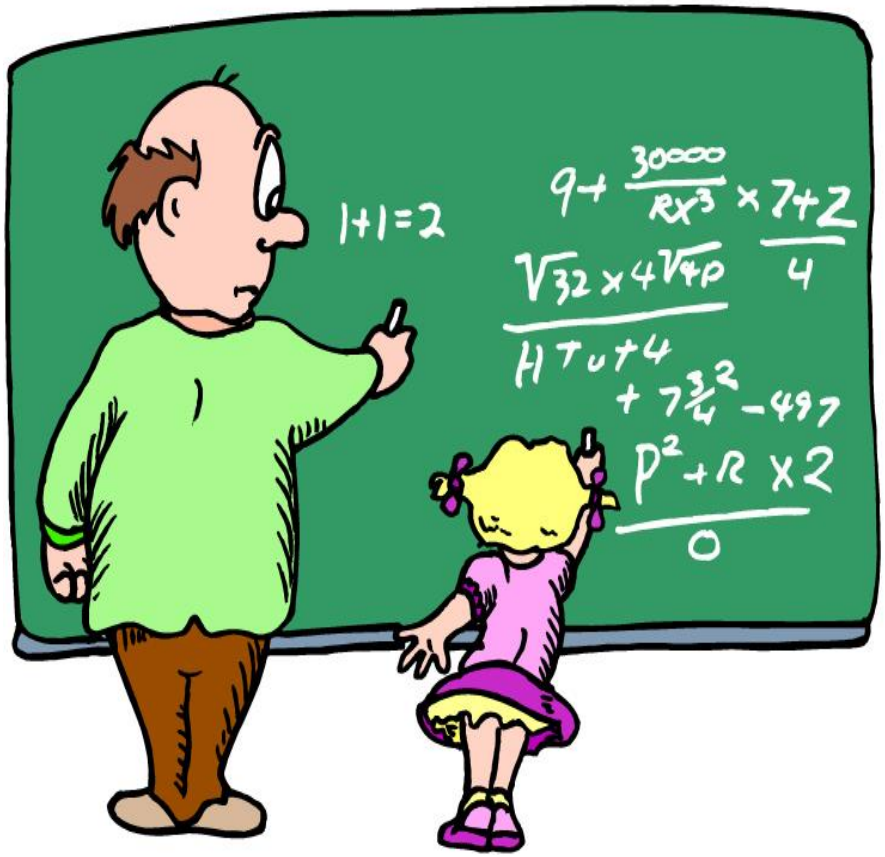
The Screening Process

The research literature

- Early
- Multiple Instruments
- Subjective and Objective

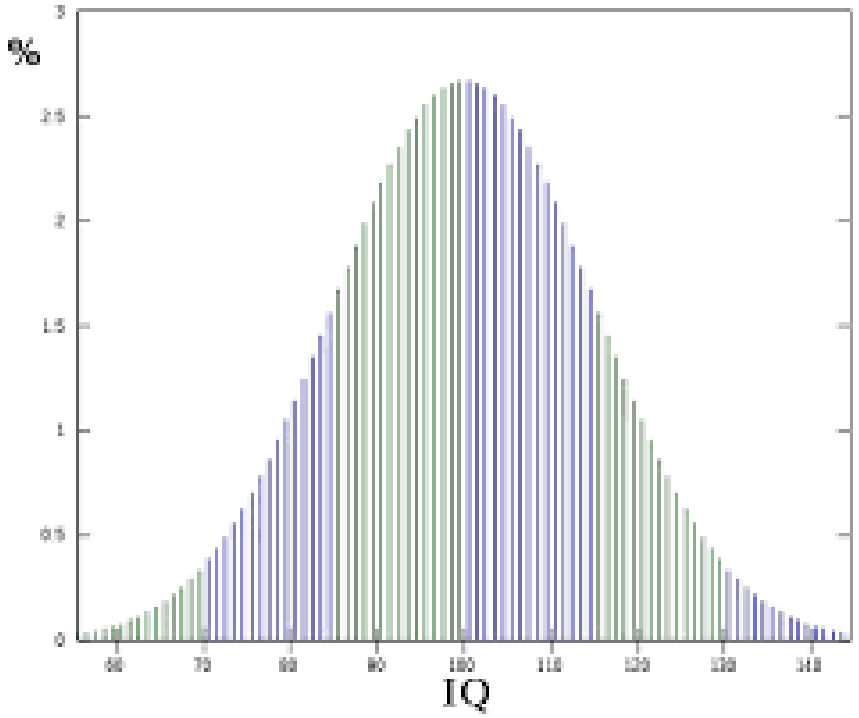
In addition…

- Low cost
- Time efficient
- Teacher deliverable
- Offer teacher useful and timely information on ALL students



Parent Questionnaire

Parent Questionnaire: Gifted Characteristics Parent Questionnaire (GCPQ)



- 18 items
- Based on published, known academic and non-academic characteristics of gifted children.
- 5-10 minutes to complete.
- Demographics: household income, gender, hearing difficulties, birth position and family history of giftedness
- Available is 7 languages.
- Dichotomised response format.

Teacher Questionnaire

Teacher Questionnaire: Gifted Characteristics Teacher Questionnaire (GCTQ)

- 15 items
- Based on published, known academic and non-academic characteristics of gifted children
- Takes approximately 30 minutes to complete for an entire class (approx. 21 students).
- Dichotomized response format

Achievement Assessment

$$2x - 12 = 5$$

$$2x - 12 + 12 = 5 + 12 \quad \text{Step 1}$$

$$2x = 17$$

$$\frac{2x}{2} = \frac{17}{2} \quad \text{Step 2}$$

$$x = 8.5 \quad \text{Solution}$$

Achievement in the Early Years. (AEY Assessment)

- Group administered (exceptions)
- 24 questions for 25 marks
- Single sided
- 1 item per page
- All questions are read allowed (script).
- Colour the smiley face ☺
- Takes approx. 30 min including transition time.
- Mapped to the Australian Curriculum in Mathematics and English.
- Question ceiling approximately two years above grade level.

Psychometrics

Table 1. Correlation

Correlations	AEY	GCPQ	GCTQ
AEY	1	0.33	0.48
GCPQ	0.33	1	0.55
GCTQ	0.48	0.55	1

The ideal is for moderate correlations to exist between the instruments. High correlations suggest that each instrument is measuring the same thing, and therefore providing duplicate and redundant information.

Table 2. Test Properties

Instrument	Cronbach's Alpha	Std. Deviation	Std. Error Measurement
AEY Test (/25)	0.81	3.1	1.4
GCPQ (/18)	0.79	3.8	1.7
GCTQ (/15)	0.87	3.4	1.2

Methodology

- The process was implemented with 276 students, their parent/s and 17 teachers.
- Data were collected during term 3 of the school year (July-Sept).
- A purposefully randomised sample of 50 students was administered the standard battery of the WJ(IV) Australian Adaptation.

Table 3. WJ (IV) Sample

Variable	**Proportions in Sample N=40 (%)**		
Gender	**Male**		**Female**
	50		50
ICSEA	**Low**	**Medium**	**High**
	7.5	47.5	45
ADHD	7.5 (12.5 including imputed, not formally diagnosed)		
ASD	5 (7.5 including imputed, not formally diagnosed)		
Hearing Impairment	5		

Methods

Cut Scores

Using the 97th percentile and above on the GIA or BIA or Gf-Gc (WJIV) as the criteria for determining giftedness, students were categorised as either:

- true positive (i.e. correctly identified as gifted),
- false positive (incorrectly identified as gifted),
- true negative (correctly identified as non-gifted), or
- false negative (incorrectly identified as non-gifted)

	Gifted WJ(IV)	Non-Gifted WJ(IV)
Gifted (screener)	True Positives	False Positives
Non-Gifted (screener)	False Negatives	True Negative

Methods - Predictive Values

Predictive Values

Four predicative values were calculated for each instrument at specific cut-scores: **specificity, sensitivity, positive predictive value and negative predictive value.**

Sensitivity (Sen): Probability of correctly classifying gifted child as gifted.

Specificity (Spec): Correctly classifying non-gifted child as non-gifted.

Positive predictive value (PPV) predicts the likelihood that a child who scores above a set cut-score on a screening instrument is gifted.

Negative predictive value (NPV) predicts the likelihood that a child who scores below a set cut-score on a screening instrument, is not gifted.

Methods - Combination Rules

AND

Child must reach the cut-score on A B and C

OR

Child can reach the cut-score on A or B or C

MEAN

A mean is taken across the instruments and the child must meet the cut-score of the mean.

See: McBee, M. T., Peters, S. J., & Waterman, C. (2014). Combining scores in multiple-criteria assessment systems: The impact of combination rule. Gifted Chid Quarterly, 58(1), 69–89.

Methods - ROC Analysis

A receiver operating characteristic curve (ROC) was plotted using SPSS (IBM Corp.,2017) to determine how good the final screening procedure is at distinguishing between gifted and non-gifted individuals.

Area under the curve (AUC) values lie between 0 and 1. If a model has an AUC of 0.5 the model has no ability to distinguish between the conditions; gifted and non-gifted. An AUC close to one is desirable.

Additionally, the coordinates of the curve can be used to refine cut-scores to strike the best balance between sensitivity and specificity.

See: Bowers, A. J., & Zhou, X. (2019). Receiver Operating Characteristic (ROC) Area Under the Curve (AUC): A Diagnostic Measure for Evaluating the Accuracy of Predictors of Education Outcomes. Journal of Education for Students Placed at Risk (JESPAR), 24(1), 20-46. doi:10.1080/10824669.2018.1523734

Results

Results indicate that schools could implement a multiple instrument process based on one of two mean rule models offering various balances between sensitivity, specificity and predictive values, the selection of which can meaningfully be predicated on the availability of school resources.

Ultimately, schools must decide if there is greater risk in identifying students for gifted provision and differentiation who are not gifted (false positives) or in not identifying gifted students who need differentiation (false negatives)? While the answer may seem simple to some, the complex nature of schools and limited funding will often be the key determinants.

The mean of three model for the GCTP, GCPQ and AEY Test with a cut-score of 13. The analysis suggests that a child identified as gifted using this mean of three model with cut point at 13 has a 100% change of being gifted and the model has an excellent ability to differentiates between gifted and non-gifted children (AUC 0.96).

Advantages

The use of a parent questionnaire offers teachers a different perspective on the children. It is an opportunity for ‘continuity of communication’.

The achievement assessment has direct links to the Australian Curriculum which offers immediate and useful information on all students which can be used for educational planning.

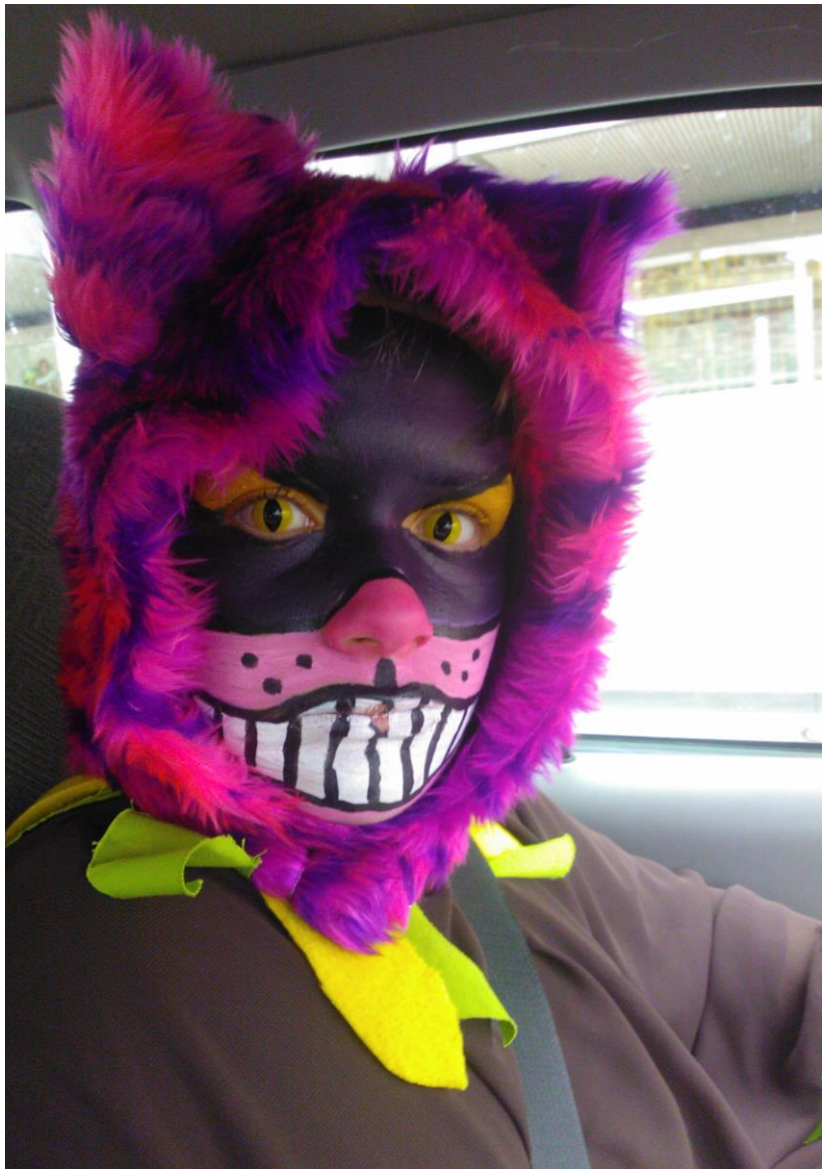
Schools or clusters of schools can create their own norms. This means norms remain current for the correct population.

Norms can also be established for minority groups such as EALD and low SEI students. Background is important. When making comparisons between students, opportunity to learn should always be considered.

Advantages

If we can successfully screen for our gifted children at a young age, early interventions can be implemented to support their social, emotional and academic needs.

Identifying children as gifted also offers parents an opportunity to seek support and guidance from organizations who support parents of gifted children.



Headed

Post Implementation Questionnaire.

- By using the post implementation questionnaire and applying the theory of planned behaviour, we are able to determine the factors most likely to influence a teacher to implement the screening process in their classroom.

- Norms: local and minority group.

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