# Low-Fidelity Simulation: Ethical Decision-Making

Pearson Educational Measurement

University of Oklahoma

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# Collaborative Effort

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# Background cont…

- NIH funded grant to study EDM
- NIH Research Goals:
  - Validate measure of EDM
  - Validate Biodata and Climate measures of environmental influences
  - Identify effective components of RCR or ethics training
  - Extend findings to professional sample

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# Background cont…

- 3 Studies:
  1. Baseline Assessment or Control
  2. RCR Training Program
     - Not discussed today
  3. Professional Sample
     - Not discussed today

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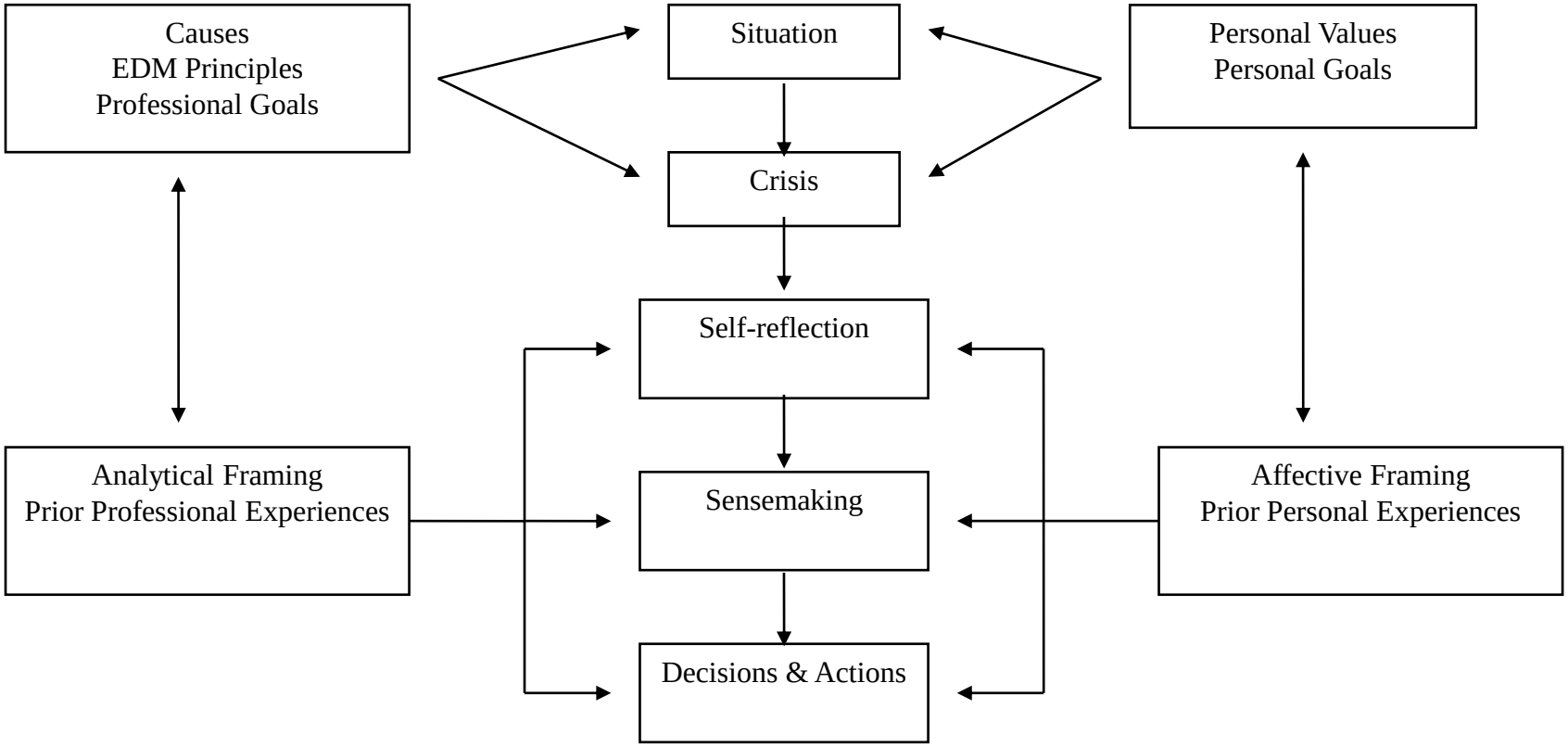
# Ethical Decision-Making Model



# Ethical Decision-Making

- Decision-making in ethical context:
  - Complex process involving many factors
  - Optimal outcome is not always possible
  - Final action involves decisions among alternatives
  - What influences these decisions?

# Study 1 – Baseline Assessment

- Graduate students
- Administer battery of measures
- 3 focal fields:
  - Social Science
  - Health Science
  - Biological Science
- Paid $100 participate

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# Measures

- Individual Characteristics:
  - Intelligence
  - Social Desirability
  - Big Five Personality
  - Narcissism
  - Philosophies of Human Nature
  - Anxiety
- Situational Characteristics:
  - Climate
  - Environmental Experiences
  - Exposure to Unethical Events

# Measures

- Criteria Measures:
  - Review Panel Task
    - Serve as member of IRB
    - Make judgments about misconduct
  - Ethical Decision-Making
    - Details coming….

# Current Test Items

1. A Biochemistry professor with a federally funded project published a paper based on the research findings. Two graduate students who assisted in the research project think they should also have been listed as authors of the paper. In this type of situation, is authorship considered "research misconduct" under federal guidelines?
    a. Yes
    b. No

16. In mentor-trainee relationships, the mentor typically seeks to help the trainee with all of the following EXCEPT
    a. Socialization into the discipline
    b. Financial aid
    c. Job placement
    d. Optimizing the educational experience

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18. A Sociologist, Professor S., plans to conduct a research project involving blind adults using guide dogs. Prior to undertaking the study, Professor S. will seek human subjects approval from the university. However, since the dogs will only be used in an observational study, approval from the university is not required for the use of the animals.

    a. True
    b. False

22. Dr. P., a Professor of Dance, has found that there is no simple solution to the following problem in peer review:

    a. Reviewer bias
    b. Anonymous reviews
    c. Review confidentiality
    d. Transparent reviews

**Case study:** Professor Y. has received federal funding to study the possible genetic association with shyness. Fifty kindergarten children (two classrooms of 25 students each) from a nearby public elementary school will be the subjects of the study. The 50 kindergarten children will be observed in the classroom for one academic semester by the research team and samples of the students' saliva will be collected for testing.

28. There are some possible risks associated with this research.

a. True
b. False

# Developing Better EDMs

- Illustrative cases that presented ethical dilemmas
- Give more human and scientific context
- And, to make more than one answer correct, consistent with the ambiguity of these issues

# Developing Better EDMs

Three problems in writing items:

1. Major infractions (e.g., the big three—fabrication, falsification, plagiarism) are known to every grad student and working scientist
2. The more minor infractions are sometimes, often even, justifiable
3. Science is a fuzzy, ill-defined enterprise
    1. Philosophy of science has competing theories about us
    2. Postmodernists regard “scientific truth” as a social construction

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# Developing Better EDMs

For example:

- Is it ever acceptable to use a 1-tail test?
- Is it ever acceptable to try for statistical significance using different tests?
- Is it ever acceptable to break studies into LPUs?
- Is it ever acceptable to eliminate outliers?
- Is it ever acceptable to run a new subject to replace an errant data point?
- Is it ever acceptable to improve messy data by transforming it?
- Is it ever acceptable to “touch-up” a gel blot or an fMRI scan?

# Developing Better EDMs

- Absolutes make for easy test construction
  - But at the expense of disbelief and condescension
- "Grayer" events make test construction harder
  - But preserve ecological and external validity
- We opted for the second approach:
  - Another problem: if there is no absolute right or wrong, how to you score the items?
    - We are looking for strategic, "optimal" solutions, not "correct" answers (more later)

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# Structure of the Items

1. Narrative format with a story line
2. Story continues in serial fashion, in three episodes
3. The subject is queried after each episode about the best course of action to take at that juncture

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# Rationale for item structure

- Story format:
  - Adds human elements to otherwise factual cases
  - Sympathetic characters that are in danger of harm or ruin
  - The attempt is to evoke anger, blame, excitement, disappointment, resentment, etc. (emotion)
- Why is it important for the scenarios to be emotionally evocative?
  - To encourage “that-could-happen-to-me” empathy, perspective-taking
  - To increase interest and more thoughtful answers

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# Rationale for item structure

- Why a serial format?
  - Economy, saves creation of entirely new items, plus it becomes more story-like
  - Allows introduction of plot twists that build on familiarity with the characters and the feelings they evoke
  - Allows introduction of new ethical dilemmas
  - And new response alternatives

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# Content of Items

- Content—two critical ingredients
  - Scientific content
  - Ethical content

# Content of Items

- Scientific content:
  - Assumptions:
    - Subjects will not be drawn into a story about cardboard scientists
    - Must be asking timely, important questions
    - Must be using correct methods and instrumentation
    - Must speak the language of the subjects

# Content of Items

- Ethical Content
  - Assure that ethical categories are evenly distributed over items.
  - Assure that each item contains 3 separate ethical dilemmas.
    - One dilemma for each of three installments of the story.
    - Need to plan so that they blend fairly smoothly into story line.

# The Process

- Materials needed
  - A taxonomy of scientific ethics subject to violation
  - A scientific taxonomy—of major sub-disciplines and their area of hottest scientific investigation
- During the development, neither was readily available
  - Created own ethical taxonomy
  - Searched across 3 broad fields for “hot” subfields

# Item Planning

- For each item, a new discipline and research taxonomy is needed
- Then wove these together in a story, with three different quandaries from our ethics taxonomy

# The Result

Broader Scenario:

Dunn and Ainsley are now at separate institutions, but they have maintained a warm personal and professional relationship since their graduate student days. They are both fascinated with the reproductive physiology of placental mammals, especially the evolved signals triggering spontaneous abortion owing to genetic defects or to the economics of maternal investment. Because in humans the rate of such abortions is around 75%, they are hoping to fund their research with a grant from NICHD. They are working on a shoestring budget to obtain preliminary insight into the difficult question of how one member of most twin pairs is selected for abortion early on, resulting in seemingly singleton births.

# The Result

Episode 1:

The coworkers have each established collaborative ties with local perinatal clinics, where they obtain placental tissues and patient records, allowing them to classify births as true singletons or as single surviving twins, and have access to the neonate's detailed medical history along with that of the mother. Ainsley is the first to discover that her basic biological training did not prepare her for the need for IRB approval before a study begins and that even the analysis of tissue may require informed consent by the individuals involved. She calls Dunn to discuss the problem. What should they do?

# The Result

Episode 2:

Within a few years the team uncovers some remarkable findings. Although it has long been known that a surviving member of a twin pair is at some increased risk for a variety of disorders, Dunn and Ainsley are apparently the first to notice that this is the single best predictor for the development of cerebral palsy. The pair exults in their unanticipated clinical findings, but Ainsley is staggered when she sees Dunn on a widely viewed television talk show confidently describing the new findings as if they were his own, without mentioning Ainsley. How should she respond?

# The Result

Episode 3:

After the media events abated, the pair reconciled and began presenting their findings at pediatric conferences and soon learned that they had nothing new to contribute. Although their findings were statistically stronger than previous estimates, the risk for cerebral palsy in the surviving member of a twin pair had long been known in medical circles and was well established in the Archives of Pediatrics. Dunn and Ainsley, as biologists, had not realized that much medical knowledge is insular; that it is not discussed before the general public because of unpleasant political ramifications, but most especially, because information about a lost twin would only increase patient worry and guilt over uncontrollable events. How should the team respond to this revelation?

# Response Options

- Response option formats:
  - Constructed response
  - Multiple Choice
  - Complex MC
- Form of Complex multiple choice
  - Eight per stem
  - Select two per stem

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# Response Options

- Each response option is a particular action or decision that can be taken with respect to narrative or plot
- No real “distractors” in the traditional sense
- Response options are extent optimize (or not) certain strategies or look like good ideas in certain ways

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# Response Options

- Distractors are more like bad choices or those who didn't use optimal decision-making (emotion inhibited their decision-making)
- Good distractors may seem like good ideas to individuals not trained on strategies or unaware of important social dimensions
- Good response options are exemplars of optimal strategies or social dimensions

# Response Options

- Have extreme responses, but more focused on “gray” or middle area so that most responses are reasonable options for average person
- Not always by the book is optimal response, e.g., Whistleblowing

# Response Options

- Applying framework to response options is important
- Taxonomic approach to responding to ethical dilemmas
- Four Broad domains:
  - Data Management
  - Study Conduct
  - Business Practices
  - Professional Practices

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# Scoring

- 3 scoring systems:
  - Ethical
  - Social Psychological
  - Cognitive Strategies

# Ethical Perspective

- Follow typical ethical values perspective
- Rated on High, Medium, and Low
- Examples:
  - Point out that the first hand opportunity they have had to learn an important lesson about how science is conducted--it isn't a career for idealists (L)
  - Talk with each team member individually and ask if they have problems that they want to discuss (M)
  - Call a special lab meeting to allow the research team to freely air their concerns (H)

# Social Psychological

- Social psychological framework from which people could respond
- Response options rated on “0” to “6” scale
  - Involvement of others
  - Deception
  - Responsibility Avoidance
  - Active Involvement
  - Retaliation
  - Selfishness
  - Closing Opportunities for Future Action

# Social Psychological

- Example: Retaliation:
  - Drop Wilson from upcoming publications (5.33)
  - Negotiate a counteroffer to stay (0.67)
  - Try to obtain emergency university funding to speed up progress (0.33)
  - Quickly try to publish a weaker paper to establish priority (3.67)
  - Engage the University legal team to prevent the transfer of Alexander's intellectual property (5.67)
  - Fire Wilson before he resigns (6.00)
  - Contact a close colleague with influential ties to the firm who might exert leverage (3.00)
  - Do nothing (0.33)

# Cognitive Strategies

- Cognitive Strategy framework from which people could respond
- Response options rated on “0” to “6” scale
  - Recognize Circumstances
  - Consideration of Others
  - Deal with Emotions
  - Analysis of Personal Motivations
  - Anticipating Consequences
  - Seeking Help
  - Questioning One’s Judgment

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# Cognitive Strategies

- Example: Recognize Circumstances:
  - Passively withhold knowledge until Alexander's group has established priority (1.33)
  - Freely share information with Wilson's new team (4.00)
  - Do nothing; it's a just reward for defecting (1.33)
  - Use the knowledge to leverage Wilson back to Alexander's lab (2.00)
  - Follow the ethics and standards set forth by the applicable scientific society (5.00)
  - Trade the information for financial or in-kind payments from the firm (0.67)
  - Actively conceal the knowledge and instruct the team to do so as well (0.33)
  - Provide a false hint about the nature of the glitch (0.33)

# Scoring

- Participants select 2 response options
- Average 2 response options based on weight to give participant a score
  - For example: items selected are weighted High and Medium for ethical then participant scores 2.5 for this item

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# The Result…

During graduate school, Langston developed a new methodological approach for analyzing data, with guidance from his advisor. He trained several graduate students on the use of this approach before he graduated. At a recent professional conference, Langston heard a student present preliminary results from her Master's thesis in which she used the data analytic approach. He noticed a potentially serious error in the interpretation of the data, attributable to improper use of the approach. He mentions this possibility after the presentation.

# The Result…cont.

A month after the conference, one of Langston's colleagues shows him a manuscript written by the student and Langston's former advisor. It has been submitted for publication and contains the same information and errors he observed at the conference. He tells his former advisor that he's sure the analytic approach was applied improperly and can demonstrate this. What should Langston's former advisor do? Choose **two** from the following:

(H) Retract the submitted manuscript

(M) Submit new analyses and interpretations indicating that the wrong version of the manuscript was submitted

(L) Wait for reviews and do additional analyses if indicated

**Note:** 6-8 responses in measure

# Outcomes of EDMs

- Validity Evidence:
  - Content evidence
    - Appropriate language
    - Important concepts/issues relevant to field
      - Qualitative Feedback:
        - Participant Reactions
  - Construct evidence
    - Substantive frameworks
    - Expected Causes of Ethical Decision-Making
    - Expected Outcomes of Ethical Decisions

# Outcomes of EDMs

- Evidence for reliability of items and scoring systems
  - ICCs for rating of Social Psychological and Cognitive Strategies was >.80
  - Average Guttman Split-Half:
    - Ethical scoring system: .77

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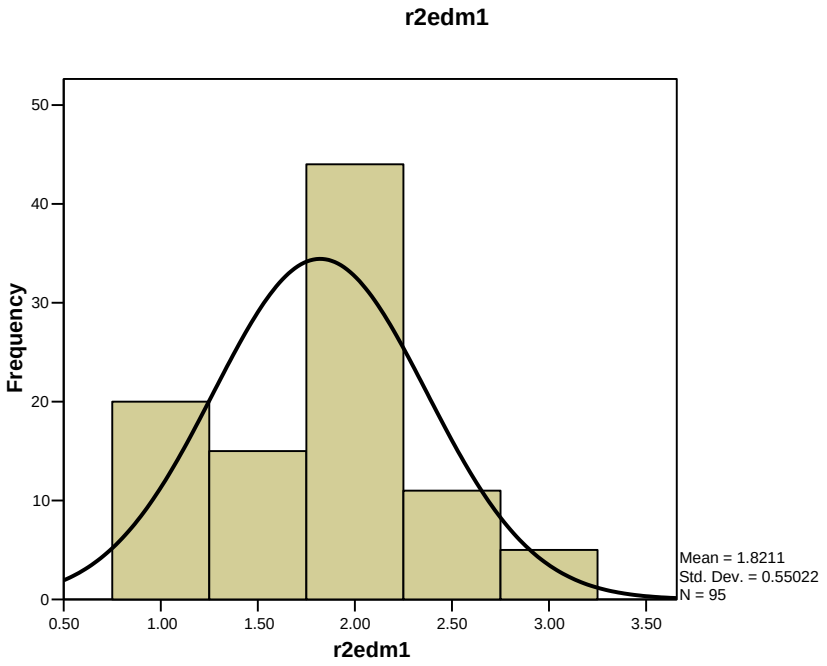
# Outcomes of EDMs

- Item Statistics – Example item
- Biological Sample – Intellectual Property

| Score | Frequency | Percent |
|---|---|---|
| 1.00 | 20 | 21 |
| 1.50 | 15 | 16 |
| 2.00 | 44 | 46 |
| 2.50 | 11 | 12 |
| 3.00 | 5 | 5 |
| Total | 94 | 100 |

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# Outcomes of EDMs

- Results:
  - Substantive Framework:
    - Cognitive Strategies
      - Recognition of Circumstances: ave corr = .50 with EDM
    - Social Behavioral
      - Deception: ave corr = -.46 with EDM

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# Outcomes of EDMs

- Results cont…
  - Expected Causes
    - Individual Differences:
      - Cynicism: ave corr = -.26 with EDM
    - Exposure to Unethical Events:
      - Average Multiple R = -.46 with
  - Expected Outcomes
    - Review Panel Task
      - Importance of Punishment Multiple R of .54 regressed on EDM

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# Applications

- Four, so far:
  - Baseline Assessment
  - Responsible Conduct in Research (RCR) Training
  - Professional Sample
  - Other Research

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# RCR Training

- Pre-Post Measure
  - Developed into 2 alternate measures
  - Take at Pre and Post
  - Application Successful

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# Professional Sample

- Developed EDM measure into online format
  - Easily developed into online format
    - Data capture
    - Manual scoring
  - Trainer reactions
  - Participant reactions
  - Future progress…

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# Other Research

- Scientific Research
  - Ethical Decision-Making
  - International
  - Differ from other measures…
- For personnel selection…

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# Questions….

- For copies of manuscripts and measures:

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