



Searching more successfully for academic talent

Finding the right measures and using the right norm groups

David Lohman

Institute for Research & Policy on Acceleration

Overview

- Talent identification as prediction/selection
- Profiles of predictor and outcome variables
 - Especially at the extremes of the distribution
- Talent as a constellation of aptitudes
- Measuring aptitude – performance relative to opportunity to learn
- Alternative assessments – advantages & disadvantages
- Multiple perspectives (norm groups) on performance

Talent identification requires:

- The *prediction* of an unusual level future competence from present and past *behavior*
- Assumptions about the *stability of individual differences* in estimates of that competence

Correlations Between IQ Scores across grades (Lohman & Korb, 2006)

Grade	3	4	5	6	7
4	86				
5	83	86			
6	80	83	86		
7	75	80	83	86	
8	70	75	80	83	86

Proportion of students identified by one test also identified by the second test

Correlation between tests

Cut score	0.50	0.60	0.70	0.80	0.90
Top 1%	0.13	0.19	0.27	0.38	0.54
Top 2%	0.17	0.23	0.31	0.42	0.58
Top 3%	0.20	0.26	0.35	0.45	0.60

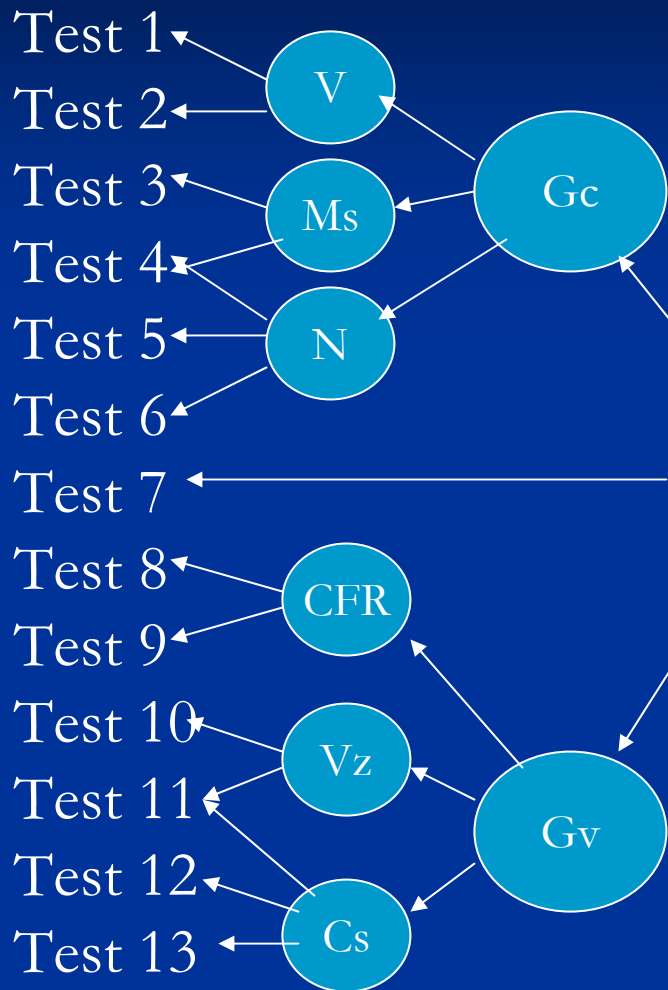
Individual differences will be stable to the extent that

- individuals do not acquire new knowledge and skills at different rates.
- the opportunities that individuals have had to develop the measured competencies do not change
- the aspects of competence that are assessed also do not change.
- Measure early and often
- Revolving door

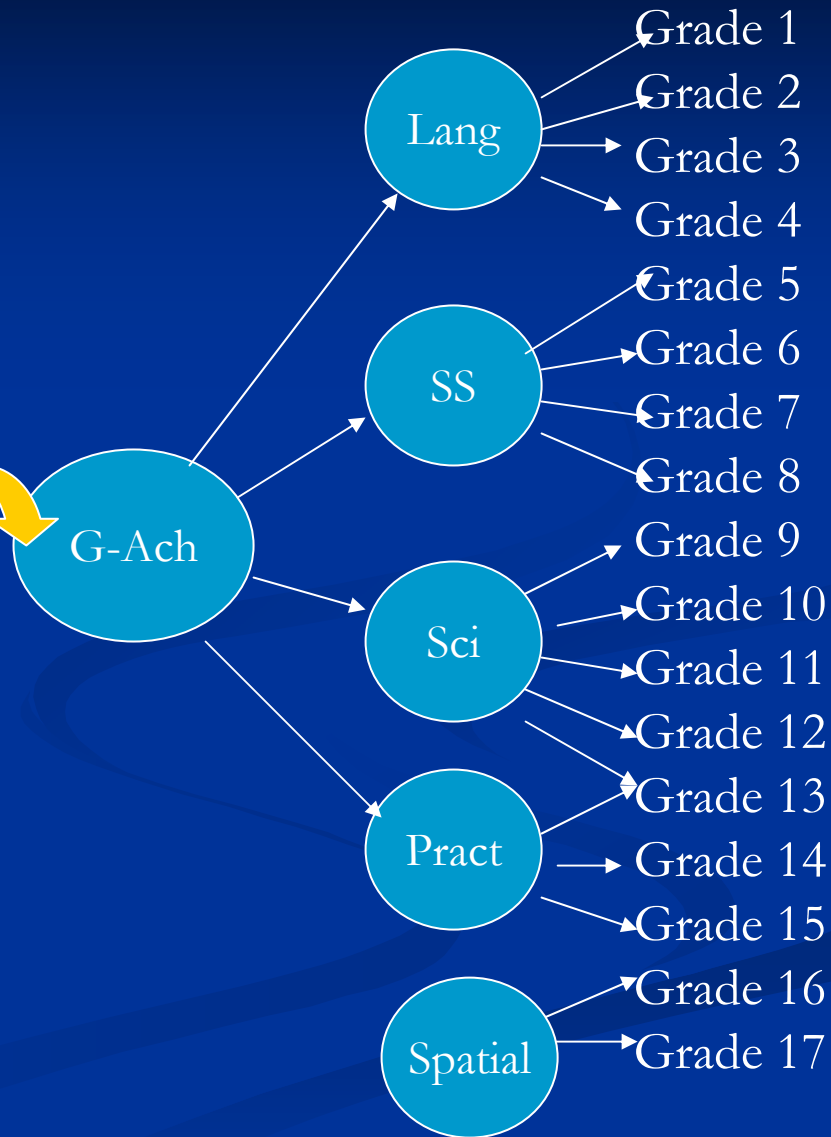
Beyond a single rank order

- Brunswikian symmetry – picking the right predictors for the criteria of interest

Ability Tests (Grade 6)

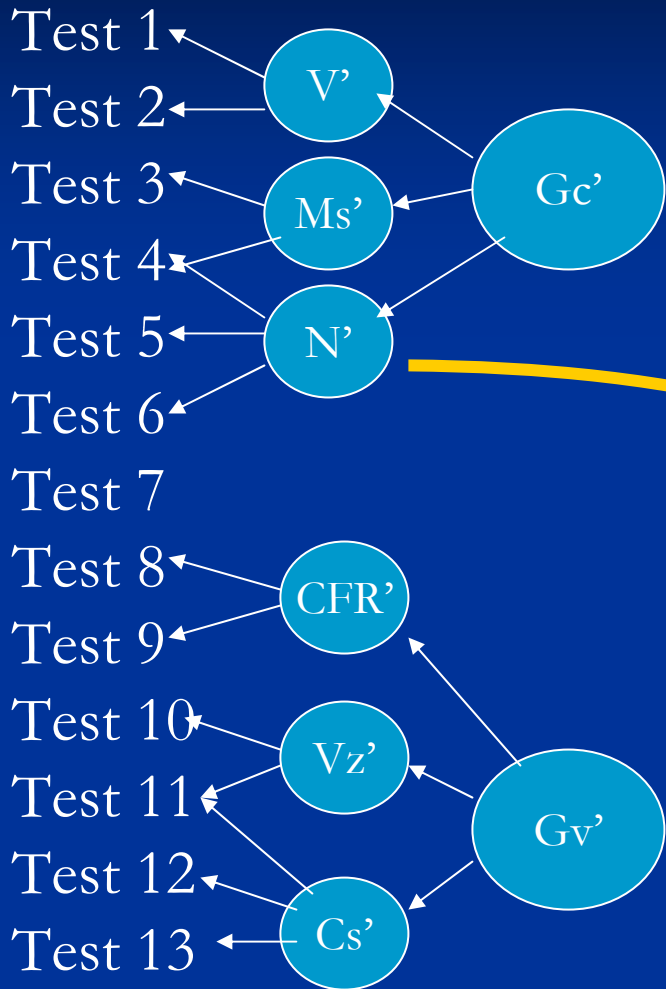


School Grades (Grade 9)

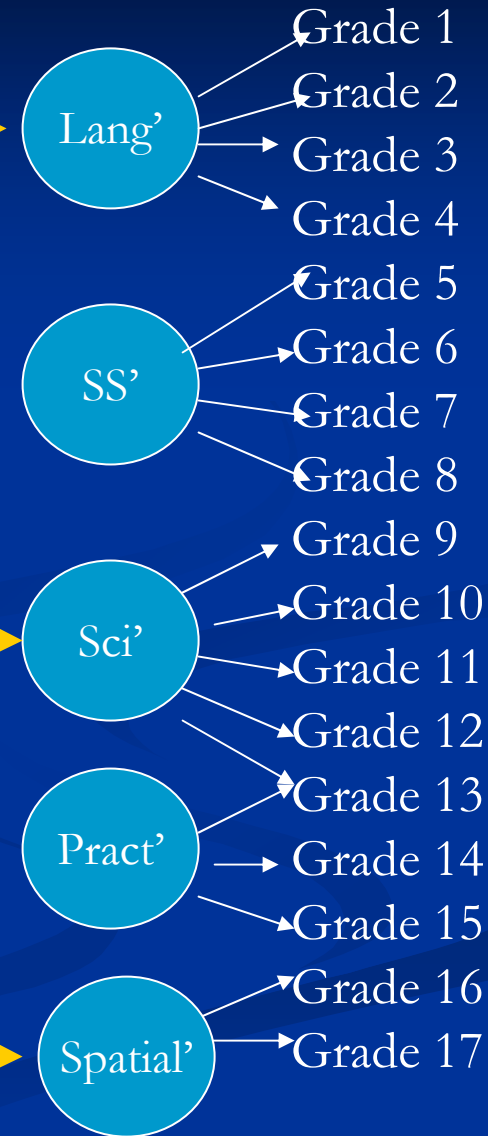


.5

Ability Tests (Grade 6)



School Grades (Grade 9)



.72

.75

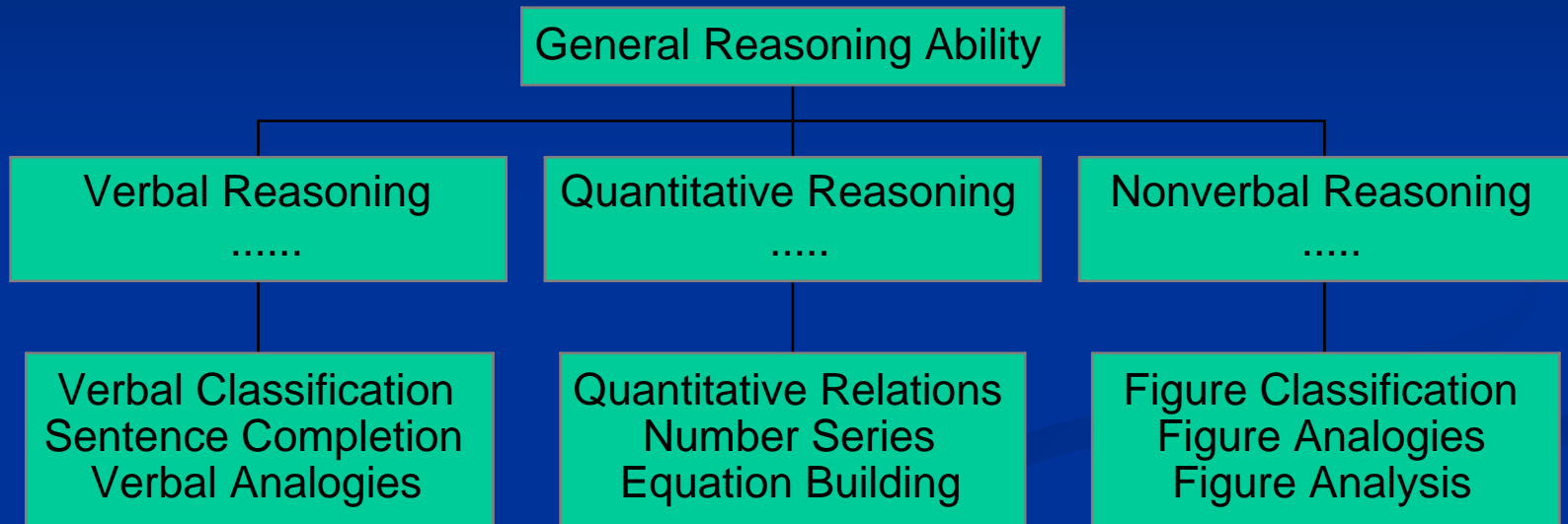
.63

Gustafsson & Balke, MBR, 1993

- g mattered most when predicting GPA
- Specific abilities mattered even more when predicting success in many domains
- Obtaining useful & reliable score profiles

Score Profiles on CogAT

Multilevel Battery (gr. 3-12)



3 Separate Test Batteries

(Not one)

CogAT6 Profile frequencies for students in K-12 pop. and for students with two stanine scores of 9

Profile	Percent in K-12 population	
Flat	33	
Significant		
Strength	21	
Weakness	22	
Extreme		
Strength	4	
Weakness	3	

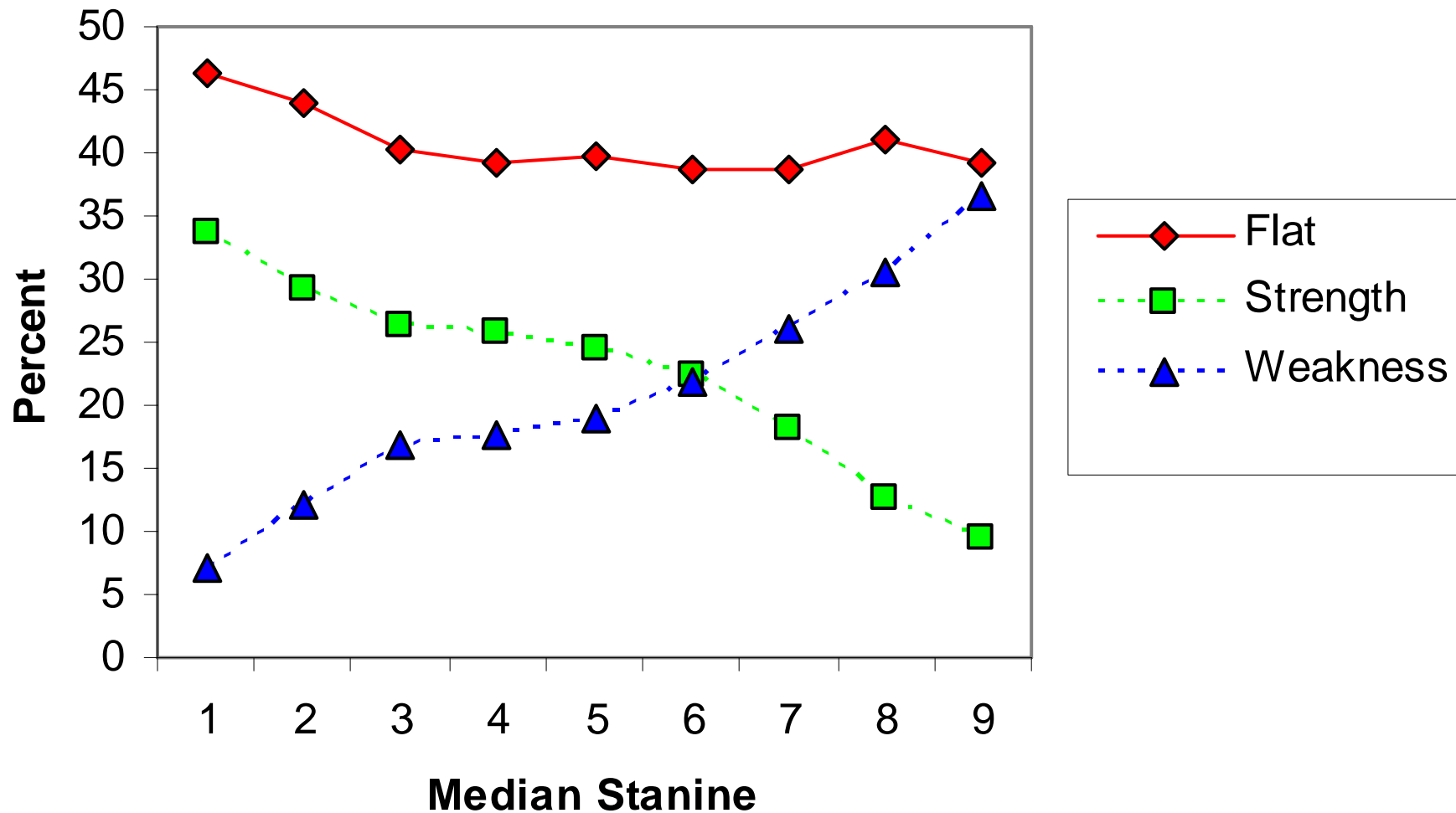
CogAT6 Profile frequencies for students in K-12 pop. and for students with two stanine scores of 9

Profile	Percent in K-12 population	Percent in Stanine=9 group
Flat	33	37
Significant		
Strength	21	6
Weakness	22	21
Extreme		
Strength	4	3
Weakness	3	16

37%



Profile Frequency by Median Stanine



Lohman, D. F., Gambrell, J., & Lakin, J. (in press). The commonality of extreme discrepancies in the ability profiles of academically gifted students. *Psychological Science*

**A brief introduction to an
aptitude perspective on
talent identification**

Sources

- Foundation in IO psychology
 - Bingham (1937)
 - *Remaking the concept of Aptitude* (2000)
 - Lohman (2005, J. Ed. Gifted) *An aptitude perspective*
- Dawes theory of work adjustment (Lubinski)
 - Satisfactoriness versus Satisfaction
- Aptitude/trait complexes (Ackerman)
 - Constellation of traits that combine in a non-compensatory way

Aptitude (talent) perspective

- What kind of expertise do you hope to help the child attain?
- How is it developed?
- Is there more than one route available for developing these competencies? Or is the system fixed?
 - Pullout program for the gifted?
 - Single subject acceleration?

Talent identification and development

- Goal is not to measure “intelligence” or to identify the “gifted”
- But to identify those who exhibit talent for learning in particular domains
- And then to provide appropriately challenging instruction to develop that talent
- Gagne’s DMGT theory

Aptitude: What it is

- Aptitude is
 - *the degree of readiness to learn & perform well in a particular situation or domain.*
- Examples of academic aptitudes
 - Ability to learn and retain knowledge & skills in a domain
 - Ability to go beyond the information given
 - An abiding interest in the domain
 - Strategies for persisting in the pursuit of excellence

Aptitude: What it is NOT

- Not fixed
- Not just abilities (affective-conative)
- Not just positive attributes (inaptitudes)
- Not independent of context or circumstance

Important Aptitudes for Academic Learning

- Cognition (knowing)
 - Domain knowledge & skill
 - Reasoning abilities in the symbol systems used to communicate knowledge (Verbal, Quant., Spatial)
- Affection (feeling)
 - anxiety, interests, working alone/with others
- Conation (willing)
 - persistence, impulsivity

Ways of measuring aptitude

1. Direct:

- Learns in a few trials what takes others many trials to learn.
- Opportunity to learn essential

2. Indirect :

- Brings required (or helpful) cognitive, affective, & conative resources to the situation
- Opportunity to learn essential

Opportunity to Learn

- On ability tests:
 - Approximate by **age** (years + months)
- On achievement tests
 - Approximate by grade (and week within grade)
- What about students who are poor, ELL, or have markedly different educational preparation?

**Non-normative
Experiences**



**Alternative assessments
(common norms)**

Advantages of nonverbal tests

- English Language Learners are disadvantaged on tests that use English
 - Allow one to use common norms for all
- Often good measures of g
- Appearance of measuring something more innate than tests that use other symbols
- Claims that they will solve the problem

Disadvantages of nonverbal tests

- Construct under-representation
- Predict academic learning less well than measures of verbal & quant reasoning
 - Specific variance negatively related to success in verbal domains
- Sensitive to environmental changes:
 - Large Flynn, practice effects, and schooling effects

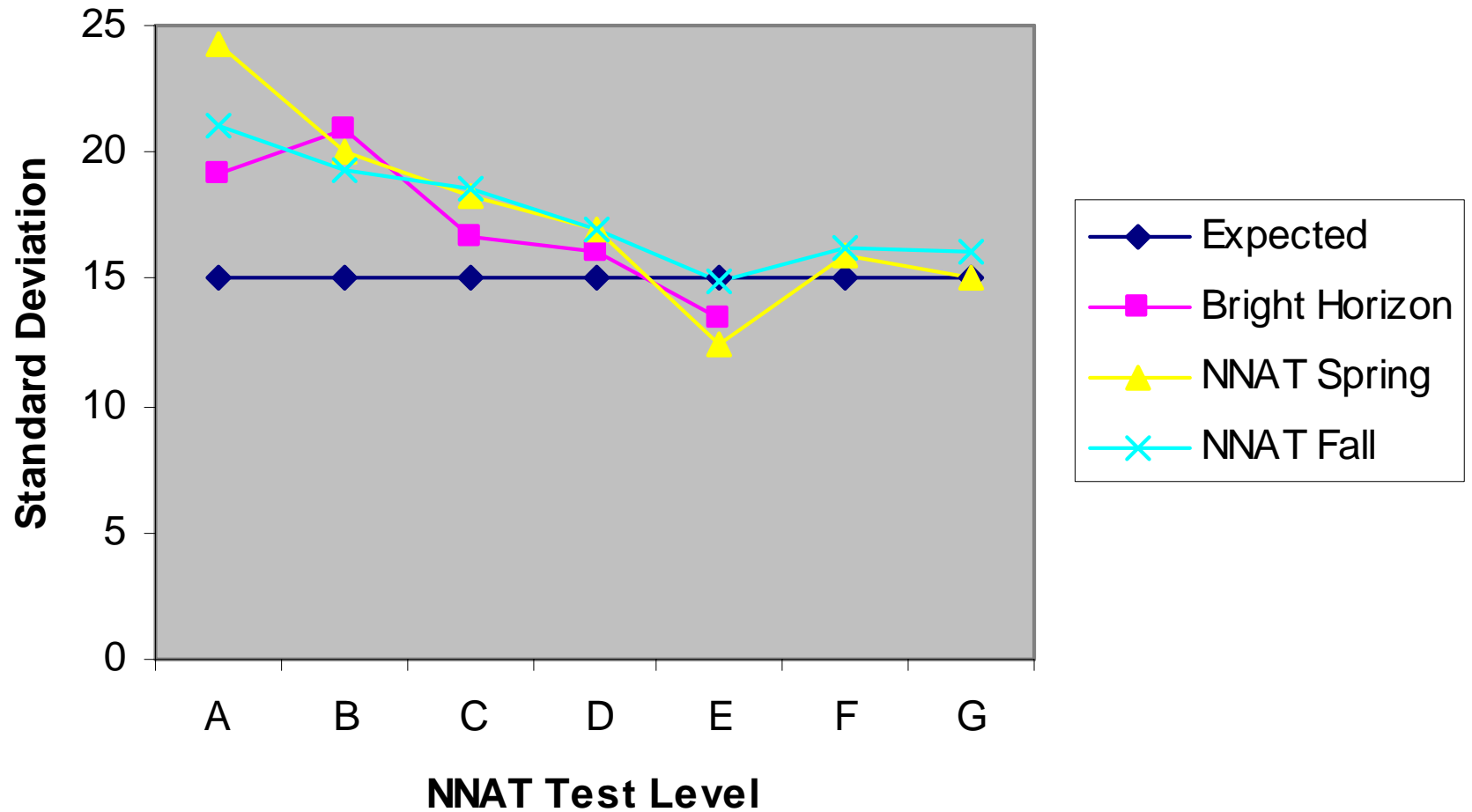
Level the playing field?

- 371 ELL & 332 Non-ELL K-6 children
 - All Hispanic
 - All free/reduced lunch
- ELL – Non-ELL score differences
 - CogAT Nonverbal 7.5 (.47 SD)
 - Raven SPM 7.3 (.46 SD)
 - NNAT 10.1 (.63 SD)

Trusting the Norms

- Judgments of exceptionality depend critically on the appropriateness & quality of the norms
- Raven Norms – about 10 points too high
 - 100.7 versus 111.5 (n = 733)
- Cattell Culture Fair – about 17 points too high
- CogAT Quantitative Battery
 - Shift in educational practice
- NNAT?

SD's of Nonverbal Ability Index (NAI) scores on NNAT by Test Level



Over-identification Rates for NNAT

True NAI Score

Level	115	130	145
A	1.5	3.4	11.9
B	1.4	2.6	7.3
C	1.3	2.3	5.8
D	1.2	1.7	2.9
E	1.0	1.0	1.0
F	1.1	1.4	2.0
G	1.1	1.4	1.9

- Lohman, D. F., Korb, K., & Lakin, J. (in press). Identifying academically gifted English language learners using nonverbal tests: A comparison of the Raven, NNAT, and CogAT. *Gifted Child Quarterly*.
- *Cognitively Speaking*, (6, Winter 2008) “Comparing CogAT, NNAT, and Raven”

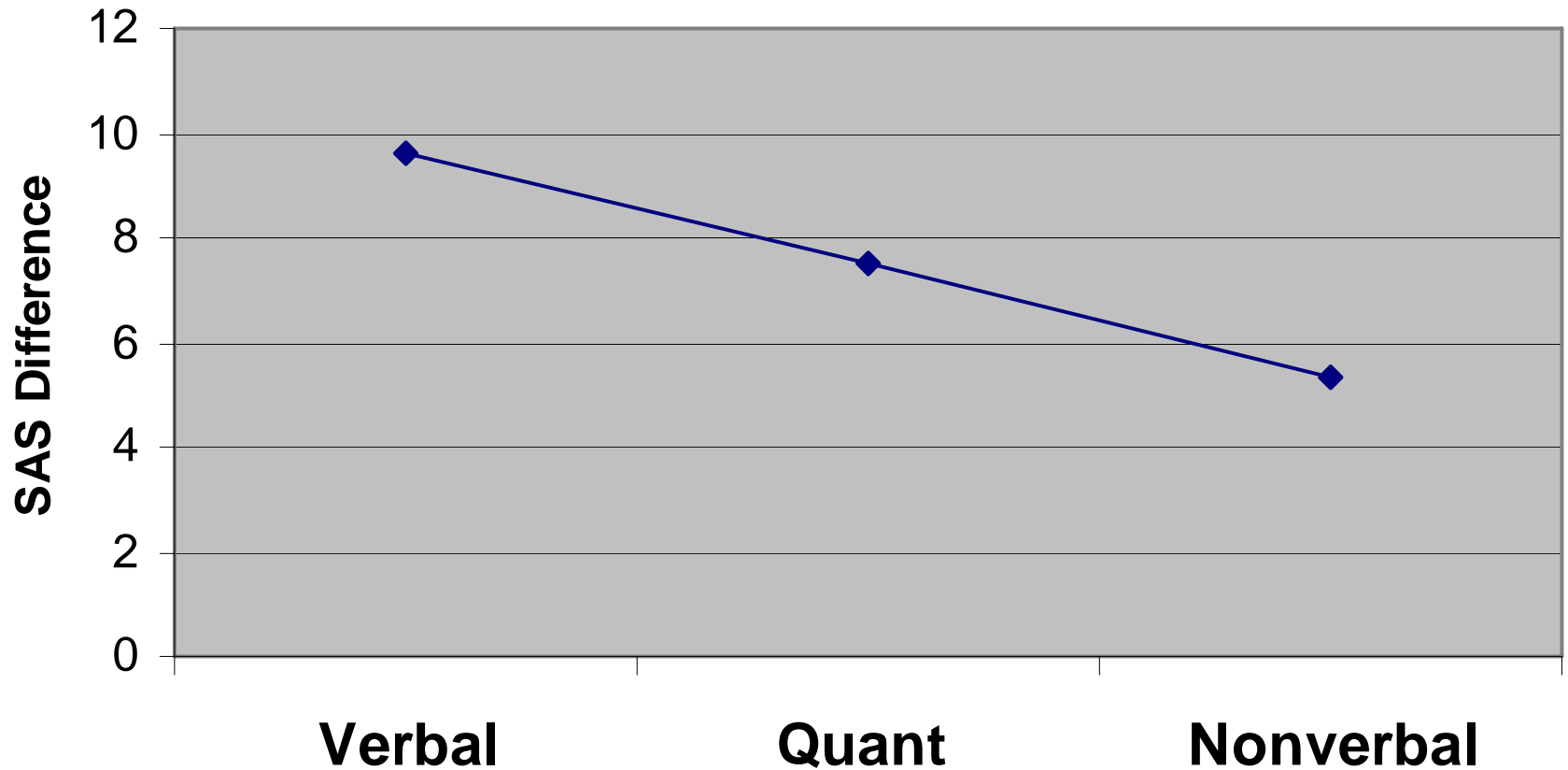
Caveat emptor

- Critically examine your data
- If possible, always use local norms as well

Means versus correlations

- Verbal and quantitative reasoning abilities are the best predictors of a wide range of educational and training outcomes - for all students
- Academic success for ELL and minority children requires the same knowledge, skills, abilities, interests, motivation, perseverance as their non-minority peers

White-Hispanic Effect Sizes for CogAT (random samples within bldg)



Nonverbal the fairest test?

Project Bright Horizon Data

ELL Students Grade **3** (N = 74 - 81)

	CogAT V	CogAT Q	CogAT N	NNAT	Raven
Dev. Reading Assess.	0.63	0.43	0.24	0.11	0.32
Reading - Terra Nova	0.56	0.36	0.30	0.33	0.41
Reading - AIMS	0.73	0.45	0.34	0.39	0.43
Math - Terra Nova	0.57	0.61	0.51	0.42	0.43
Math - AIMS	0.61	0.70	0.57	0.50	0.47

**Non-normative
Experiences**

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graph LR; A[Non-normative Experiences] --> B[Alternative assessments (common norms)]; A --> C[Common assessments (multiple norm groups)];
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**Alternative assessments
(common norms)**

**Common assessments
(multiple norm groups)**

Multiple Perspectives

- For ELL students in grade 3, compare scores to:
 - Other grade 3 students in the nation (common norms)
 - Other students in grade 3 in the district/school
 - Other ELL students in grade 3 in the district
- Not a single statistical adjustment of scores (Mercer)

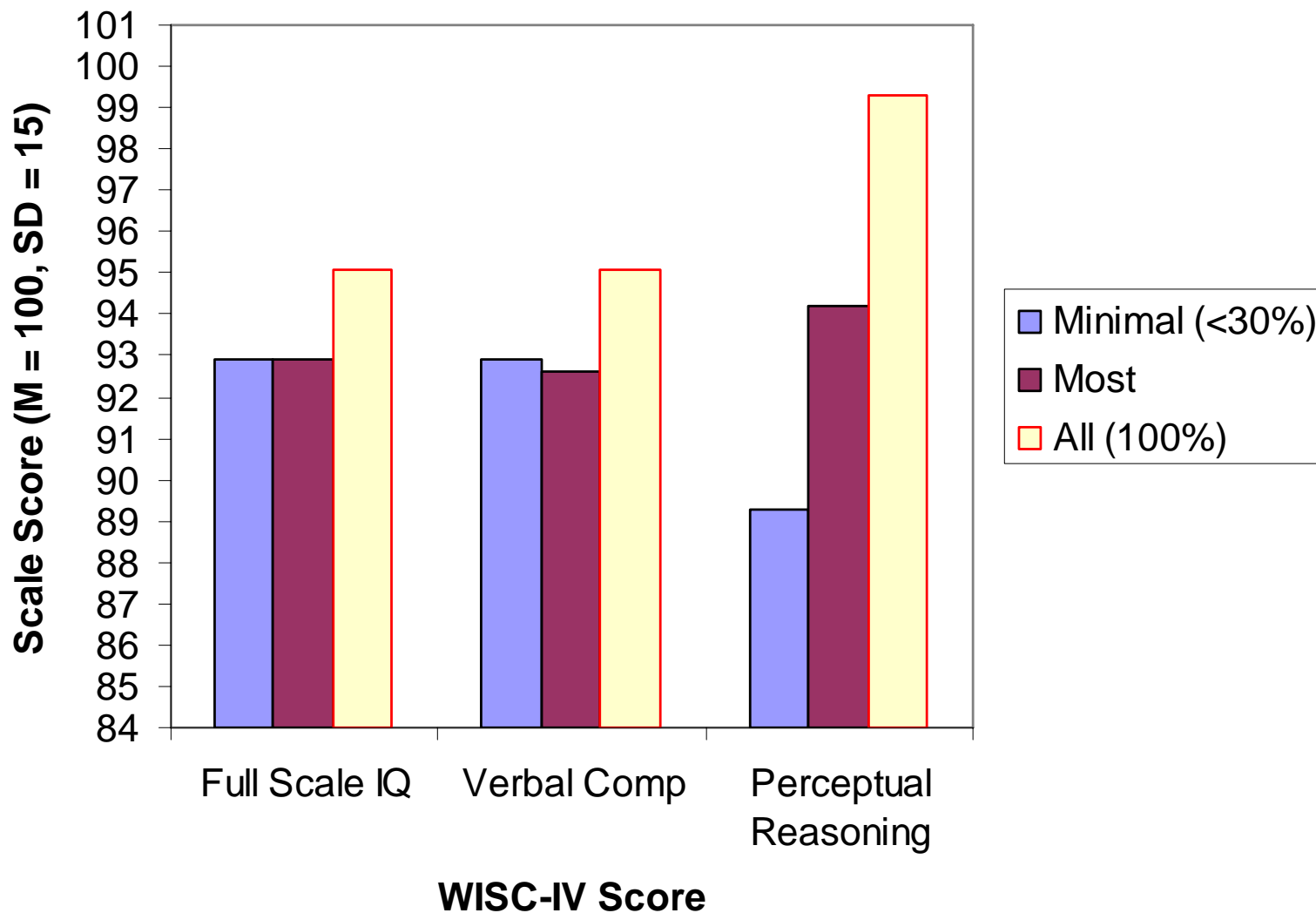
Improvements in Measurement for ELL children

- One test for all (e.g., early Binet)
- “Nonverbal” tests (Army Beta)
 - Reduced difference between ELL and native speakers of English
- Translated/adapted English-language tests (Woodcock-Munoz)
- Translated tests with contextualized norms (WISC-IV Spanish)
- Simultaneous development in (both) languages with contextualized norms

WISC-IV *Spanish*

- Target population: Bilingual Spanish-speaking children in the U.S. with no more than 5 years of U.S. schooling
- Translate & adapt the verbal tests
- Calibrate the Spanish Verbal Scale with the normative (English) Verbal Scale
- Index opportunity to learn by
 - % education in U.S.
 - Parental educational level

WISC-IV Spanish Scores by Percent Education in the U.S.



**“nonlanguage tests may
be more culturally loaded
than language tests”**

Anastasi & Urbina, 1997, p. 344

WISC-IV Spanish Scores: Multiple Perspectives

- Index scores (Mean 100, SD 15)
 - Verbal Comprehension (Spanish Calibration)
 - Perceptual Reasoning
 - Working memory
 - Processing Speed
- PR (by Pct Education in U.S.)
- PR (by Pct Education in U.S & Parental Education)
- Professional judgment required

Inference of Aptitude?

- When someone learns in a few trials what others learn in many trials
- Opportunity to learn is critical
- Common norms appropriate only if experiences are similar
- Placement by achievement

Main Points

- Focus on talent identification & development
- Instability of observed scores on the best tests
- Importance of affective & conative traits
- Assumptions about opportunity to learn
- Consider alternative norms rather than alternative assessments
- Develop tests for bilingual children that are not simply translated versions of the English language test

The Connie Belin & Jacqueline N. Blank International Center
for Gifted Education and Talent Development

The University of Iowa College of Education



Thank you.

faculty.education.uiowa.edu/dlohman