

Personnel Selection

Overview

Strategies and Objectives

Measurement Issues

- Reliability
- Validity
- Utility
- Fairness

Selection Techniques

- Employment Interviewing
- Employment Testing

Decision Making


Developing a Selection System

Objectives

- **Effectiveness:** high productivity, low absence and turnover, etc.
- **Fairness:** equal opportunity regardless of group membership

Developing a Selection System

Basic Strategy

Predictors  Criteria

1. Samples

Examples:

- typing test
- engine diagnosis

2. Signs

Examples:

- intelligence
- personality
- education

Standards of Success

Examples:

- performance
- attendance
- stability
- adaptability
- responsibility

Basic Issues in Measurement

Classical Test Theory

$$X = t + b + e$$

Where: X = score on a measure

t = true score

b = systematic error

e = random error

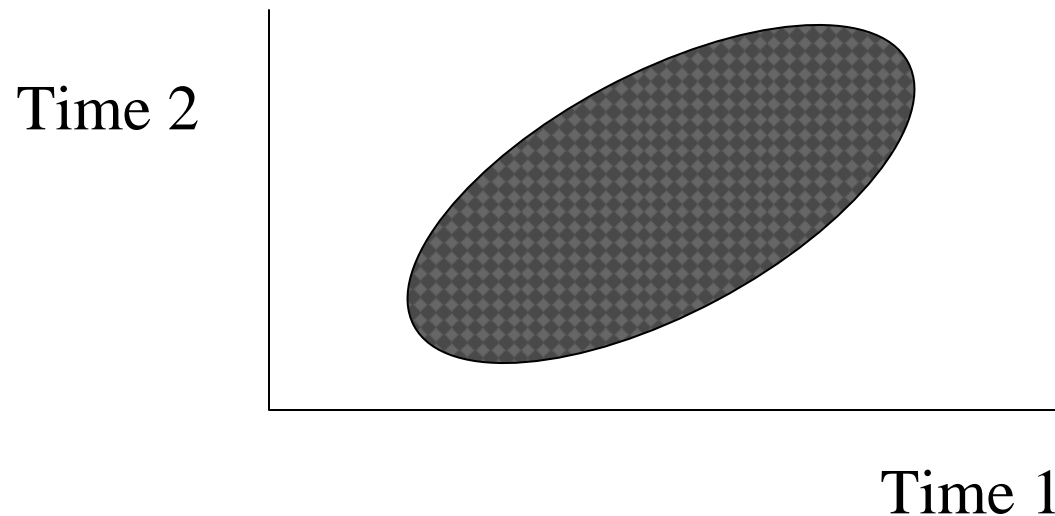
Criteria for Evaluating Measures

- Reliability:
 - consistency in measurement
- Validity:
 - accuracy of inferences from scores on a measure
- Utility:
 - practical value added by using a measure
- Fairness:
 - freedom from bias

Reliability: Consistency in Measurement

Types of Reliability

1. Temporal Stability: consistency over time
 - Index: Test-retest reliability coefficient (r)



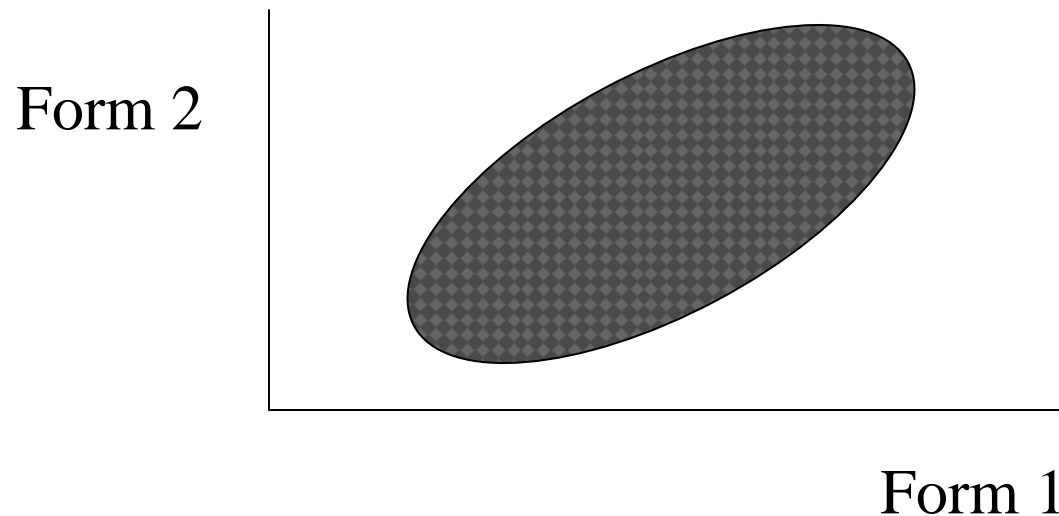
Reliability:

Consistency in Measurement

Types of Reliability

2. Alternate Forms: consistency across different forms of a measure

➤ Index: Alternate forms reliability coefficient (r)



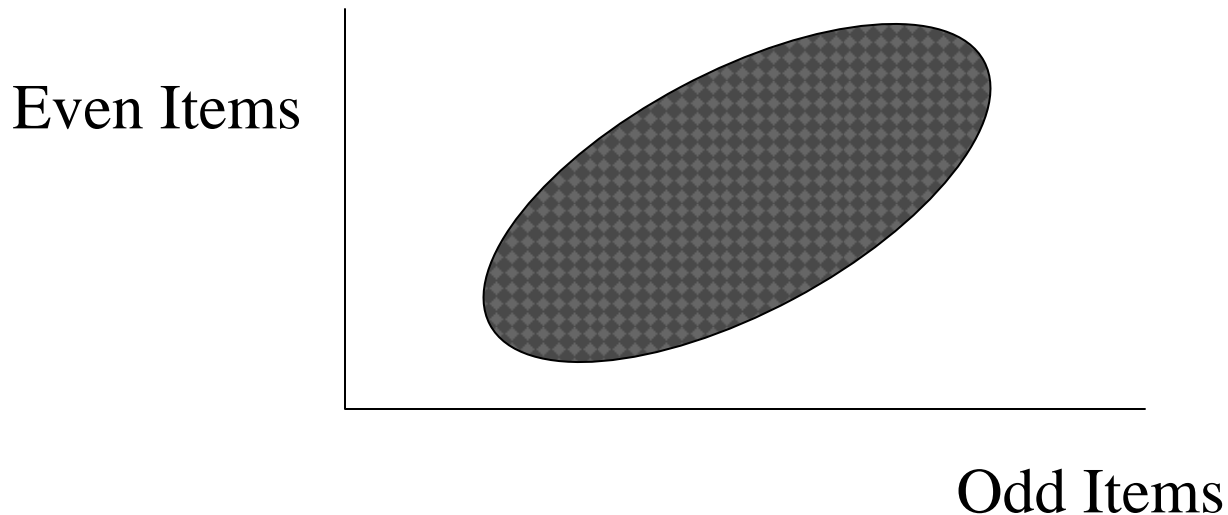
Reliability:

Consistency in Measurement

Types of Reliability

3. Internal Consistency: consistency of content within a measure

➤ Index: Split-half reliability coefficient (r)



Reliability: Consistency in Measurement

Types of Reliability

3. Internal Consistency: consistency of content
within a measure

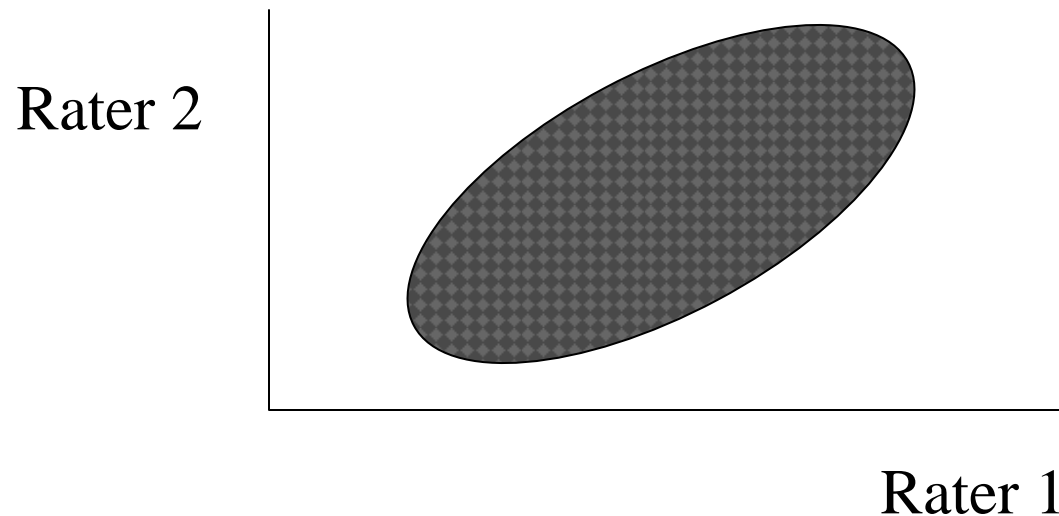
➤ Other Indices: KR-20

Coefficient alpha

Reliability: Consistency in Measurement

Types of Reliability

4. Inter-rater reliability: consistency across raters
 - Index: Inter-rater reliability coefficient (r)



Validity: Accuracy of Inferences

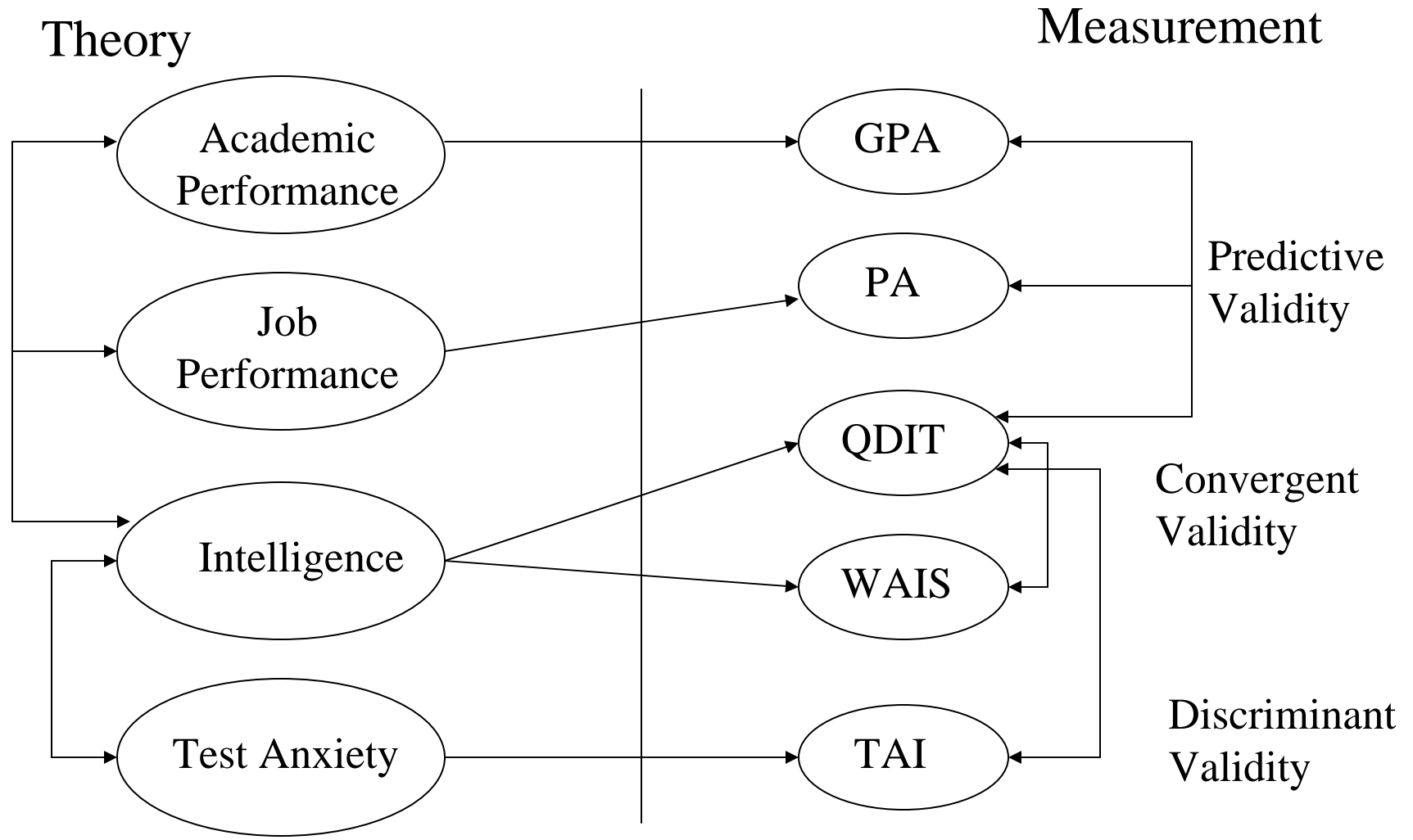
Types of Inferences:

1. Scores on a measure reflect the level on a trait

Forms: Face validity

Construct validity

Construct Validation



Validity: Accuracy of Inferences

Types of Inferences:

2. The measure adequately reflects the content of the domain

Index: Content validity (expert judgment)

Criteria: Relevance

Proportional representation

Validity: Accuracy of Inferences

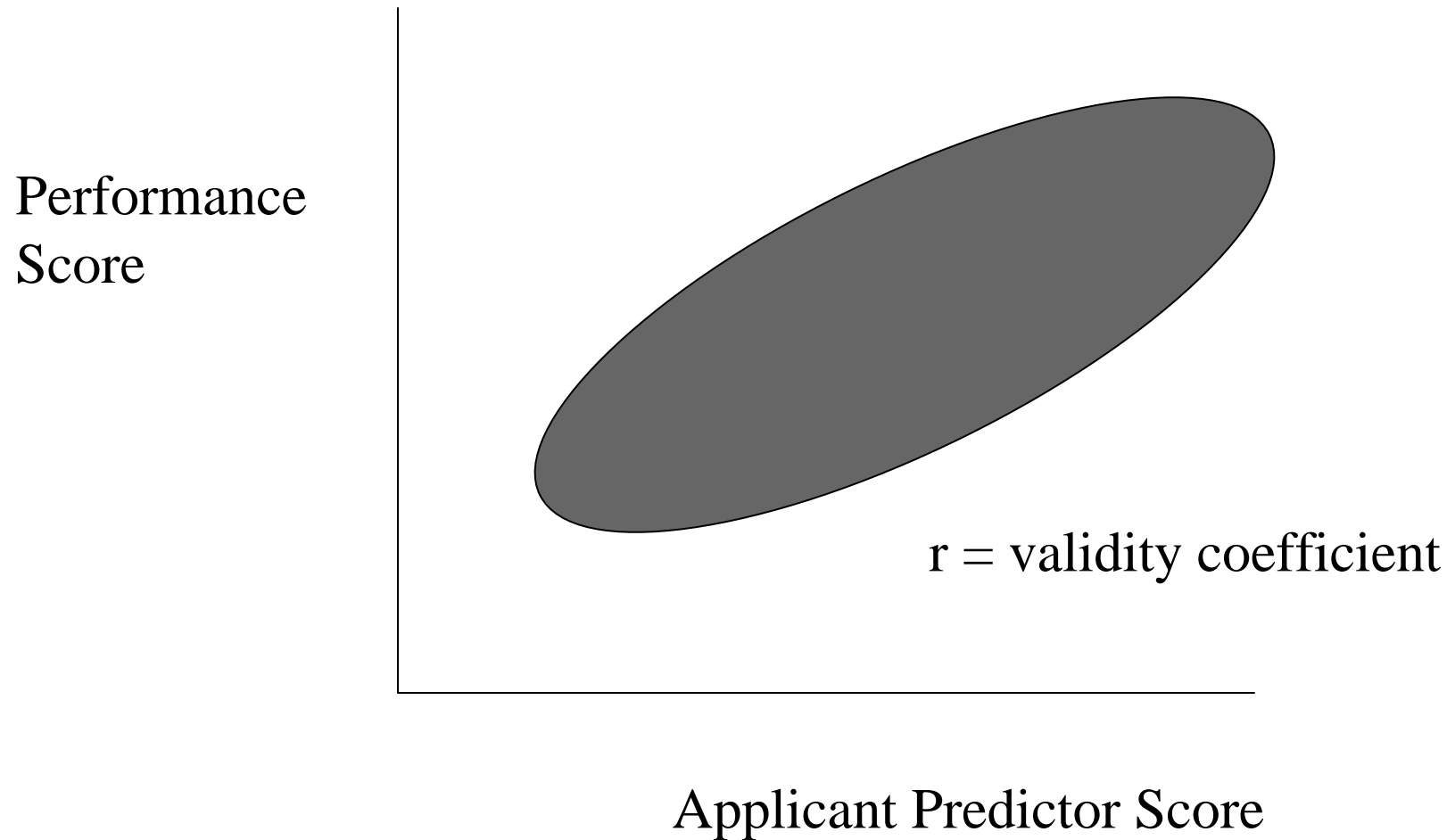
Types of Inferences:

3. Scores on a measure can be used to predict some criterion

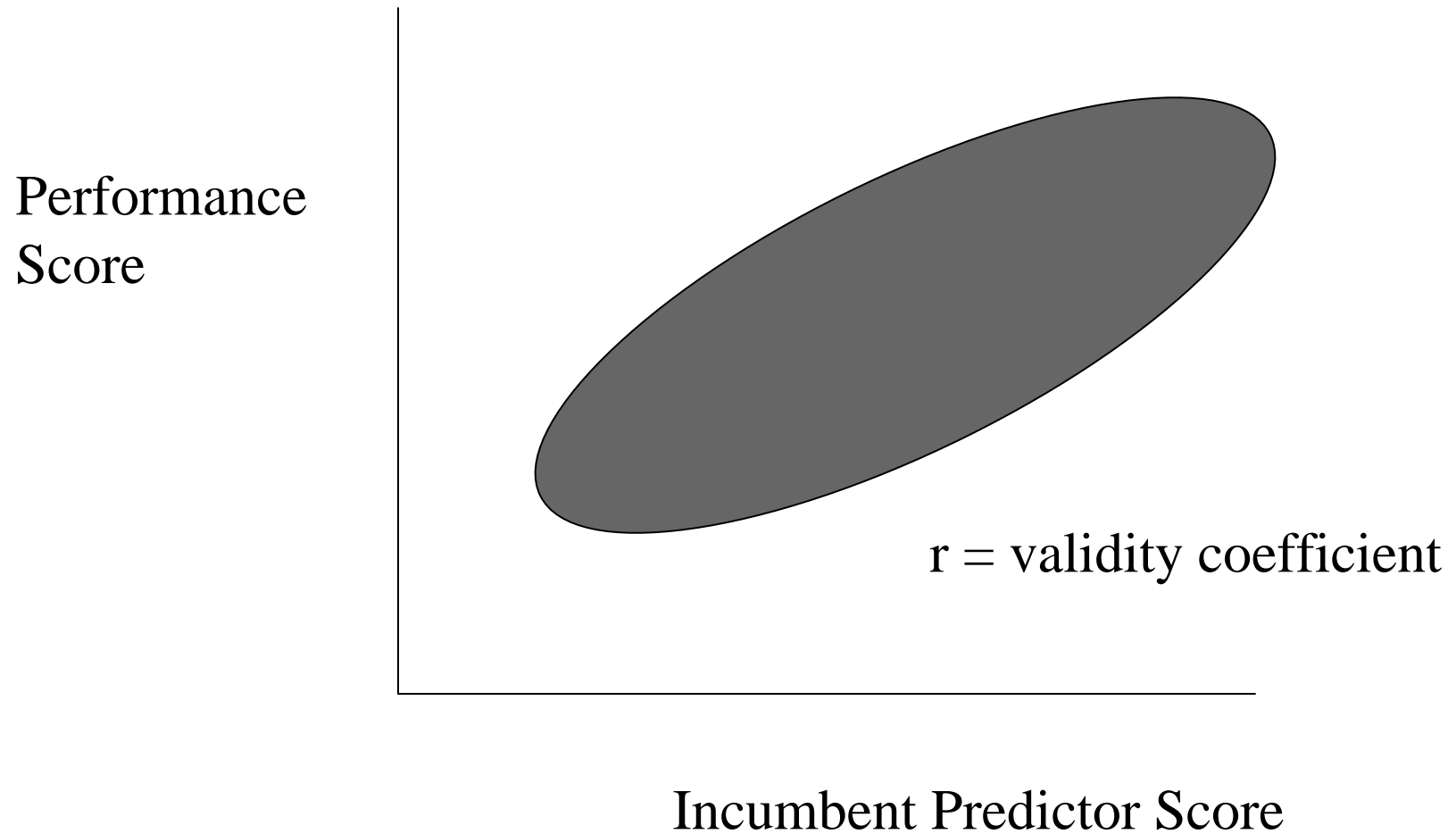
Index: Criterion-related validity (r)

- Predictive validity
- Concurrent validity

Predictive Validity



Concurrent Validity



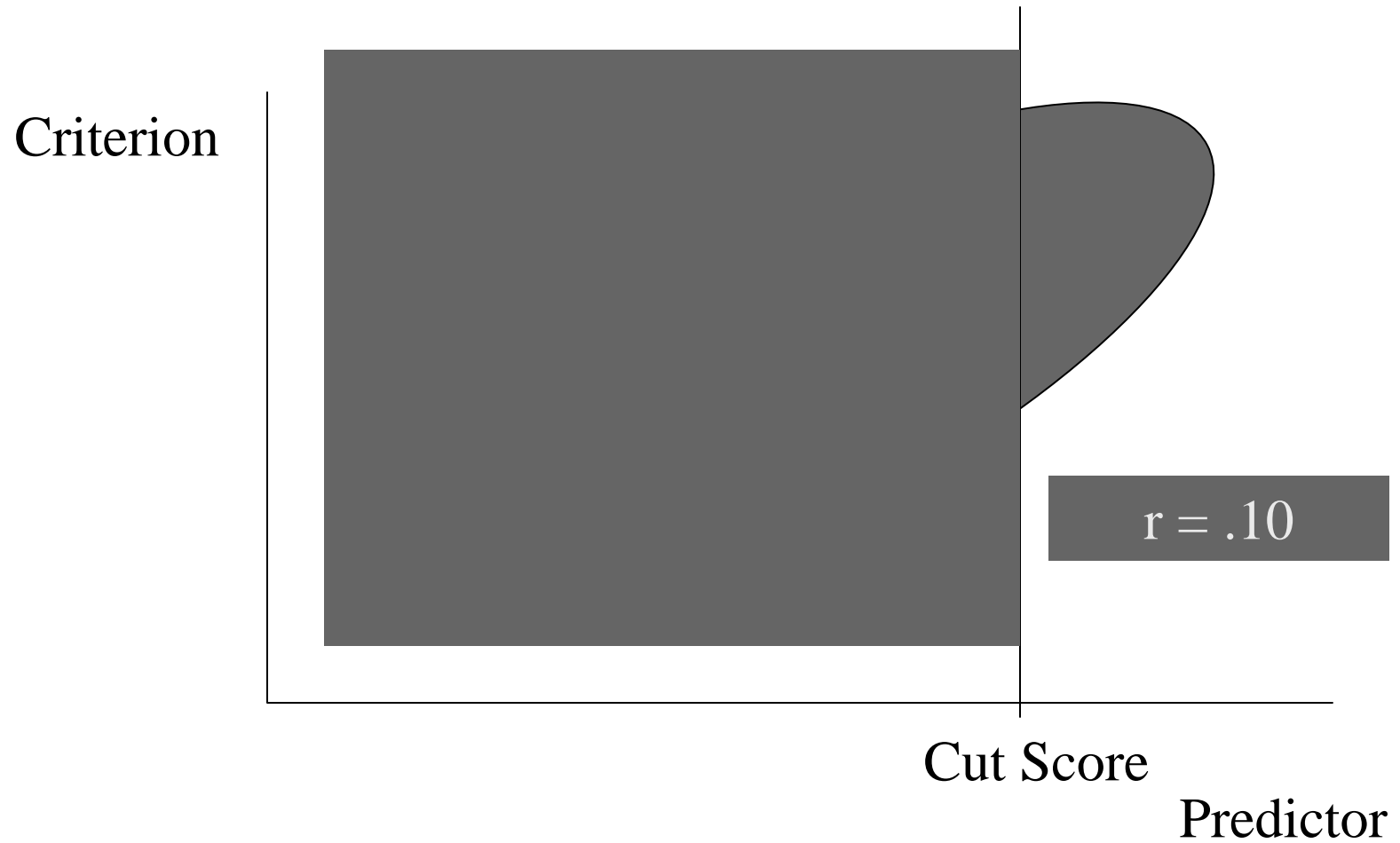
Factors Affecting Correlation Coefficients

- True relation between the construct
- Sample size
 - Random error greater with small samples
- Reliability of the Measures
 - Unreliability attenuates (lowers) r
- Variability in the Measures
 - Restricted variability attenuates r
- Other errors (e.g., recording errors)

Effects of Range Restriction



Effects of Range Restriction



Utility: Practical Value Added

Forms

1. Gain in Predictive Efficiency

Utility = success rate after – success rate before

Factors Affecting Utility

- Validity of the measure (positive relation)
- Selection ratio (opening/applicants; negative relation)
- Base rate (inverted U; best at 50%)

Utility:

Practical Value Added

Forms

2. Cost Effectiveness

Utility = benefit/cost after – benefit/cost before

Factors Affecting Utility

- Validity, selection ratio, base rate
- Costs of testing
- Profits from improved performance etc.

U.S. Legislation and Cases: A Brief History

- 1964 Civil Rights Act
- 1971 Griggs v. Duke Power Company
- 1978 Bakke v. Regents of the University of California
- 1979 Weber v. Kaiser Aluminum and the American Steelworkers Union
- 1987 Wards Cove v. Atonio
- 1991 Civil Rights Act

U.S. Civil Rights Act (1964)

Title VII: section of the Act dealing with discrimination in employment practices

Re: Discrimination

"... it shall be unlawful employment practice for an employer ... to fail or refuse to hire or to discharge any individual, or otherwise to discriminate against any individual with respect to his compensation, terms, condition, or privileges of employment, because of such individual's race, color, religion, sex, or national origin."

U.S. Civil Rights Act (1964)

Title VII: section of the Act dealing with discrimination in employment practices

Re: Right to Test

"Nor shall it be an unlawful practice for an employer to give and to act upon the results of any professionally developed ability test, provided that such test, its administration or action upon the results is not designed, intended, or used to discriminate because of race, color, religion, sex or national origin."

Shifting Burden of Proof Model

- Phase 1:** Demonstrate adverse impact
➤ Criterion = 80% rule
- Phase 2:** Employer has opportunity to demonstrate business necessity
- Phase 3:** Plaintiff has opportunity to demonstrate that alternative methods exist that would not create adverse impact

Personnel Selection in Canada

The Legal Context

1. Canadian Human Rights Act (1977)
2. Constitution Act (1982)
 - Part 1, Sections 1-34: Canadian Charter of Rights and Freedoms
3. Employment Equity Act (1986)
4. Canadian Labour Code

Canadian Legislation

Canadian Human Rights Act (1977)

8. It is a discriminatory practice, directly or indirectly, (a) to refuse to employ or continue to employ an individual, or (b) in the course of employment, to differentiate adversely in relation to an employee, on a prohibited ground of discrimination

Canadian Legislation

Canadian Human Rights Act (1977)

Prohibited Grounds of Discrimination (federal)

- Race
- National Origin
- Colour
- Religion
- Age
- Sex (including pregnancy and childbirth)
- Marital Status
- Family Status
- Mental or physical disability (including previous drug or alcohol dependence)
- Pardoned conviction
- Sexual orientation

Canadian Legislation

Canadian Human Rights Act (1977)

- applies to all federally regulated employers
- prohibits undue discrimination even if unintended
- permits a defence of "business necessity"

Canadian Legislation

Canadian Charter of Rights and Freedoms (1982)

15. (1) Every individual is equal before and under the law and has the right to equal protection and equal benefit of the law without discrimination and, in particular, without discrimination based on race, sex, age or mental or physical disability

(2) Subsection (1) does not preclude any law, program or activity that has as its object the amelioration of conditions of disadvantaged individuals or groups including those that are disadvantaged because of race, national or ethnic origin, colour, religion, sex, age or mental or physical disability

Canadian Legislation

Employment Equity Act (1986)

2. The purpose of this Act is to achieve equality in the work place so that no person shall be denied employment opportunity or benefit for reasons unrelated to ability and, in the fulfillment of that goal, to correct the conditions of disadvantage in employment experienced by women, aboriginal peoples, persons with disabilities and persons who are, because of their race or colour, in a visible minority in Canada by giving effect to the principle that employment equity means more than treating persons in the same way but also requires special measures and the accommodation of differences.

Canadian Legislation

Employment Equity Act (1986)

Employer's Duty

4. An employer shall, in consultation with such persons as have been designated by the employees to act as their representatives or, where a bargaining agent represents the employees, in consultation with the bargaining agent, implement employment equity by ...

Canadian Legislation

Employment Equity Act (1986)

- (a) Identifying and eliminating each employer's employment practices, not otherwise authorized by a law, that results in employment barriers against persons in designated groups:
and

Canadian Legislation

Employment Equity Act (1986)

- (b) Instituting such positive policies and practices and making such reasonable accommodation as will ensure that persons in designated groups achieve a degree of representation in the various position of employment with the employer that is at least proportionate to their representation
 - (i) in the work force, or
 - (ii) in those segments of the work force that are identified by qualification, eligibility or geography and from which the employer may reasonably be expected to draw or promote employees

Personnel Selection in Canada

The Legal Context

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Landmark Cases in Canada

1984 Action Travail des Femmes v. Canadian National

- Challenged the use of the Bennett Mechanical Comprehension Test in selection for non-apprentice entry-level positions on the grounds that it discriminated against women
- First use of statistical evidence to identify adverse impact
- Adapted the Shifting Burden of Proof Model
- Acknowledged need for job analysis
- CN ordered to stop using the BMCT
- CN ordered to impose hiring quota until under-representation was eliminated

Fairness: Freedom from Bias

Question: How do we know whether a test is biased?

Case #1: Selection of fire-fighters

- Women challenged construct, content, and criterion-related validity of selection procedure

Case #2: Fairness of LSAT

- Use of LSAT for selection into UofT law school challenged for (a) predictive validity and (b) fairness to minorities

Fairness: Freedom from Bias

Definition of “Test Bias”

- Bias in selection exists when, on average, members of different groups have an equal probability of being successful on the job but an unequal probability of being hired

Fairness: Freedom from Bias

Criteria used to detect Test Bias

1. Group differences in mean predictor scores
(Adverse impact)
 - A difference in means by itself does *not* indicate bias

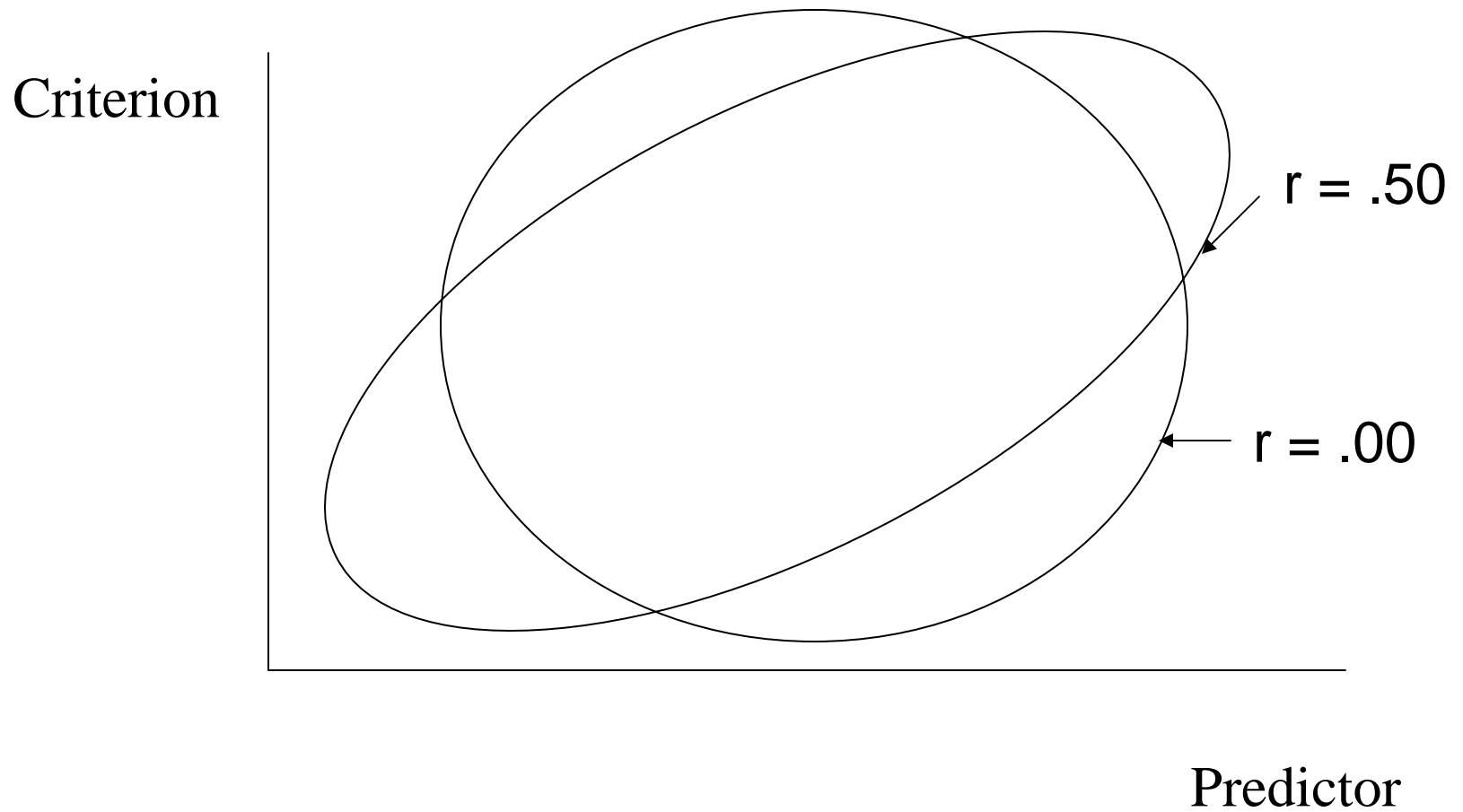
Fairness:

Freedom from Bias

Criteria used to detect Test Bias

2. Group differences in validity (Differential Validity)
 - Bias exists if there is differential validity and test scores are used the same for both groups
 - Bias can still exist even in the absence of differential validity

Example of Differential Validity



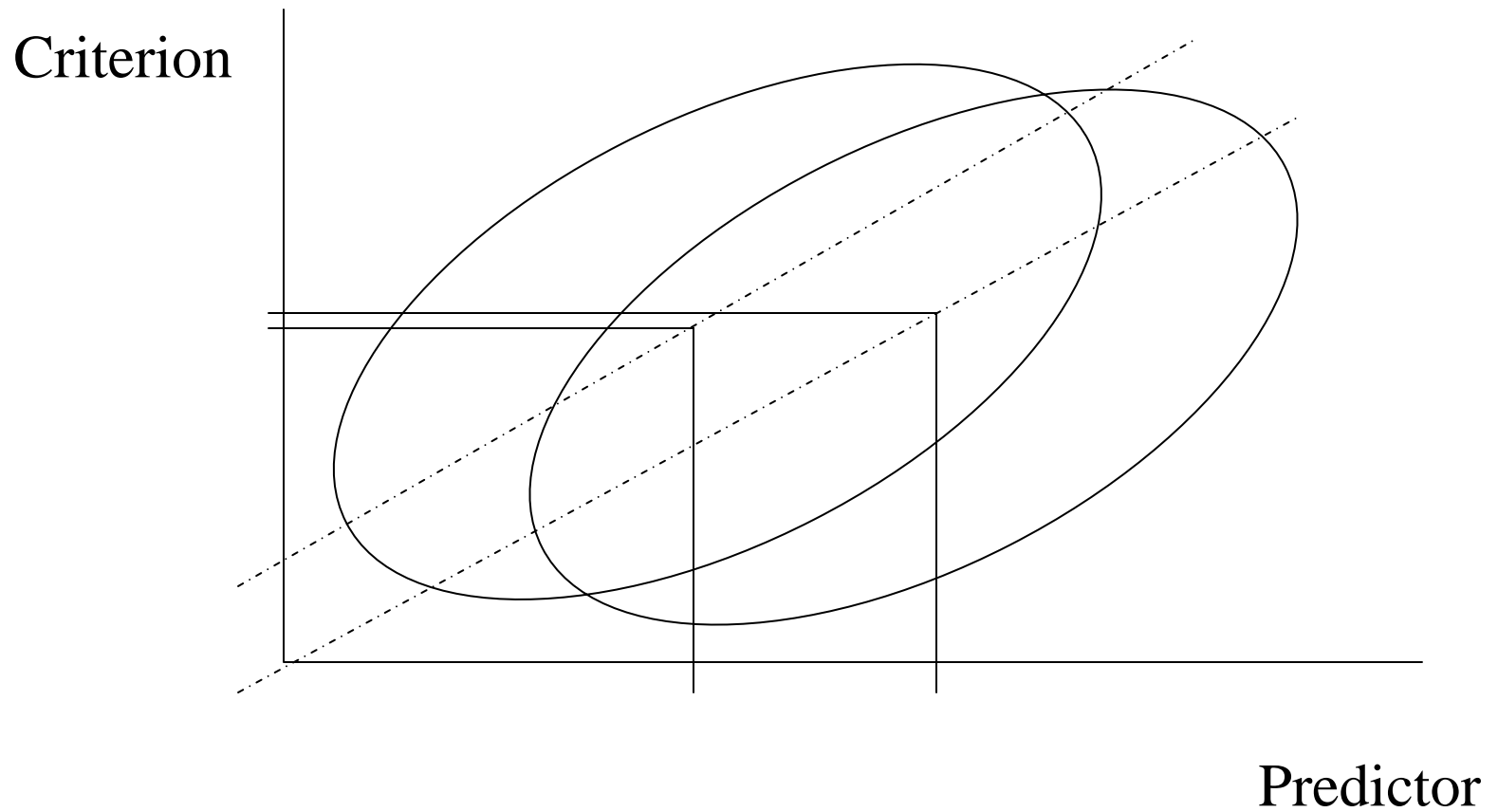
Fairness:

Freedom from Bias

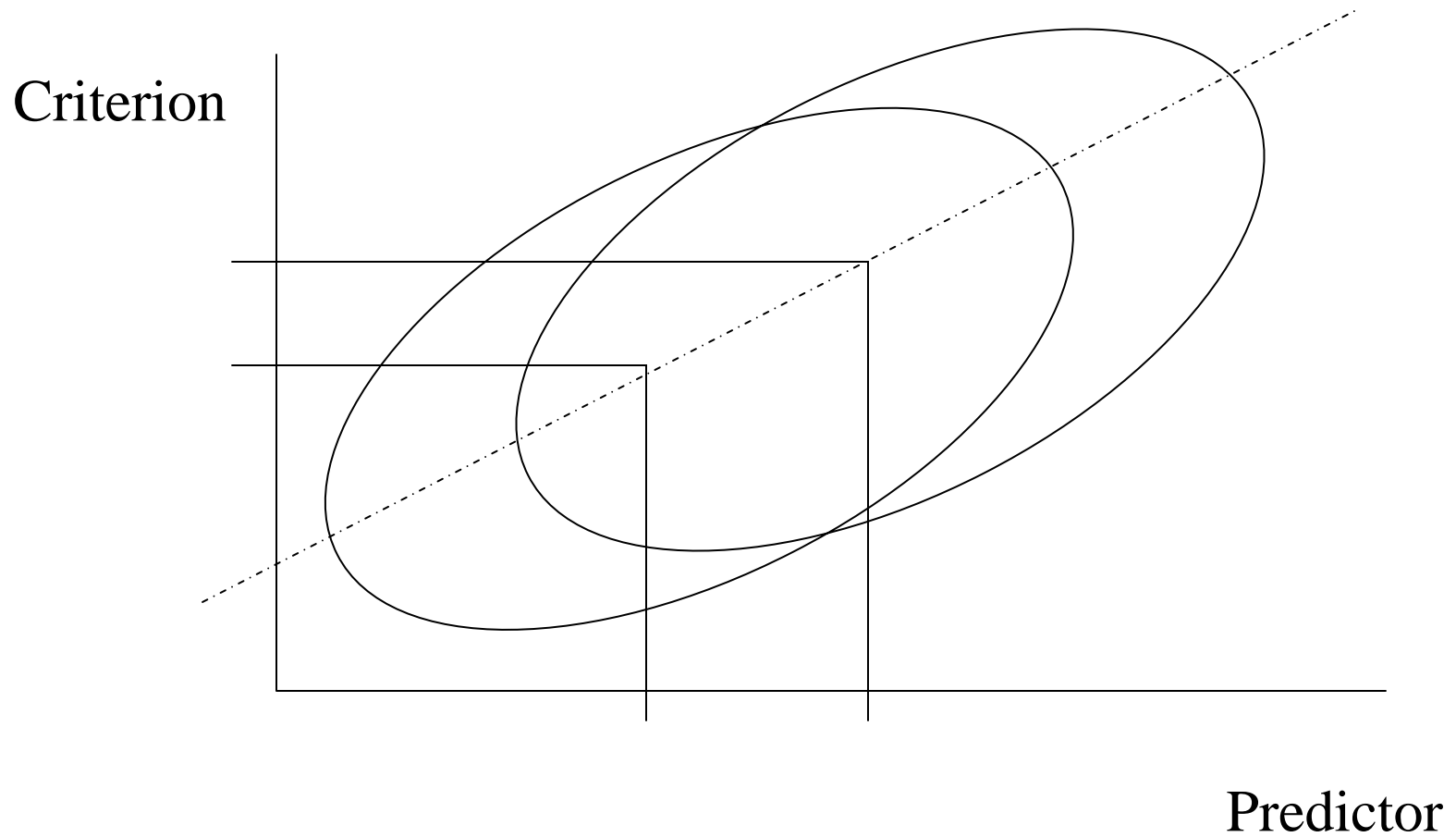
Criteria used to detect Test Bias

3. Group differences in regression lines
(Differential Prediction)
 - Bias exists if the same equation is used to predict criterion scores when regression lines differ across groups

Example of Differential Prediction



Example of “Justifiable” Discrimination



Differential Validity: The Case of Cognitive Ability Testing

Ghiselli (1966)

- Reviewed validity coefficients obtained in hundreds of studies
- Found validity coefficients varied widely

Conclusion: there is evidence for differential validity

Implication: use of tests must be justified on a case by case basis (i.e., through local validation studies)

Differential Validity: The Case of Cognitive Ability Testing

Schmidt & Hunter (1981)

- Two factors can account for variation in validity coefficients
 1. Differences in true validities (as Ghiselli suggests)
 2. Statistical artifact
 - Random error due to small samples
 - Differences in attenuation due to unreliability
 - Differences in attenuation due to range restriction

Differential Validity: The Case of Cognitive Ability Testing

Schmidt & Hunter (1981)

- Found evidence that differences are due primarily to statistical artifact

Conclusion: validity of cognitive ability tests is generalizable (Validity Generalization)

Implication: there is no need for local validation studies

Selection “Tools”

- Applications/Resumes
- References
- Biographical Data (Biodata)
- Interviews
- Drug Testing
- Physical Health
- Work Samples
- Assessment Centres

Selection “Tools”

- “Psychological Tests”
 - Personality
 - Integrity
 - Vocational interest
 - Physical ability
 - Aptitude/ability
 - Job knowledge

Selection “Tools”

Questions to Ask

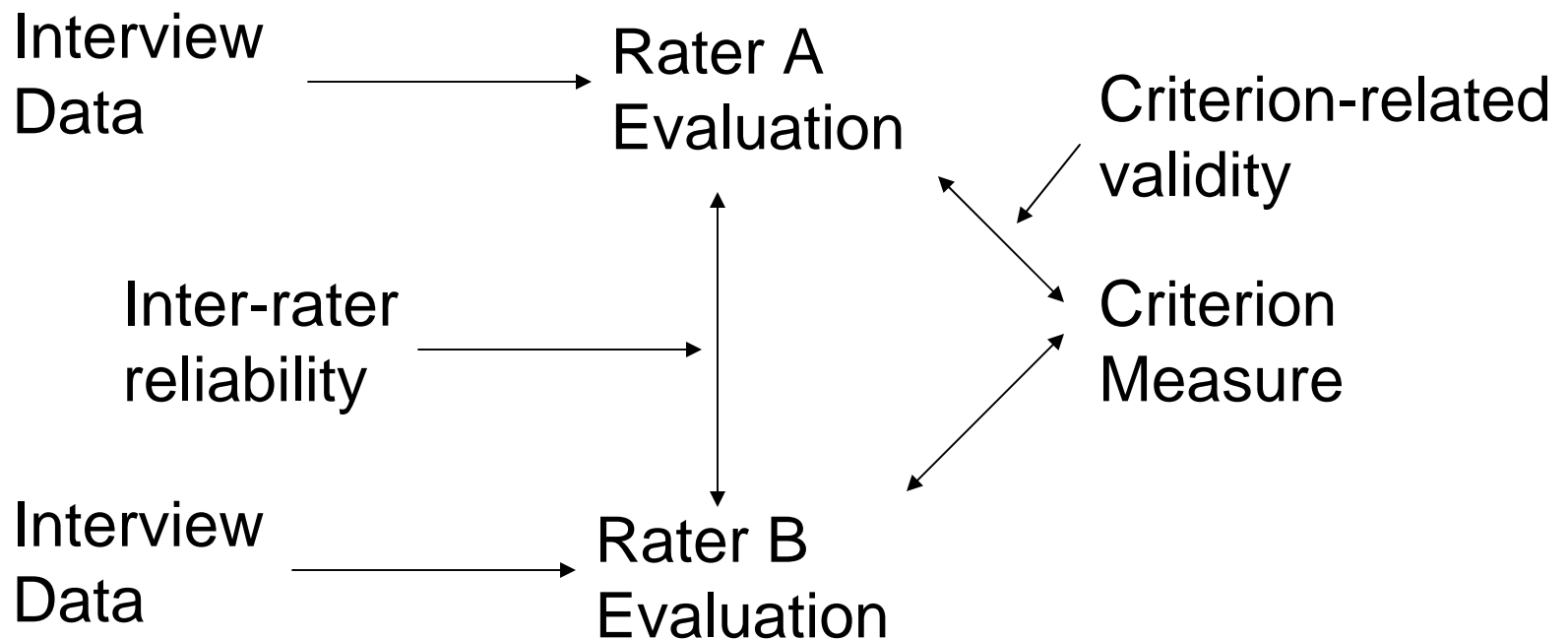
- What is it?
- Why is it used?
- What evidence exists concerning its effectiveness (i.e., reliability, validity, utility, fairness)
- What are the problems with its use?
- What are the solutions?

The Employment Interview: Reasons for Its Popularity

- Provides a sense of control
- Interviewers' belief in their ability to evaluate others
- Face validity
- Legal restrictions placed on testing
- Flexibility (can be tailored to measure various KSAOs)
- Serves multiple purposes
 - obtain relevant information
 - provide information about the job and organization
 - public relations

The Employment Interview: Assessing Reliability and Validity

Note: Reliability and validity must be assessed with respect to the measurement of some construct



The Employment Interview: Common Problems

- Uninformative questions and answers
- Poor knowledge of the job and its requirements
- Judgment errors
 - Negativity bias
 - Primacy effect
 - Halo error
 - Contrast error
 - Personal biases (e.g., age, sex, race, similarity-to me)

Methods for Improvement

- Interviewers should be well informed about the job (job analysis)
- Structure the interview
 - Common questions
 - Job-relevant content
 - Objectively scored
- Interviewer training (for accuracy and bias suppression)
- Use multiple raters

New Approaches

Situational Interview

Rationale:

- Behavioural intention predicts future behaviour

Method:

- Conduct a job analysis (Critical Incidents Technique)
- Identify realistic situations that involve a dilemma
- Develop a scoring guide
- Present the situation to candidates in a neutral tone and ask “what **would** you do?”
- Score the interview according to the scoring guide

New Approaches

Patterned Behaviour Description Interview

Rationale:

- Past behaviour predicts future behaviour

Method:

- Conduct a job analysis
- Develop questions to solicit examples of previous behaviour that illustrates required abilities (e.g., leadership)
 - Tell me about a time when ...
 - What was the situation?
 - What did you do?
 - What was the outcome?
 - Who can verify this?

Personality Testing

Discussion Questions

- What is personality?
- How would you measure it?
- Is it relevant to personnel selection?

Personality and Selection

Common Approaches to the Study of Personality

1. Motivational

e.g., Freud, Maslow, Murray, McClelland

2. Trait

e.g., Allport, Eysenck, Cattell

- **Big Five Personality Factors**

- Openness to Experience
- Conscientiousness
- Extraversion
- Agreeableness
- Neuroticism (Emotional Stability)

Measurement of Personality

- **Projective Technique**

e.g., Rorschach Inkblots, TAT

- **Objective Measures**

e.g., MMPI, CPI, 16-PF, NEO, PRF,
Myers-Briggs

Personality and Selection: A Brief History

Early Research

Guion & Gottier (1965) conducted a review of the literature (i.e., validation studies) and found no strong evidence for a link between personality and performance

Personality and Selection: A Brief History

Recent Research

Studies are now finding evidence that personality contributes over and above cognitive ability to the prediction of performance

e.g., Day & Silverman (1989) – accountants

Gellatly et al. (1993) – food service managers

Rothstein et al. (1994) – MBA students

Personality and Selection: A Brief History

Meta-Analyses

Barrak & Mount (1991)

- found specific links between Big 5 measures and various indices of performance
- found some evidence for validity generalization in the case of conscientiousness

Tett, Jackson & Rothstein (1991)

- found that the average correlation between personality and performance was greater in confirmatory studies than in exploratory studies

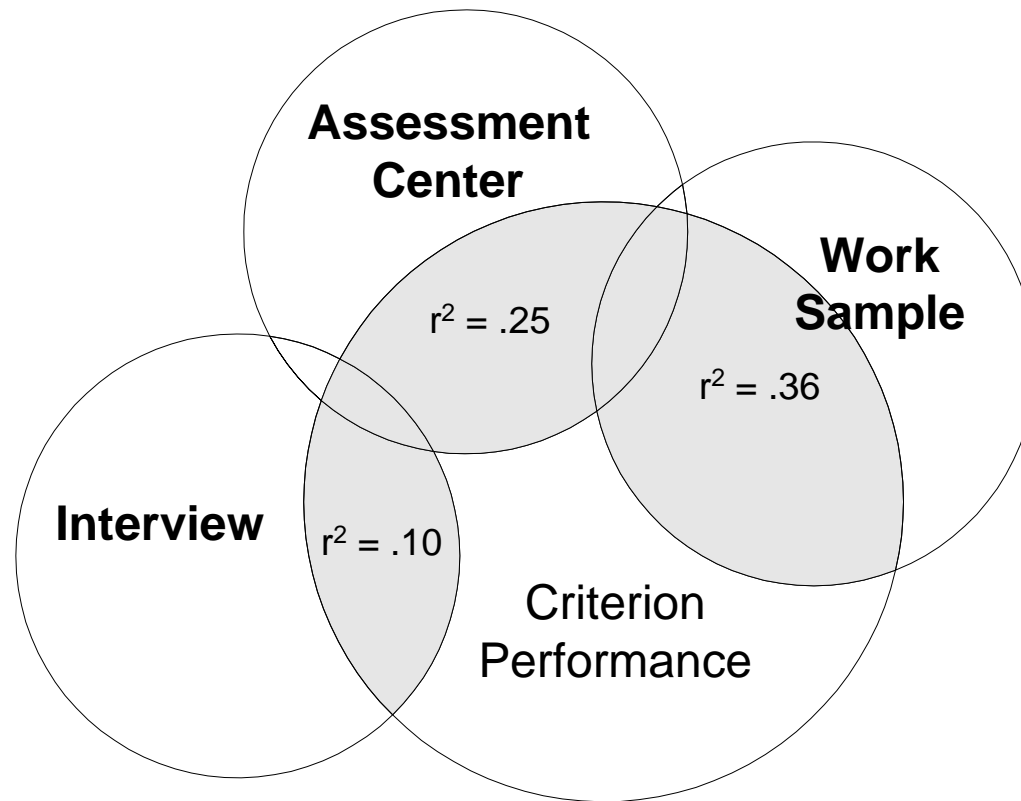
Methods of Combining Information in Decision-Making

Multiple Regression Approach

- Objective: Maximize variance explained (R^2)
- Strategy: Assign optimal weights to each predictor

$$\text{Predicted performance} = a + b_1P_1 + b_2P_2 + \dots + b_nP_n$$

- Method: Rational (intuitive) or Statistical
- Caution: Check for validity shrinkage
- Assumption: Predictors are compensable



Test Battery $R^2 = .55$

Methods of Combining Information in Decision-Making

Multiple Regression Approach

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Methods of Combining Information in Decision-Making

Multiple Cutoff Approach

- **Objective:** Ensure that minimum standard is attained for all required characteristics
- **Method:** Set minimum score on predictors (where necessary), and eliminate anyone who falls below that score

Methods of Combining Information in Decision-Making

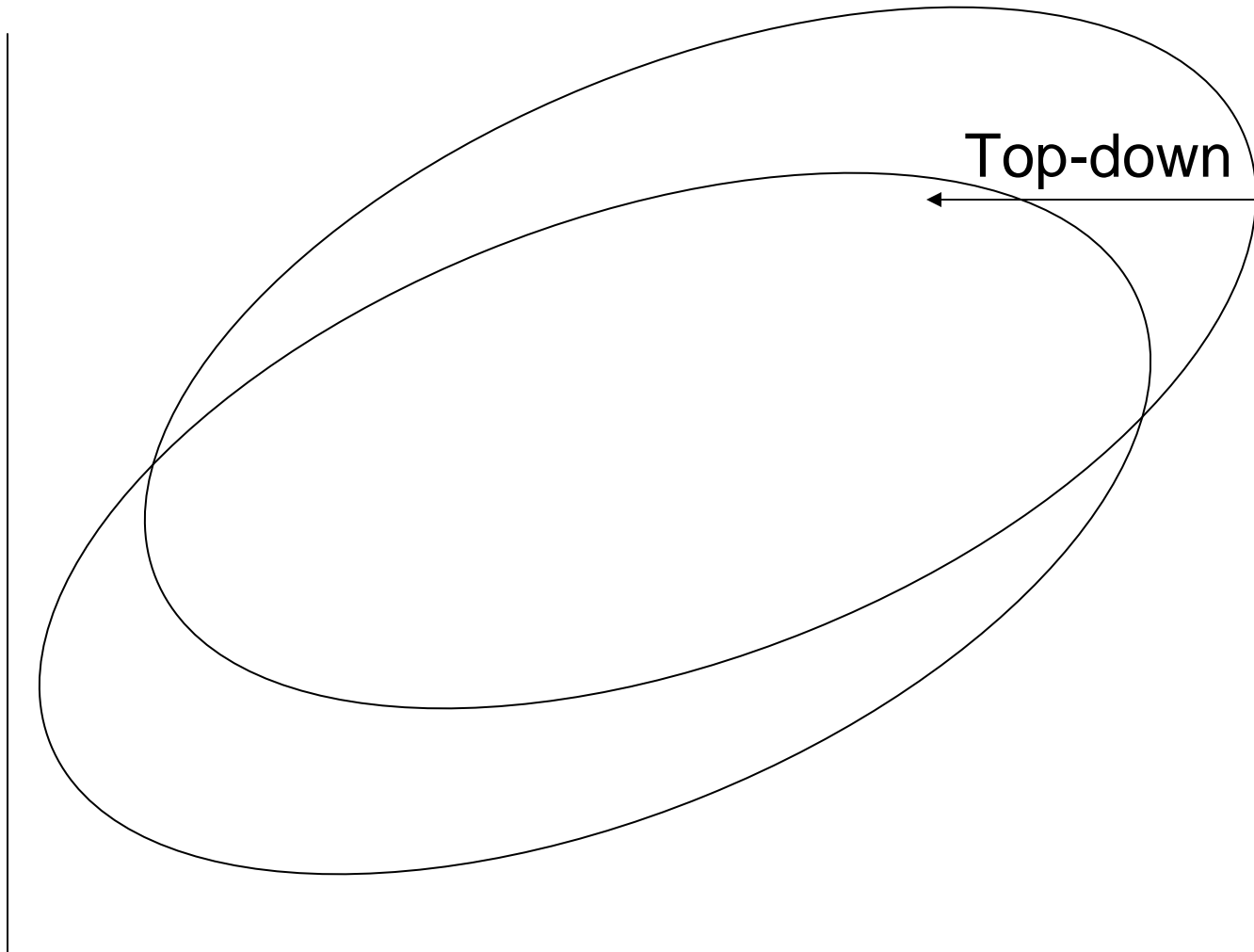
Multiple Hurdle Approach

- Objective: Reduce selection costs
- Method: Order procedures and eliminate candidates who fall below a minimum score; successful candidates move on to the next “hurdle”

Selection Strategies

- **Un-adjusted Top-Down Selection**
 - Hire the individuals from the entire applicant pool with the highest scores

Criterion



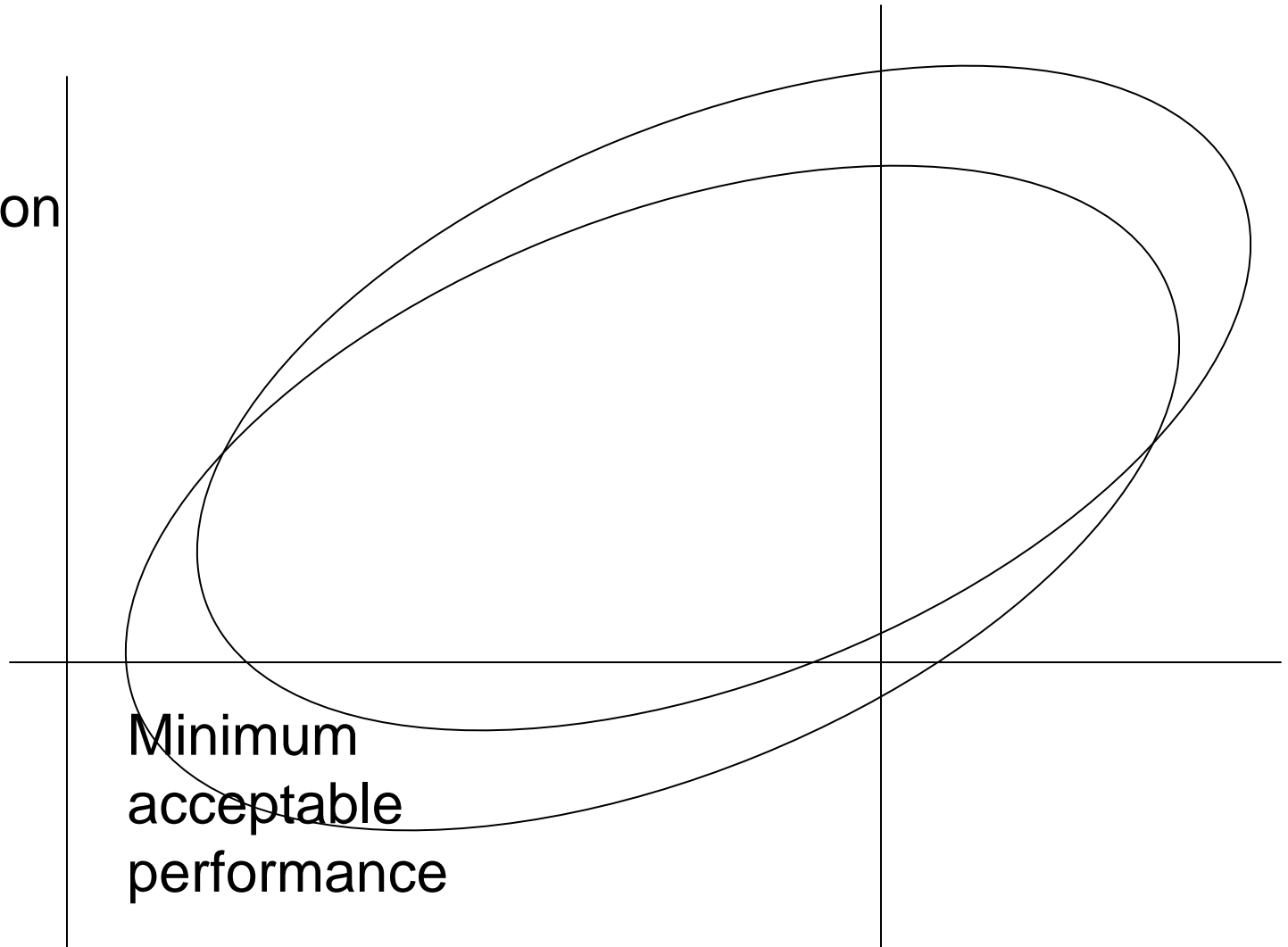
Top-down

Predictor

Selection Strategies

- **Passing Scores**
 - Identify the minimum score required and select from those above the cutoff to achieve desired workforce composition

Criterion



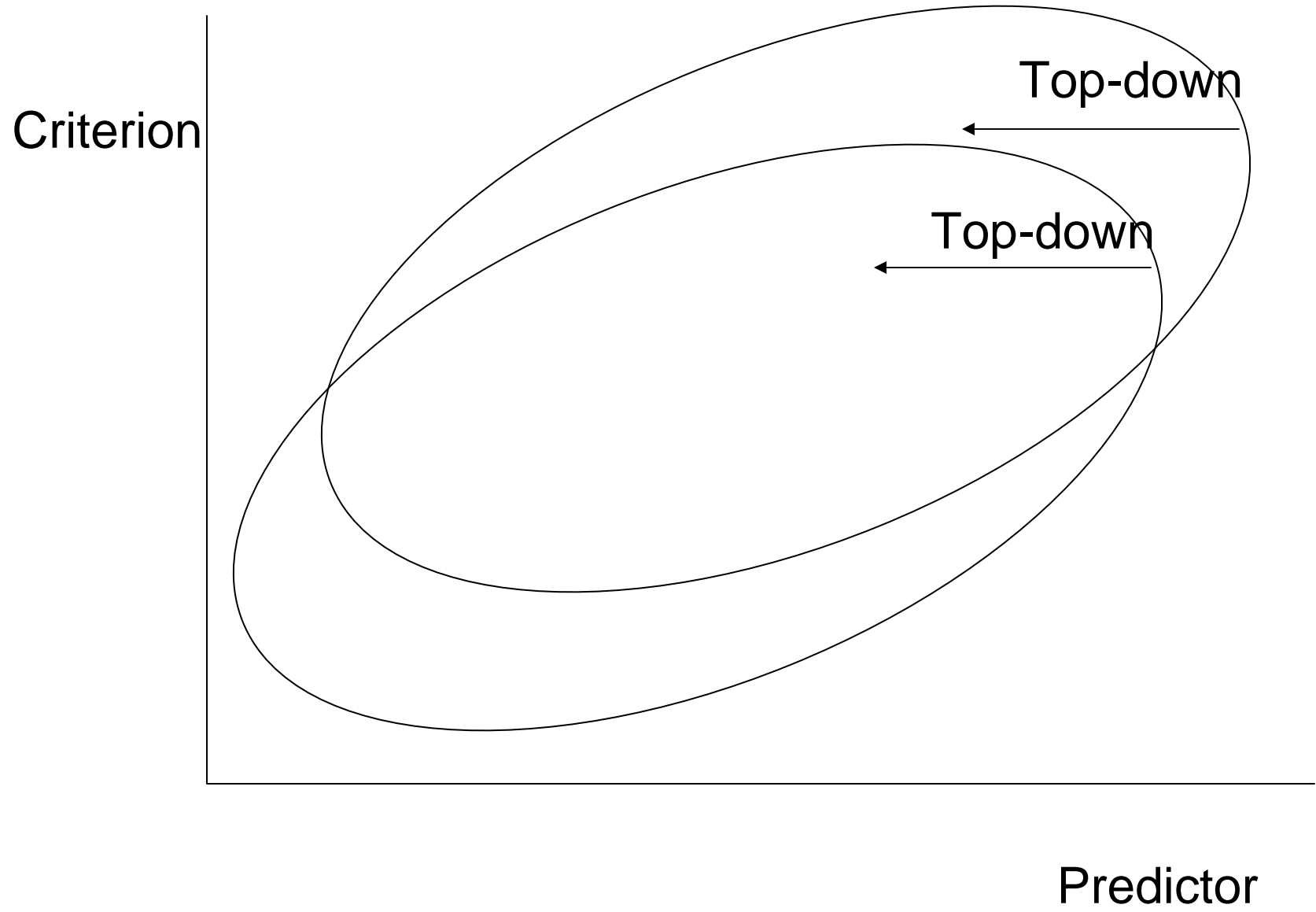
Minimum
acceptable
performance

Passing score

Predictor

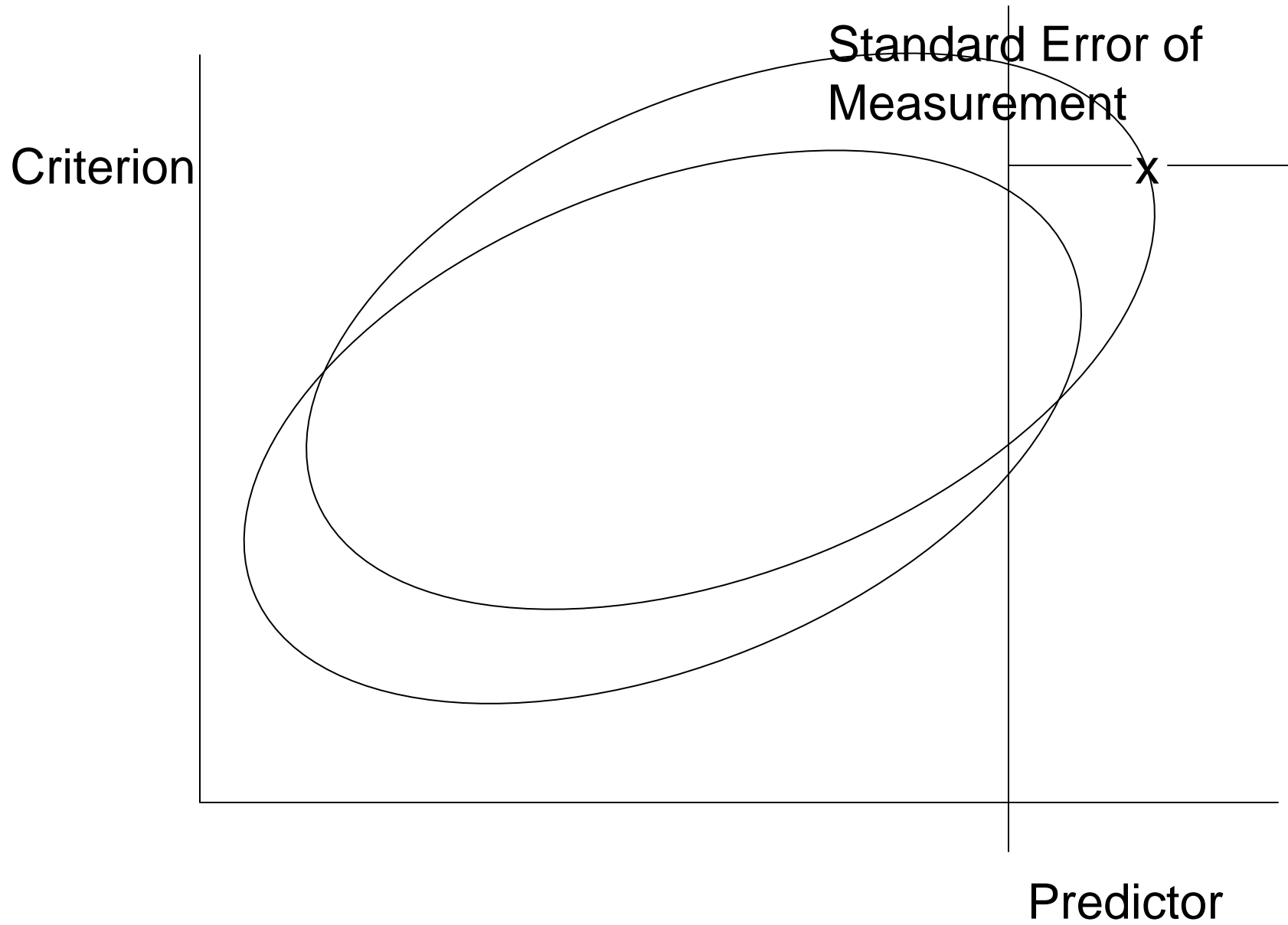
Selection Strategies

- **Within-group Top-Down Selection**
 - Divide sample according to group membership and hire applicants with the highest scores within groups to achieve desired workforce composition



Selection Strategies

- **Banding (sliding or non-sliding)**
 - Use standard error estimate to determine “equivalent” scores and select from within this group



Implications of Scientific Selection: A Summary

Objective #1: Accurate Decision-making

- Conduct a job analysis
- Select or develop measures of job-relevant characteristics
 - applications forms (standard, biodata)
 - interviews
 - cognitive ability tests
 - other aptitude or ability tests
 - personality inventories
 - work samples
 - etc.

Implications of Scientific Selection: A Summary

- Assess the reliability, validity, and potential utility of these measures
- Combine measures into a “battery” using appropriate strategy (e.g., multiple regression, multiple cutoff, multiple hurdle)
- Monitor success and revise accordingly

Implications of Scientific Selection: A Summary

Objective #2: Fairness in Selection

- If possible, avoid using measures with different group means
- If possible, avoid using measures with differential validity
- If necessary, and permitted by law, use differential prediction (i.e., use different selection criteria for different groups)

Note. Small businesses should attempt to comply with the underlying principles even though many of the procedures cannot be used