

The Scientist Practitioner Model

The Ethical Choice

---

---

---

---

---

---

---

---

Presenters

- Carl J. Sheperis Mississippi State University
- Donna Sheperis Delta State University
- Rick Balkin Texas A&M Commerce
- Laura Simpson Delta State University
- Joshua Watson Mississippi State University Meridian

---

---

---

---

---

---

---

---

SCIENTIST-PRACTITIONER

- **Basic Principles of Scientist Practitioner Model**
  - Integrative approach to science and practice
  - Contributes to and essential for the ever changing counseling profession
  - Overall theoretical, empirical, and experiential approach to science and professional practice in counseling
  - Consistent with ACA Code of Ethics
  - Sensitive to issues of diversity and individual differences
- Model provides for the development of the knowledge, skills, and attitudes that encourage the scientific approach to practice
- Model calls for life-long learning
- Value placed on role models

---

---

---

---

---

---

---

---

### WHAT DOES COMPETENCY MEAN?

Webster's Dictionary

- Competent – properly or sufficiently qualified; capable, adequate for the stipulated purpose
- Competence – (1) the state or quality of being adequately well-qualified; ability; (2) a specific range of skill, knowledge, ability
- Competent (adj) – Connotes public understanding of certification
- Competence (noun) – Connotes professional judgment of an individual's ability or capability (to do certain things) based on education, training, experience, and special assessment

---

---

---

---

---

---

---

---

### WHAT IS PROFESSIONAL COMPETENCE?

- **“Professional competence is the habitual and judicious use of communication, knowledge, technical skills, clinical reasoning, emotions, values, and reflection in daily practice for the benefit of the individual and community being served”**

(Epstein & Hundert, 2002)

---

---

---

---

---

---

---

---

### ACA Code of Ethics Changes

2005 *ACA Code* adds Standard C.6.e. Scientific Bases for Treatment Modalities.  
A change from the 1995 *Code* which merely directed counselors to monitor their effectiveness.  
Previous code did not speak to our responsibility to base techniques and treatment plans on theory and/or empirical or scientific results (Glosoff & Kocet, 2005)

---

---

---

---

---

---

---

---

ACA Standards Related to Practice

**A.4.a. Avoiding Harm**

Counselors act to avoid harming their clients, trainees, and research participants and to minimize or to remedy unavoidable or unanticipated harm.

**C.6.e. Scientific Bases for Treatment Modalities**

Counselors use techniques/ procedures/modalities that are grounded in theory and/or have an empirical or scientific foundation. Counselors who do not must define the techniques/procedures as “unproven” or “developing” and explain the potential risks and ethical considerations of using such techniques/procedures and take steps to protect clients from possible harm.

---

---

---

---

---

---

---

---

Evidence-Based Practice

The union of research and clinical services

Refers to a body of scientific knowledge defined with reference to research methods and designs about a range of service practices (e.g., diagnosis, assessment, intervention). The practice is referenced to the research quality and validity brought to bear on these issues (Hoagwood & Johnston, 2003).

---

---

---

---

---

---

---

---

Competencies needed for evidence-based practice:

- Formulate an answerable question(s);
- Search using bibliographic databases & find information;
- Critically appraising research findings;
- Interpret and apply results to practice situation;
- Evaluate one’s own practice.

---

---

---

---

---

---

---

---

**Evidence-Based Interventions:**

Interventions that have been documented to be effective in research trials and that meet the criteria of one of more professional groups or organizations that provide formal designation. The evidence base is typically on a continuum varying on dimensions of type of methodology (e.g., randomized trials) and type of study (e.g., effectiveness, efficacy), among other characteristics.

---

---

---

---

---

---

---

---

**Counselor as Scientist Practitioner**

- Counseling best practice is informed by research
- Ethical counselors provide treatment that is scientifically indicated to be effective or has a theoretical framework supported by the profession (i.e. evidence-based counseling interventions or Empirically Supported Treatments) or inform their clients of the risks associated with unproven methods

---

---

---

---

---

---

---

---

**Examples from the Field**

- ACA opinion on restorative or conversion therapy practices – goal is change an individual's sexual orientation from homosexual to heterosexual. Research does not support conversion therapy as an effective treatment modality.
- Mississippi Licensure Board decision on unproven techniques

---

---

---

---

---

---

---

---

ACA Standards Related to Training

**F.6.f. Innovative Theories and Techniques**

When counselor educators teach counseling techniques/procedures that are innovative, without an empirical foundation, or without a well-grounded theoretical foundation, they define the counseling techniques/procedures as “unproven” or “developing” and explain to students the potential risks and ethical considerations of using such techniques/procedures.

---

---

---

---

---

---

---

---

Benefits of Using Scientist-Practitioner Model for Training

- Provides structure and vocabulary to teach scientific and practice issues.
- Assists in developing testable hypotheses about client issues.
- Allows for addressing clinical questions about which students are most curious as opposed to discussing research in the abstract.

---

---

---

---

---

---

---

---

Barriers to the Use of Research to Inform Practice

- Journals are not always utilized by counselors to inform their work or counselor educators to keep courses relevant.
- Counselors are not always well trained consumers of research.
- Within the literature, an overfocus exists on correlative and survey research.

---

---

---

---

---

---

---

---

Obstacles to Scientist-Practitioner Model

- A large teaching load and limited resources do not facilitate an emphasis on conducting research.
- Retention, promotion, and tenure are so closely tied to teaching evaluations it is daunting to step aside from course prep.
- There is limited time and resources for the legwork required to conduct original research.

---

---

---

---

---

---

---

---

Obstacles to Scientist-Practitioner Model

- Persistent utilization of students with an interest in research brings the risk of “playing favorites”.
- Limited opportunity for direct clinical practice.  
\*\*And yet, the state of the model is strong and the flexibility enables it to be of value to counselors in many contexts.\*\*

---

---

---

---

---

---

---

---

Benefits of Using Scientist-Practitioner Model

- Demonstrates how integrated research and practice can be.
- Encourages critical thinking about issues and decisions.
- Serves as a springboard for professional growth in research and practice.

---

---

---

---

---

---

---

---

**Conducting Outcome Research**

*Identifying which treatments are effective with which clients in which settings.*

---

---

---

---

---

---

---

---

**Questions to Address**

- Does counseling really work?
- Is therapy effective?
- Does a particular skill or technique improve (fill in the blank)?
- Is one approach more effective than another?

---

---

---

---

---

---

---

---

**Conducting Outcome Research**

- Addresses counseling efficacy through:
  - Treatment vs. control group comparisons
  - Treatment1 vs. treatment2 comparisons
- Typically conducted using:
  - True experimental research designs
  - Quasi-experimental research designs

---

---

---

---

---

---

---

---

**Outcome Research Designs**

- Treatment Package Strategy
- Dismantling Strategy
- Constructive Strategy
- Parametric Strategy
- Comparative Outcome Strategy
- Client and Counselor Variation Strategy

*Research Design in Counseling (Heppner, Wampold, Kivlighan, 2007)*

---

---

---

---

---

---

---

---

**Methodological Issues**

- Selecting an appropriate comparison group
- Assessing treatment integrity
- Measuring change
  - Clinical vs. statistical significance
  - Hypothesis testing
  - Growth curve analysis

---

---

---

---

---

---

---

---

**Understanding Statistical Significance, Effect size, and Power**

A Key Element for Science Informing Practice

---

---

---

---

---

---

---

---

*The Statistical Test—  
What Does It Really Mean?*

- Many believe that a result that is statistically significant is, by default, important and meaningful.
- The truth is that a statistical test is merely a measure of probability, not meaningfulness.

---

---

---

---

---

---

---

---

**Two Aspects of Probability**

- The alpha level is an indication of how much *type-I error* researchers have allowed in the study.
  - Type-I error is the likelihood of identifying relationships or differences when no relationship or difference truly exists.
- The *p*-value is an indication of the precise amount of type-I error in the study (e.g., if a researcher indicates an alpha level of .05, then there is a 5% chance that the researcher could make a type-I error).
  - This level is set prior to the data analysis and is based on the researcher's willingness to accept a certain probability for error.

---

---

---

---

---

---

---

---

**An Example**

$$F(3, 96) = 13.81, p < .001$$

---

---

---

---

---

---

---

---

**Evaluating Meaningfulness:  
Effect Size**

- Because statistical significance is merely a term of probability, many counseling journals (e.g. *Journal of Counseling & Development, Counselor Education and Supervision*) have mandated the use of effect size to measure practical significance.
- *Effect size* is critical because it tells us the magnitude of the difference between or among variables.

---

---

---

---

---

---

---

---

**Effect Size: Two Methods**

(Trusty, Thompson, & Petrocelli, 2004).

- Common effect size measures for variance accounted for in the model include  $\eta^2, \omega^2, R^2, \lambda$ , and various correlation coefficients (e.g.  $r, rs, sr, \phi$ ).
- Each of these effect size measures help researchers and consumers to determine the degree to which changes in the criterion or dependent variable(s) occur with respect to changes or manipulation in the predictor or independent variable(s).
- Differences also are reported based on standard deviation units, using such tests as Cohen's  $d$  or Cohen's  $f$ , which indicate the extent to which differences exist between or among groups.

---

---

---

---

---

---

---

---

**Interpreting Effect Size**

- There are many types of effect size.
- Not all journals mandate the reporting of effect size.
- General guidelines do exist in interpreting effect size measures, and researchers often report an interpretation of the effect size found.
  - Cohen (1988, 1992) provided general interpretations of effect size classifying the measures in to *small, medium, or large*.

---

---

---

---

---

---

---

---

### Interpreting Effect size

- Effect size should be provided in the results section.
- An interpretative statement, often using Cohen’s (1988, 1992) standards of *small, medium, and large* effect sizes, related to the meaningfulness of the finding(s) should be provided.
- “The manuscript is incomplete unless these effects are evaluated in the context of the study and in the larger context of knowledge” (Trusty et al., 2004, p. 109).

---

---

---

---

---

---

---

---

### Power

- *Power* is the likelihood of finding statistically significant differences given that statistically significant differences actually do exist.
- Put another way, power is the likelihood of rejecting the null hypothesis when it actually should be rejected.

---

---

---

---

---

---

---

---

### Power

- The power of a study is dependent upon several factors:
  - Sample size
  - Effect size
  - Alpha level

---

---

---

---

---

---

---

---

### Power and sample size

- A large sample size increases the likelihood of finding statistically significant differences.
- Thus larger sample sizes increase statistical power
- Often, statistical tests show significance, not because the results are meaningful, but simply because the sample size is so large that the test picks up on very minor deviations/differences.

---

---

---

---

---

---

---

---

### Power and alpha level

- The alpha level also has an impact.
- When the alpha is at the .10 level of significance, as opposed to .05, the critical value is lowered and the likelihood of finding a statistically significant difference increases ( $F_{obs}$  is more likely to be larger than  $F_{crit}$ ).
- As the likelihood of masking a type I error is increased, the likelihood of making a type II error is decreased. Therefore, there is an inverse relationship between type I and type II error.
- While procedures exist to decrease the chance of making a type I error, researchers run this risk of increasing the chance of making a type II error, especially when smaller sample sizes are involved.

---

---

---

---

---

---

---

---

### Power and effect size

- Additionally, effect size is pertinent.
- The greater the magnitudes of the differences between groups, the fewer participants are needed to identify statistical significance.

---

---

---

---

---

---

---

---

### Power and error

- Finally, power is influenced by error; the less error measured in a study, the more power.
- While issues like the magnitude of the treatment effect or the error variance are minimally influenced by the researcher, the establishment of an alpha level and the sample size are easily controlled.
- The easiest method of increasing power in a study is to increase sample size.

---

---

---

---

---

---

---

---

### An Heuristic Example

Recall that a z-test compares a sample mean to a population mean and accounts for error using the population standard deviation and the size of the sample.

$$z = \frac{\bar{X} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

---

---

---

---

---

---

---

---

### An Heuristic Example

Recall that a z-test compares a sample mean to a population mean and accounts for error using the population standard deviation and the size of the sample.

$$z = \frac{\bar{X} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

$$z = \frac{105 - 100}{\frac{15}{\sqrt{25}}} = 1.67$$

---

---

---

---

---

---

---

---

### An Heuristic Example

Recall that a z-test compares a sample mean to a population mean and accounts for error using the population standard deviation and the size of the sample.

$$z = \frac{\bar{X} - \mu}{\frac{\sigma}{\sqrt{n}}}$$

$$z = \frac{105 - 100}{\frac{15}{\sqrt{25}}} = 1.67$$

$$z = \frac{105 - 100}{\frac{15}{\sqrt{36}}} = 2.00$$

---

---

---

---

---

---

---

---

### References

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*(2nd ed.). Hillsdale, NJ: Erlbaum.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112, 155-159.

Glossoff, H.L. & Kocet, M.M. (2005) Highlights of the 2005 ACA Code of ethics. Retrieved from <http://www.counseling.org/Resources/CodeOfEthics/TP/Home/CT2.aspx>

Heppner P.P., Wampold B.E., & Kivlighan, D.M. (2007). *Research Design in Counseling*. Salt Lake City, UT: Brooks/Cole

Trusty, J., Thompson, B, & Petrocelli, J. V. (2004). Practical guide for reporting effect size in quantitative research in the *Journal of Counseling & Development*. *Journal of Counseling & Development*, 82, 107-110.

---

---

---

---

---

---

---

---