



Strategies for Reducing Adverse Impact

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Overview

- # Diversity, Validity, and Adverse Impact
 - # Strategies for Reducing Adverse Impact
 - # Conclusions
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Tradeoff Between Optimal Selection and Diversity

- # Cognitive ability is among best predictors for nearly all jobs
 - produces a larger racial subgroup difference than nearly any other test
 - using the “most valid” test will result in lower diversity (and quite often adverse impact)
 - focusing on diversity will “decrease” test utility
 - This is a tradeoff that must be balanced!
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Adverse Impact and the Four-Fifths Rule

Adverse impact exists if the selection ratio for discriminated-against group is less than 4/5ths (or 80%) of the selection ratio for the group with the highest ratio

Group 1 (majority): $100/200 = 50\%$ selection ratio

Group 2 (minority): $30/100 = 30\%$ selection ratio

$$50\% \times .80 = 40\%$$

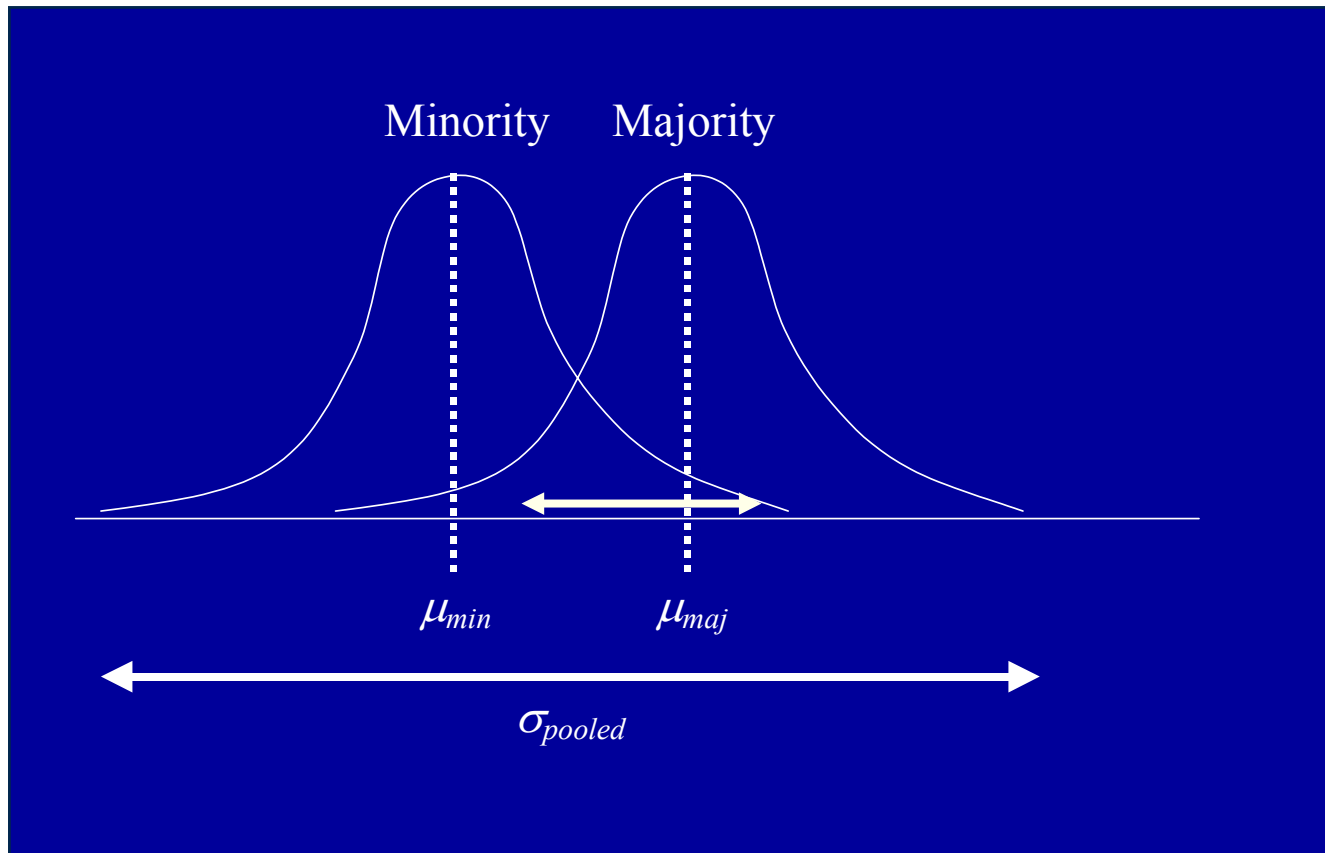
a selection ratio $<40\%$ suggests adverse impact

Causes of Adverse Impact

Complex Interaction of:

- predictor validities and intercorrelations
 - selection ratio
 - number of minority and majority applicants
 - nature of job performance
 - subgroup differences on each predictor
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Subgroup Differences



d = Standardized Subgroup Difference

converts mean difference to SD units:

$$d = (\mu_{majority} - \mu_{minority}) / \sigma_{pooled}$$

Example: White mean = 80, Black Mean = 60,
pooled SD = 15

$$d = (80 - 60) / 15 = 1.33$$

So Whites score 1.33 SD's higher than Blacks

d for Overall Cognitive Ability

Race:

- White-Black: 1.00
- White-Hispanic: .50 to .66
- Asian-White: -.20

Male-Female: .00

Younger-Older: .40

d for Personality-Race

# Race:	<u>W-B</u>	<u>W-H</u>	<u>W-A</u>
■ Extraversion	.10	-.01	.15
■ Conscientiousness	.06	.04	.08
■ Adjustment	-.04	-.01	.08
■ Agreeableness	.02	.06	.01
■ Openness	.21	.10	.18

d for Test Methods

<u>Method</u>	<u>W-B <i>d</i></u>
# Structured Interview	.23
# Biodata	.33
# Situational Judgment (video)	.43
# Situational Judgment (paper)	.61
# Accomplishment Record	.33

Subgroup Differences and Minority Hiring Rates

Majority Selection Ratios

<u><i>d</i></u>	<u>10%</u>	<u>50%</u>	<u>90%</u>
.10	.084	.460	.881
.20	.070	.421	.860
.30	.057	.382	.836
.40	.046	.345	.811
.50	.038	.309	.782
.60	.030	.274	.752
.70	.024	.242	.719
.80	.019	.212	.684
.90	.015	.184	.648
1.00	.013	.159	.610

Strategies for Reducing Adverse Impact

- I. Assess Full Range of KSAOs
 - II. Use Specific Measures of Ability
 - III. Criterion Weighting
 - IV. Change Test Format
 - V. Enhance Applicant Perceptions
 - VI. Use Test Orientation Programs
 - VII. Targeted Recruiting
 - VIII. Banding and Score Adjustment
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Strategy I:

Assess Full Range of KSAO's

- # Premise: if add non-cognitive tests to cognitive ability, subgroup difference of predictor battery will be reduced.

Strategy I:

Assess Full Range of KSAO's

Ex: cognitive ability	$d = 1.00$
conscientiousness	$d = .09$
interview	$d = .23$
biodata	$d = .33$

Strategy I:

Assess Full Range of KSAO's

Adverse Impact

<u>SR</u>	<u>All 4</u>	<u>Non-cog</u>	<u>Cog</u>
.10	.23	.55	.14
.50	.48	.74	.36
.90	.82	.92	.74

Strategy I:

Assess Full Range of KSAO's

Implications:

- adding noncognitive tests can reduce adverse impact
 - how much? *It Depends!!!*
 - composite d does not equal average of d 's!
 - composite d can be higher than components if predictor correlations are low and d 's are high
 - adding more non-cognitive tests produces diminishing returns
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Strategy II:

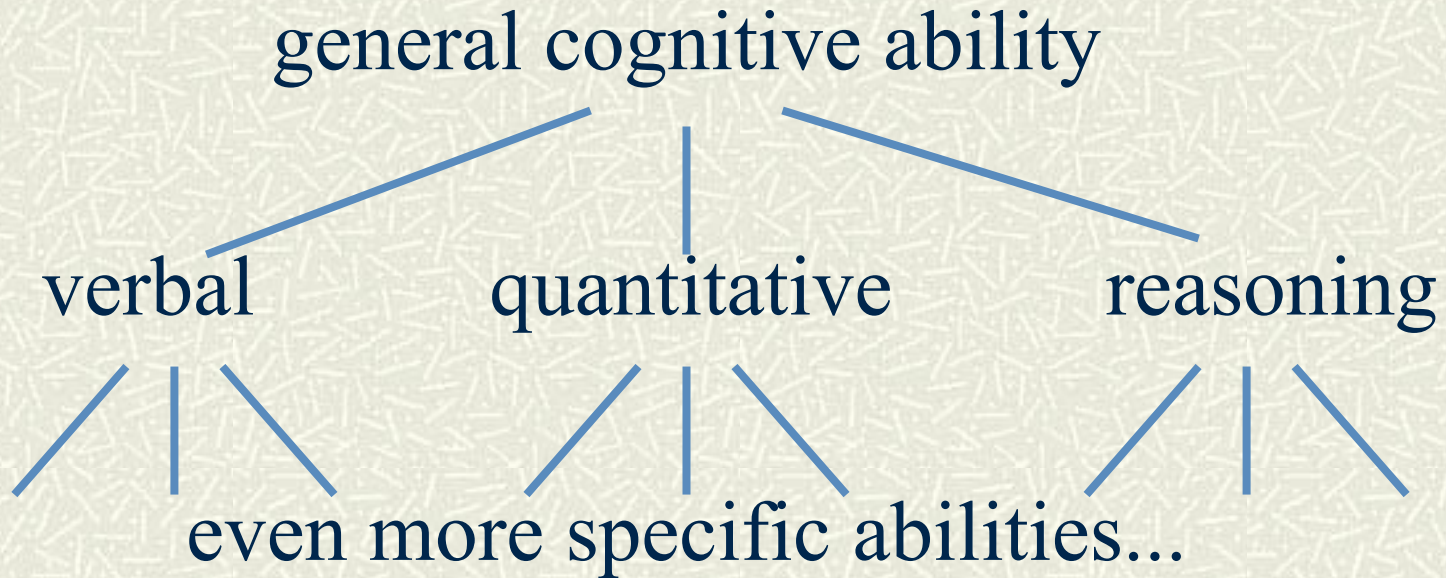
Use Specific Measures of Ability

- # Premise: overall subgroup differences in ability are 1 SD; more specific abilities produce smaller differences.
 - # Ex: if appropriate, measure only quantitative ability instead of overall cognitive ability.
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Strategy II:

Use Specific Measures of Ability

Structure of Cognitive Ability



Strategy II:

Use Specific Measures of Ability

# Ability:	<u>W-B</u>	<u>W-H</u>	<u>M-F</u>
■ Verbal	.60	.40	-.10
■ Quantitative	.70	.30	.20
■ Science	1.00	.60	.20
■ Spatial	.70	???	.40
■ Memory	.50	???	.00
■ Processing Speed	.30	.40	.00

Strategy II:

Use Specific Measures of Ability

Implications:

- more specific abilities produce smaller subgroup differences for some groups
 - identify and assess only the relevant abilities
 - incumbent samples have smaller subgroup differences
 - if overall cognitive ability is not required for job, don't measure it (assuming no tradeoff in validity)!
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Strategy III: Criterion Weighting

- # Premise: if performance is multidimensional, weighting dimensions by organizational importance may reduce subgroup differences in predictors.
 - # Why? Because relative weight of predictor is affected by weight of criterion dimension. “Technical” criterion dimensions are more ability-laden, so greater differences.
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Strategy III: Criterion Weighting

Adverse Impact and Differential Weighting:

Task:	1.0	5.0	1.0	1.0	0.0
Contextual:	0.0	1.0	1.0	5.0	1.0

<u>SR</u>	<u>Adverse Impact</u>				
.10	.13	.14	.19	.34	.44
.40	.33	.33	.40	.52	.61
.60	.47	.48	.53	.65	.73
.80	.66	.67	.72	.80	.84

Strategy III: Criterion Weighting

Implications:

- as weight less technical dimensions of performance, adverse impact decreases because of smaller relations to cognitive ability
- criterion weights can account for up to 34% of variance in validities

Strategy IV: Change Test Format

- # Premise: subgroup differences result from verbal/reading component on paper and pencil tests. Change test format (minimize verbal requirements) and subgroup differences will be reduced.
 - # Ex: Use a video-based test of interpersonal skills instead of a paper and pencil test.
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Strategy IV: Change Test Format

Implications:

- d smaller for more visual test stimuli:

- Ex 1: d for interpersonal skills

- paper and pencil test: $d = 1.19$

- video-based test: $d = .28$

- Ex 2: d for verbal ability

- traditional paper and pencil: $d = 1.03$

- evaluate written material: $d = .91$

- draft description of short video: $d = .45$

Strategy IV: Change Test Format

Implications:

- reading requirements related to d
 - Ex: reading requirements and White-Black d for situational judgment tests:

<u>Reading Level</u>	<u>d</u>
10	.51
12	.62
14	.74

Strategy IV: Change Test Format

Implications:

- if must measure verbal ability, do so directly
 - be careful to ensure:
 - additional constructs not measured
 - same construct still measured
 - can produce a sizeable reduction for non-cognitive measures
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Strategy V:

Enhance Applicant Perceptions

- # Premise: subgroup differences result from differences in test-taking motivation, the perceived appropriateness/face validity of tests, or instruction set.
 - # Ex: Using a more face valid test enhances test-taking motivation and reduces score differences.
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Strategy V:

Enhance Applicant Perceptions

Average White-Black d :

<u>Perception</u>	<u>W-B</u>
test-taking motivation	.24
face validity	.17 (lab)
predictive validity	.20
beliefs in tests	.44
fairness	-.25
test specific anxiety	-.06
test self-efficacy	.32

Strategy V:

Enhance Applicant Perceptions

d for face validity and instruction

- presenting a cognitive ability test in a work-related context and telling test-takers it measures work-specific abilities reduces d from .99 to .80.
 - A reduction of .19 SD
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Strategy V:

Enhance Applicant Perceptions

Implications:

- minority applicants tend to hold more negative test perceptions
 - enhancing minority motivation produces a small reduction in subgroup differences
 - these perceptions may relate not only to test scores but also applicant withdrawal
 - contributes to chilling effects
 - social context may be de-motivating
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Strategy VI:

Use Test Orientation Courses

- # Premise: subgroup differences result from unfamiliarity with the test or unequal test-taking skills. Providing test orientation or coaching sessions will equate subgroups on necessary test-taking skills.

 - # Ex: provide 1 hour information and practice session before taking test.
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Strategy VI:

Use Test Orientation Courses

Implications:

- produces very little reduction of subgroup differences
 - both groups improve about the same
 - those who start training with highest skills benefit the most
 - good public relations value; tend to foster very favorable applicant perceptions
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Strategy VII: Targeted Recruiting

- # Premise: primarily recruiting qualified minorities increases chances of selecting from top of distribution and reduces number of unqualified candidates.
 - # Remember: AI = in part based on # minority candidates who apply
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Strategy VII: Targeted Recruiting

Implications:

- almost no data on this strategy!
 - however, is used frequently in academics for admission into selective programs.
 - difficulty is in identifying and reaching those qualified minority applicants and convincing them to apply.
 - careful recruiting could reduce chilling effects.
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Strategy VIII:

Banding & Score Adjustment

- # Premise: there is no perfectly reliable test; therefore consider unreliability when making selection decisions to identify “bands” from which scores are indistinguishable.

Strategy VIII: Banding & Score Adjustment

- # What can we influence?
 - width of band
 - preference for referral within band
 - size of confidence interval
 - reliability of test
 - multiple tests-how do you estimate?
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Strategy VIII: Banding & Score Adjustment

Implications

- selection ratio and referral choice are most important features of selection process
- but applicant pool characteristics are key!
 - selection ratio
 - proportion of minority candidates

Conclusions

- # Assess the entire range of KSAOs, but only those required for the job
 - # Weight criteria according to their importance
 - # For non-cognitive tests, change test formats to minimize verbal or cognitive ability loadings to the extent it is appropriate
 - # Reduce the reading requirements of tests
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Conclusions

- # Use liberal time limits when possible
 - # Use face valid tests, and try to foster more favorable perceptions
 - # Use test orientation programs when possible
 - # Target minorities in the high range of ability
 - # **USE MULTIPLE STRATEGIES!!!**
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Conclusions

- # Recognize that adverse impact is caused by multiple factors. If overall tests of cognitive ability tests are used, it will be nearly impossible to eliminate adverse impact - but it can be meaningfully reduced. The key is to understand what is causing it in a particular instance, and adopt those strategies most relevant for the particular situation.
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Additional Information

Overheads, references, and other information may be obtained at:

www.gmu.edu/departments/psychology/ployhart/
