INCREASING EXTENSION'S EVIDENCE-BASED PROGRAMMING

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OVERVIEW:

- What is Evidenced-Based programming and why should we talk about it?
  - Better able to evaluate programs.
  - Better able to develop programs.
- Opportunities for Growth as an Organization
- Major issues in program evaluation: Threats to validity and the like.
  - Issues for Design Phase
  - Issues for Intervention Phase
  - Issues for Post Intervention Phase.
- Lessons from psychotherapy research
- Multilevel modeling – HLM
  - Conceptual understanding

WHAT IS EVIDENCE BASED PROGRAMMING?

- The integration of professional wisdom with the best available empirical evidence in making decisions about how to deliver instruction/intervention.
  - Theory
  - Literature
  - Research

QUALITY: LEVELS OF EVIDENCE

All evidence is NOT created equal

1. Randomized trial (true experiment)
2. Comparison groups (quasi-experiment)
3. Pre-Post comparison
4. Correlation studies
5. Case studies
6. Anecdotes

All are evidence-based

LEVELS OF RESEARCH EVIDENCE (KERNER, 2005).

TYPES OF EVIDENCE REVIEW	TYPES OF PROGRAMS				
		Research Tested Intervention Program (peer reviewed, funded research & publication)	Evaluated Program (peer reviewed publication)	Evidence-Informed Program (based on literature)	Program based on experience/tacit knowledge (no reference to literature)
	Systematic Review	1	2	4	NA
	Secondary Systematic Review	2	3	6	NA
	Individual Efficacy/ Effectiveness Study	4	5	7	NA
	Individual Program Evaluation	NA	NA	8	9

1 = Best

All are evidence based

OPPORTUNITIES FOR GROWTH AS AN ORGANIZATION

- Organizational Issues
  - Awareness vs. Behavior Change
    - Short interventions raise awareness, but do they promote behavior change?
    - Funding agencies interested in "Bottom Line" – Are we making a difference?
  - Bean counting vs. Community Impact
    - Bean counting: "Can you talk about … to our group of 50 soccer moms for an hour?
    - Impact: There has been a 30% decrease in teenage pregnancy in ….. County during the last five years.

OPPORTUNITIES FOR GROWTH (CONT.)

- Branding within and without the University.
  - State Specialists need to find ways to be more involved with research faculty.
  - RPT documents could recognize resident faculty contributions to Extension.
  - Educators could be remunerated for research participation.
  - Share community needs Program Advisory Committee results with research faculty.
  - Publicize impacts.

OPPORTUNITIES FOR GROWTH (CONT.)

Extension as a network has the capacity to conduct multisite, multistate randomized trials.

- Randomization
  - Could be at the level of individual, family, school, community, or county.
  - Example: Low-income couples in couple education classes could be randomized by DHS office across several states.
- Longitudinal designs with more than a single post interview.
  - We know little about the long term effects of any of the programs we offer.
  - Innovative cost-effective designs that use technological advances.

OPPORTUNITIES FOR GROWTH (CONT.)

- Community based participatory research (funded by NIH through National Center on Minority Health and Health Disparities)
  - Community involvement in
    - Problem identification
    - Research design
    - Selection and administration of intervention
    - Data collection
  - Funding for up to 11 years.

ISSUES IN PROGRAM EVALUATION – DESIGN PHASE

- Consideration must be given to each of three phases of program evaluation/research:
  - Design phase
  - Intervention phase
  - Post intervention phase

ISSUES IN PROGRAM EVALUATION – DESIGN PHASE

- Threats to the design phase
  - Random Sample
    - Selection Bias – differences between the sample and the population
      - Individuals who undergo psychotherapy are 14 times more likely to commit suicide than the general population.
        - Individuals with a greater tendency for suicide go to therapy.
      - Youth whose parents use corporal punishment are more likely to develop antisocial behaviors.
        - Youth with more behavior problems may receive more severe discipline.

ISSUES IN PROGRAM EVALUATION – DESIGN PHASE

- Statistical power threat – Sample is too small to find a significant effect.
  - Use small sample statistics (i.e., Fisher's Permutation test, Nichols & Holmes, 2001).
- Subjects must be
  - Identified and selected to be in the initial pool to be contacted.
  - Subject must be successfully contacted by the research staff and found to satisfy the eligibility criteria.
  - Subjects must consent to take part in the intervention trial (program or control group).
- Measurement threat
  - Outcome measures are inappropriate, invalid, or unreliable,
  - Poorly administered,
  - Used to assess a sample for which the measure was not designed.
  - Best to determine psychometric properties beforehand.

ISSUES IN PROGRAM EVALUATION – DESIGN PHASE

- Theory development
  - Key constructs and how to measure them.
  - Details of etiology, risk factors, protective factors, etc.
  - Relationship between the IVs and DVs (i.e., direct, mediated, and moderated effects).
  - Time to show an effect (i.e., immediate or over a period of time).
  - Developmental window (e.g., three months after birth of child).
  - Do causal variables differ across groups (e.g., gender, ethnicity).
  - Mechanisms by which the intervention operates.

ISSUES IN PROGRAM EVALUATION – INTERVENTION PHASE

- Threats to the intervention phase
  - Random Assignment
    - Selection bias (attention effect) – When subjects respond to the attention received from the program.
      - People who self-select into an intervention may be more motivated toward change than those who opt not to participate, OR may be worse off at initiation of the program than others.
      - If subjects are free to choose for themselves whether or not they want the intervention, then it becomes difficult to distinguish between an effect due to the intervention or an effect due to self-selection factors.

ISSUES IN PROGRAM EVALUATION – INTERVENTION PHASE

- Quasi-experimental design with control group and pretest.
  - Unable to completely rule out selection or maturation bias.
  - Several variants of this design (e.g., double pretest) can add considerable strength.
- Pre-Post Design – does not have a control group.
  - Difficult to discern whether effect is due to intervention or developmental course.
  - If worse than average at initiation, sample can be subject to regression to the mean bias.

ISSUES IN PROGRAM EVALUATION – INTERVENTION PHASE

- Concurrent Controls – two or more groups are chosen for comparison.
  - Problem is that groups are rarely comparable on all of the characteristics that may explain outcome differences.
  - In cases where it is unethical to offer a no-intervention condition may offer a treatment as usual, or some other universal intervention, or a wait-listed control design.
  - In wait-listed control designs the payoff for those who wait is that the program they receive will be the "enhanced" version.
    - This is particularly effective for a system wide intervention.
    - Post intervention analyses can combine information across the studies as in a meta analysis.

ISSUES IN PROGRAM EVALUATION – INTERVENTION PHASE

- Implementation bias – situation where the intervention is not delivered by the intervenors as intended.
  - Appropriate training and supervision are dimensions of implementation.
  - Facilitator effect – If the persons delivering the intervention influences the intervention above and beyond the effect of the intervention.
  - This usually occurs in effectiveness trials rather than efficacy trials.
  - Assess for the degree of completion or adherence and use this as a variable in the analysis.

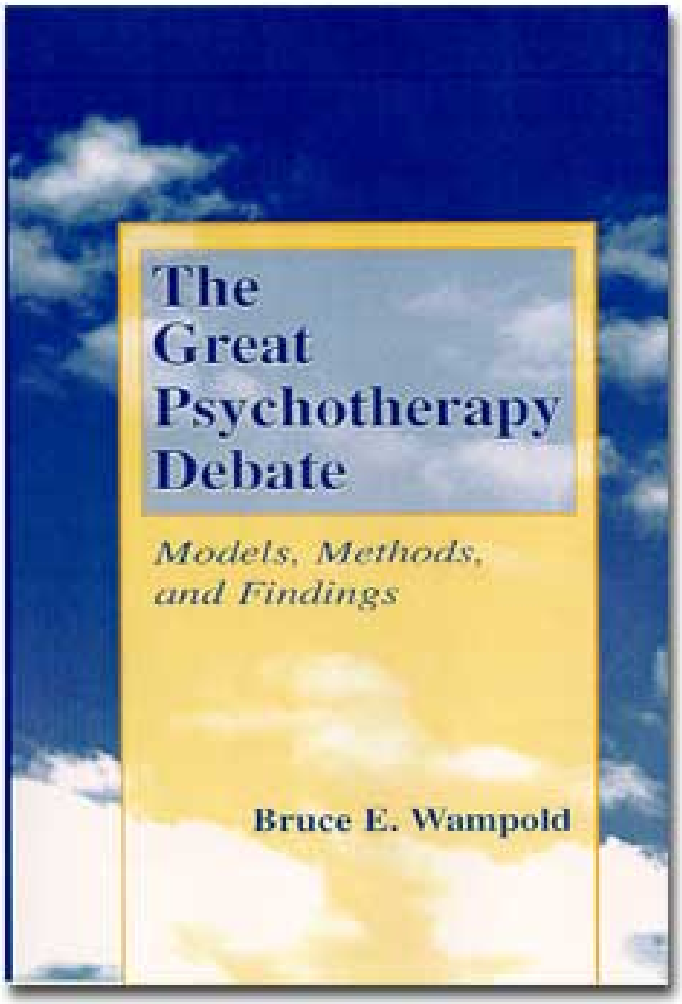
ISSUES IN PROGRAM EVALUATION – POST INTERVENTION

- Threats to the post-intervention phase
  - Attrition Bias – Loss of follow-up after the intervention is attrition. If those who drop out are different than those assessed.
  - Data Quality – Close monitoring of data collection
    - Missing or absent subjects can be used in some statistical analyses (e.g., are they different from those who finished).
      - Journal reviewers are becoming increasing stringent on handling of missing data.
    - Data cleaning such as finding outliers, keypunching errors, etc.
  - Due to cost limitations a random sample of those who completed the initial trial can be selected for more in-depth follow-up.

ISSUES IN PROGRAM EVALUATION – POST INTERVENTION

- Analysis threat – When improper statistical analyses are performed, or when there are errors in the management or organization of data.
  - Effect size vs. significance.
    - Significant but meaningless.
  - Categorical or continuous outcomes.
  - Survival analysis
  - Mediation Analysis
  - Reciprocal causation (3 waves of data)
  - Nested effects.
    - Students within classrooms/schools
    - Time within individuals within Organizations
    - Time within individuals within dyads
    - Individuals within therapists/facilitators

LESSONS FROM PSYCHOTHERAPY RESEARCH



- The therapist is necessary to deliver the treatment.
  - Personal characteristics of the therapist modify the effect of the treatment.
- Rigorous review and analyses of controlled studies on psychotherapy outcome.
- **Conclusion: much more variance resides with the clinician than with the treatments.**

LESSONS FROM PSYCHOTHERAPY RESEARCH

- Kim, D. M., Wampold, B. E., Bolt, D. M. (2006). Therapist effects and treatment effects in psychotherapy: Analysis of the National Institute of Mental Health Treatment of Depression Collaborative Research Program. *Psychotherapy Research*. 16(2): 161-172.
  - Wampold and colleagues recently reanalyzed data from the NIMH's Treatment of Depression Collaborative Research Program (TDCRP) study using HLM.
  - Prior published reports found significant differences between two methods of psychotherapy as well as between placebo and antidepressant medication.
  - Reanalysis of psychotherapy data using HLM revealed that 0% of the variance was due to the psychotherapy methods, while 8% was attributable to the therapists.

MULTILEVEL MODELING - HLM

- Why HLM?
- **Simple ANOVA is appropriate only if the individual farmer, teacher, clinician, etc. has little or no impact on the effectiveness of the farming, teaching, or treatment method!**
- We must account for how the deliverer of the program may effect the outcomes of the program.

MULTILEVEL MODELING - HLM

- Central problem: Intra Class Correlation (ICC)
  - How much variability is between groups.
  - As little as .05 can easily increase Type I error in excess of 20%.

Citation:

Baldwin, S. A., Murray, D. M., & Shaddish, W. R. (2005). Empirically Supported Treatments or Type I Errors? Problems With the Analysis of Data From Group-Administered Treatments. *Journal of Consulting and Clinical Psychology*, 73, 5, 924-935.

- **Of 33 Empirically Supported Treatments only 6 to 19 were still significant (depending on the assumptions used) after correcting for ICC.**

MULTILEVEL MODELING - HLM

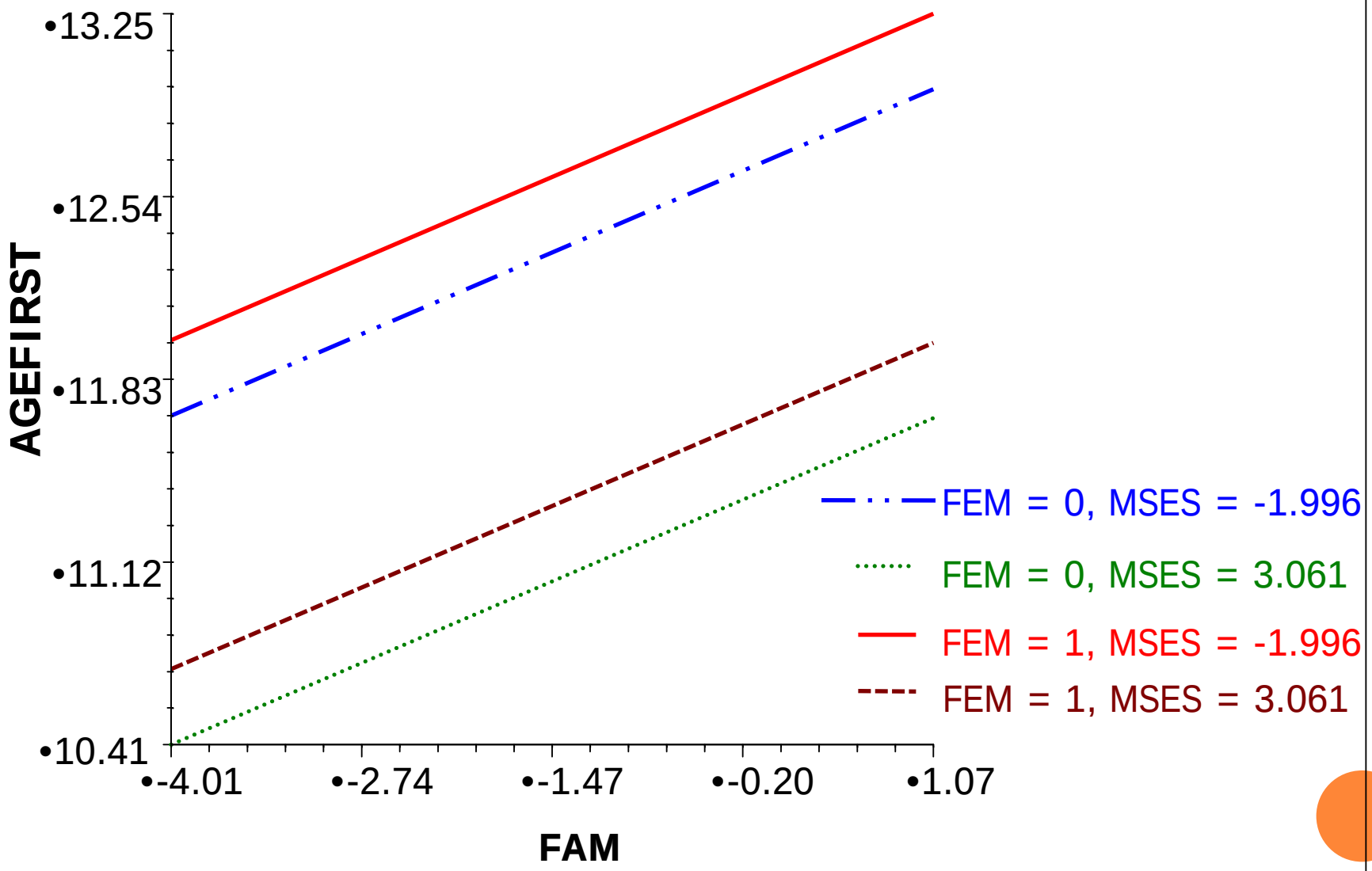
- Hierarchical Linear Modeling (HLM) is an advance in statistical methodology that permits us to model variance at the group (e.g., school, clinician) level as well as the treatment level.
  - Aka – multi-level analysis, mixed-effects model, random-effects model, growth curve analysis, random-coefficient regression model, covariance components model.

- Conceptually one may view HLM as running a regression model several times, or at 2 or 3 levels.
  - Students within Schools
  - Time within Individuals
  - Time within Individuals within Dyads
  - Individuals within Facilitators
  - Etc.

MULTILEVEL MODELING - HLM

- Modeling level-2 effects (e.g., facilitator effects) allows us answer key questions for training of field staff. For example:
  - What facilitator characteristics may increase retention.
  - What facilitator characteristics work better with which populations (e.g., men, children, older, Black, rural).

- Modeling level-2 effects may help us develop more precise interventions.
  - Some brief examples -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•-1.47
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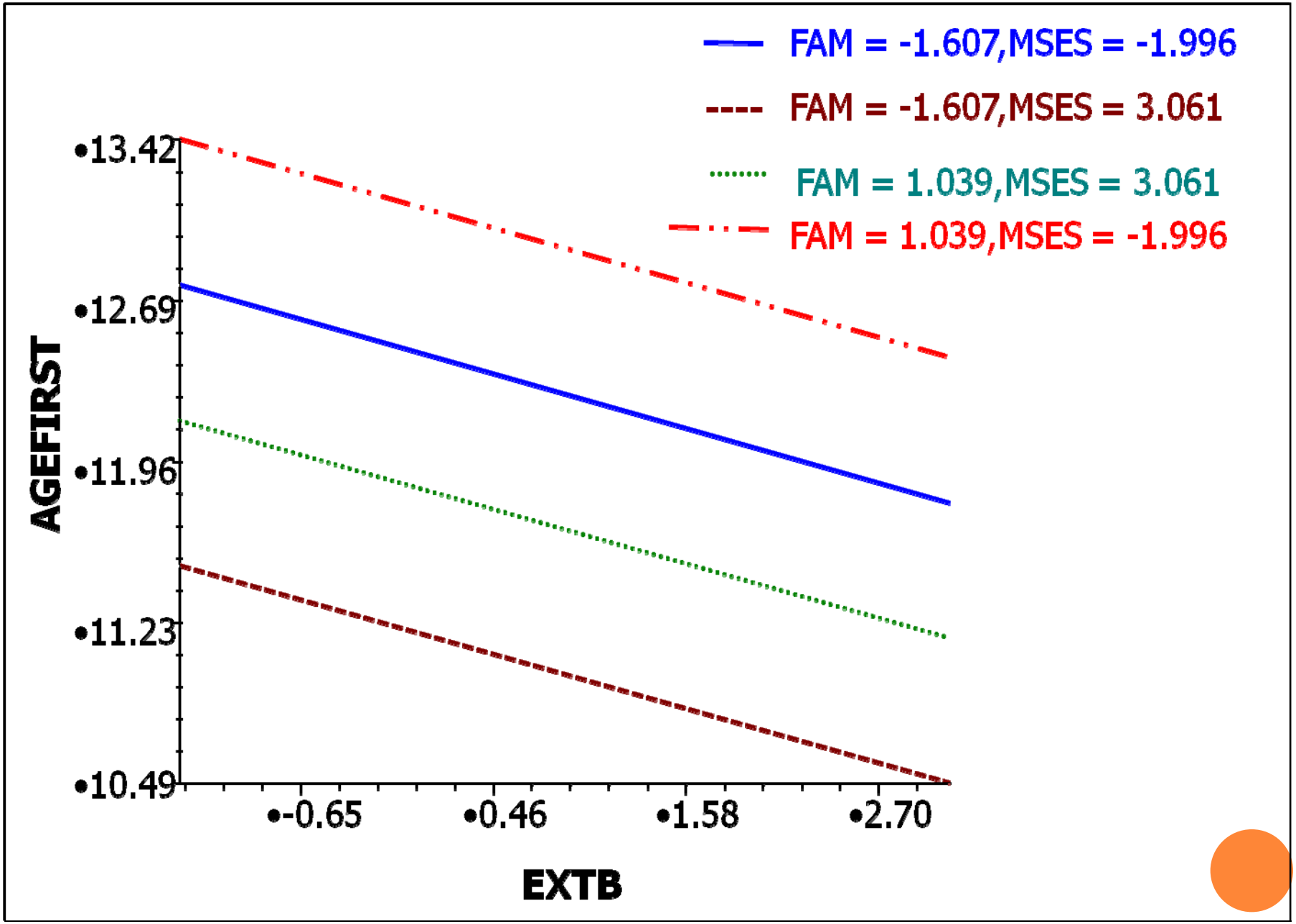
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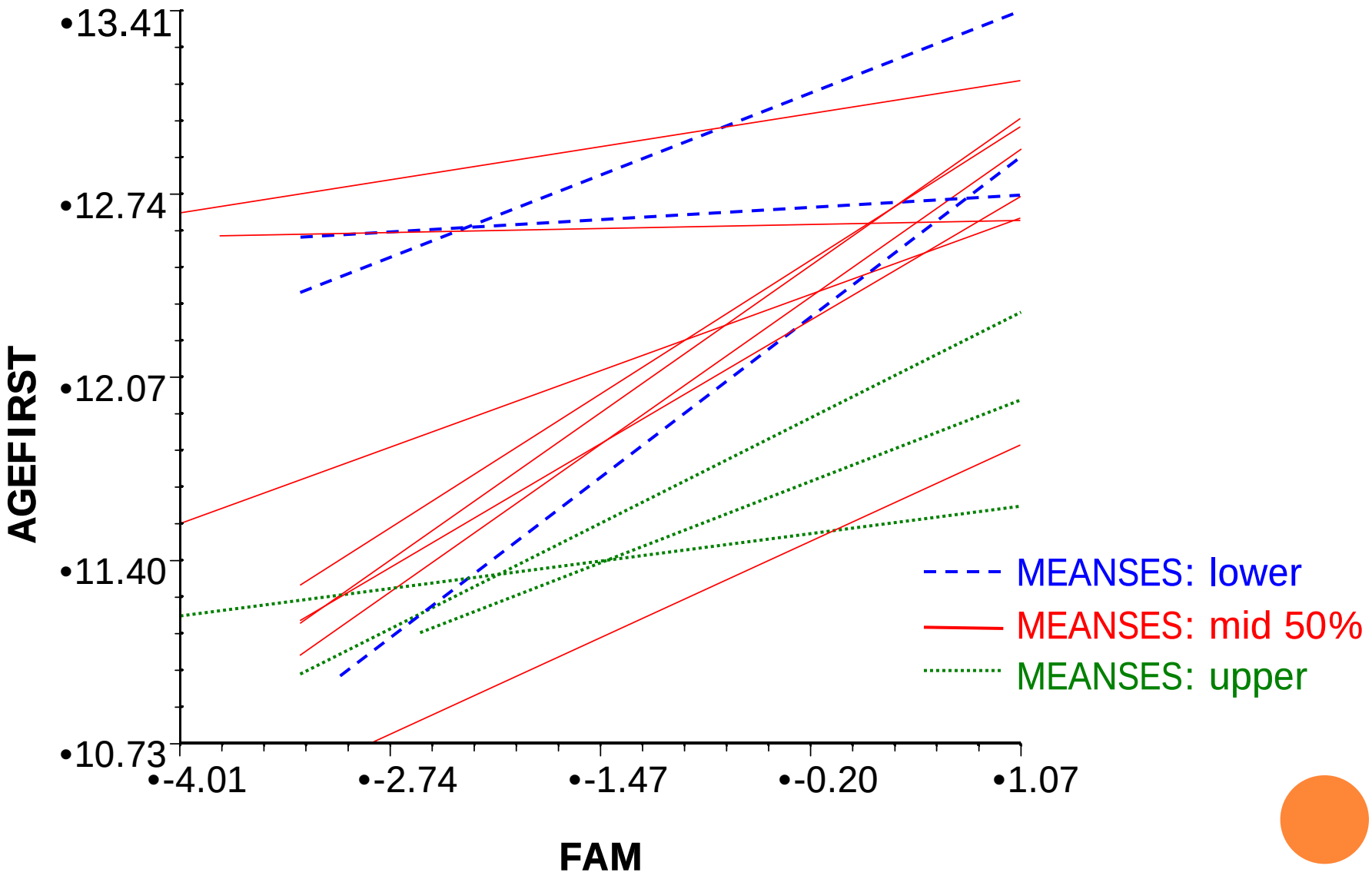
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FAM
MEANSES: lower
MEANSES: mid 50%
MEANSES: upper

CONCLUSION

- Cooperative Extension is an awesome organization with enormous potential.
- Challenge the traditional thinking on what our job is and how we do our job.
- Incorporate more rigorous methods.
  - Design
  - Intervention
  - Analysis
- Incorporate innovative cross-disciplinary methods
  - Cost benefit analysis
  - Internet data collection
  - Assessment as intervention

Thank You
For Your Attention!

Go Cowboys!!!