4.669…
Evaluation and Planning
Respect data. Trust judgement.

Evolutionary Biology and Ecology as a Valuable Framework for Some Evaluation

Jonny Morell

Evaluating Better Together
University of Denver
Morgridge College of Education
Colorado Evaluation Network (COEN).
REACH (Research, Evaluation, and Assessment Collaboratory Hub)

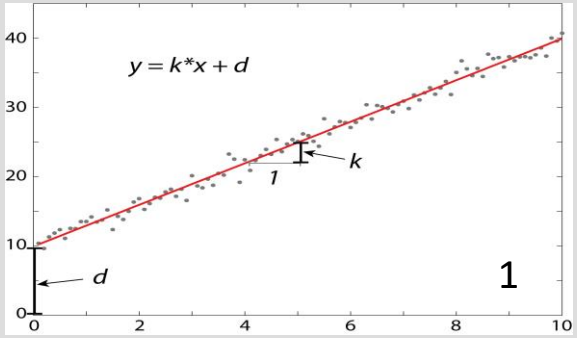
Feb 7TH, 2020

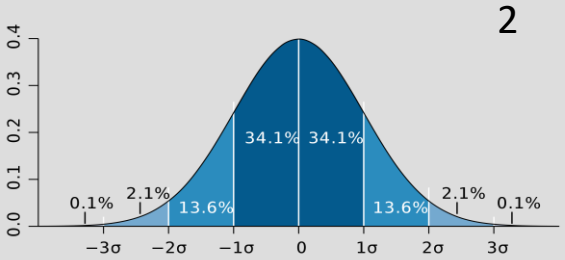
Contact information
Email jamorell@jamorell.com
Phone 734 646-8622

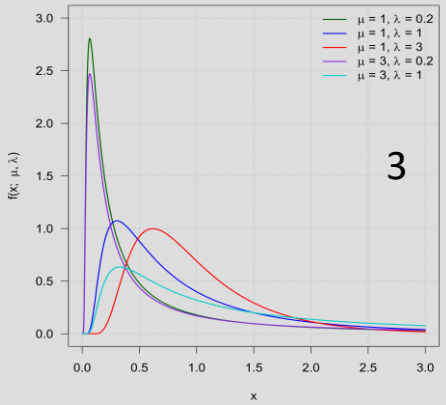
Social media
Web www.jamorell.com
Blog *Evaluation Uncertainty: Surprises in programs and their Evaluations*
www.evaluationuncertainty.com
YouTube https://bit.ly/2TNHIFR

Intellectual traditions give us ways to think about

- models,
- data needs,
- methodologies,
- data interpretation,
- acceptable answers,
- questions to engage,
- convincing arguments,
- hypothesis generation,
- choice of research design, and
- assembling research teams







$$X = T + e$$

Elements are networked

- Emergent consequences is different from the value of any single one.

This one is ours but there are others

1 http://work.thaslwanter.at/BSA/html/Fitting.html

2 https://en.wikipedia.org/wiki/Standard_deviation

3 https://en.wikipedia.org/wiki/Inverse_Gaussian_distribution

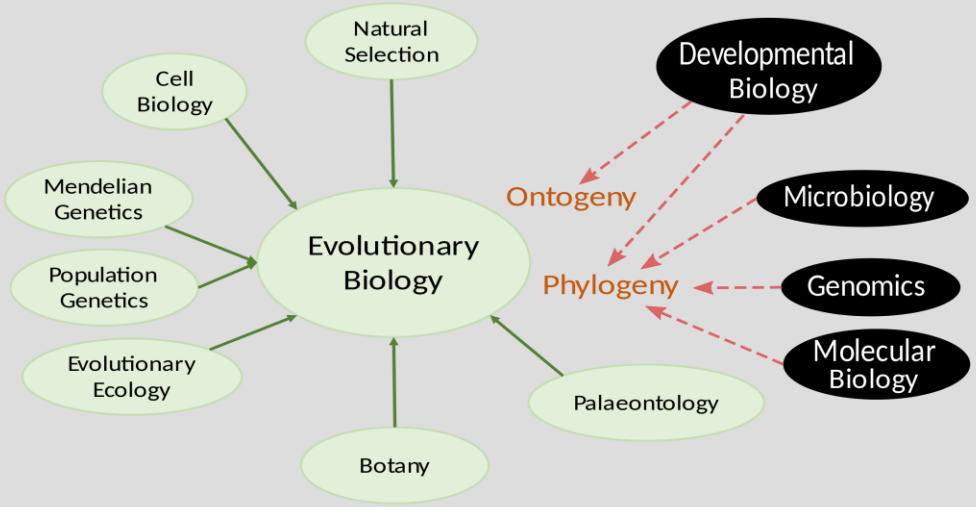
Evolutionary biology / ecology is one of the others.

When might it be useful?

- Population size
- Rates of change
- Types of programs
- Diversity of programs
- Communities of programs
- Program change over time

What would it be useful for?

- Conceptualizing program theory, methodology, metrics, and
- Analytical tools and methods



https://en.wikipedia.org/wiki/Modern_synthesis_(20th_century)

Would the evaluation be the same in both worlds?

Jonny Morell's Radical New Aardvark Hide Tanning Program

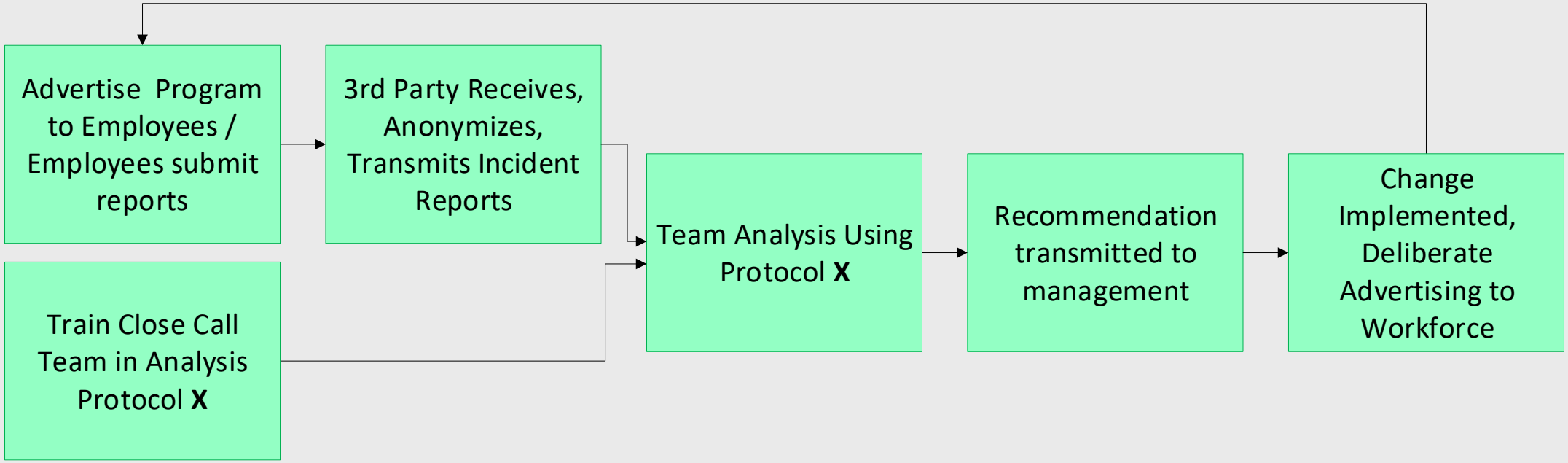
Alternate Universe #1	Alternate Universe #2
Traditional mix of methods and processes	Traditional mix of methods and processes + EB/E perspective

Some concepts From Evolutionary Biology and Ecology that Might Sometimes be Useful in Evaluation		
Evolution	Change in the heritable characteristics of biological populations over successive generations	Our programs are not biological, but they do have characteristics that pass across implementations.
Coevolution	Interactive effects of change between one organisms / programs. Agnostic as to whether one or both benefit.	Prevention and treatment programs mutually adjust to changes in each.
Mutation	Spontaneous heritable change.	Programs do seem to change for unknowable reasons in ways that are copied when the program is copied.
Fitness landscape	Representation as altitude and steepness of "terrain" in which an organism is evolving	Nice way to conceptualize risks and rewards of change.
Selection pressure	The pressure exerted by the environment, through natural selection, on evolution	Changing environment for of competing policy ideas may favor some policy variation / mutation over others.
Birth and death rates	Fate of individual organisms / programs does not matter. Rates for species do matter.	Not a common evaluation perspective. Takes some getting used to.
Ecosystem	A community of living organisms in conjunction with the nonliving components of their environment, interacting as a system.[2]	Similar to many systems perspectives in evaluation but focuses attention in a somewhat different way.
Ecology	The scientific analysis and study of interactions among organisms and their environment.	Ditto above.

“Speciation”, “Adaptation”, and “Selection Pressure”

Speciation	evolutionary process by which populations evolve to become distinct species
Adaptation	evolutionary process whereby an organism becomes better able to live in its habitat or habitats.
Selection Pressure	factors that contribute to variations among organisms that increase chance of one surviving over others.

Here is the design of an accident reporting / safety improvement program safety program we tested in four settings *



What might happen as this program is implemented in many different service areas and companies?

* Loosely based on an evaluation we did of the Confidential Close Call Reporting System

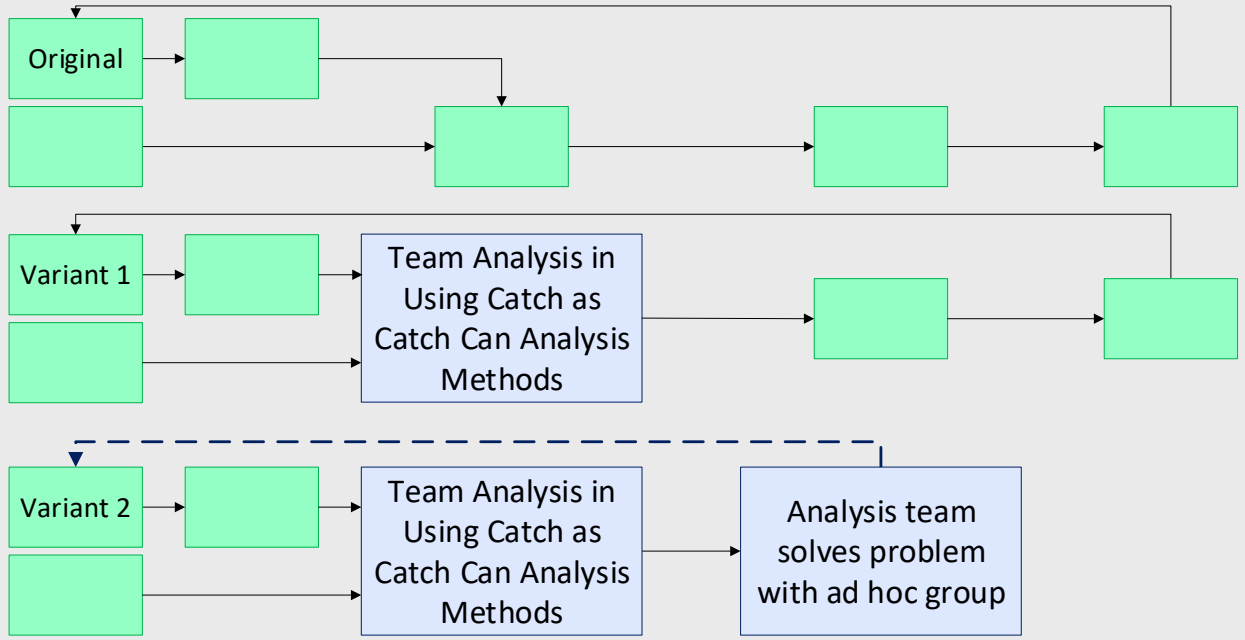
Program population and form over time

Would an evaluation of this program change if we thought in terms of:

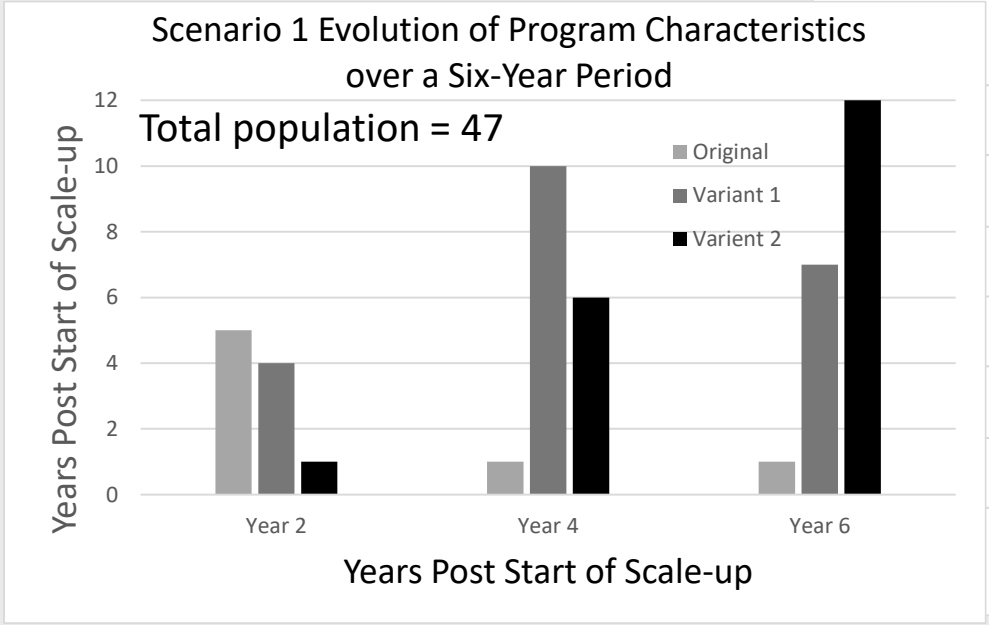
- Speciation
- Adaptation
- Selection Pressure

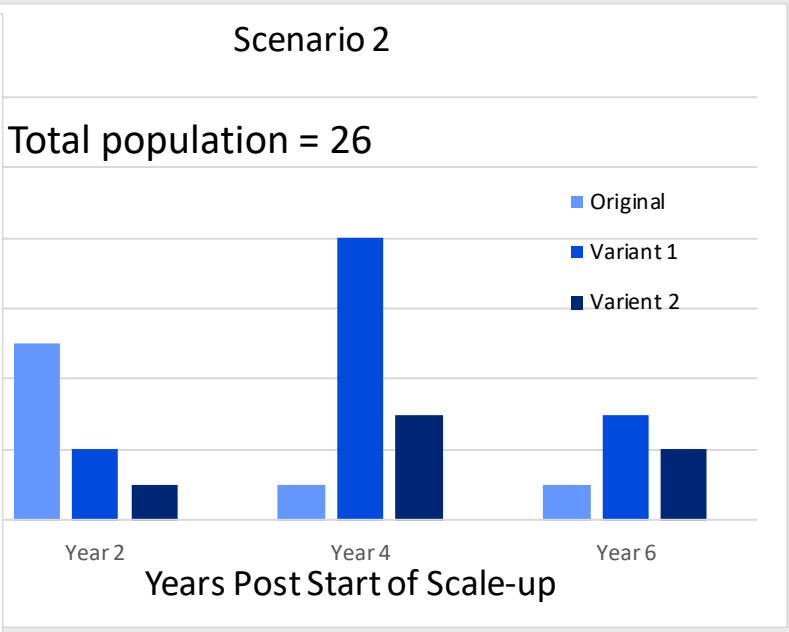
What environmental pressures led to these adaptations?

Is this the same program we started with?



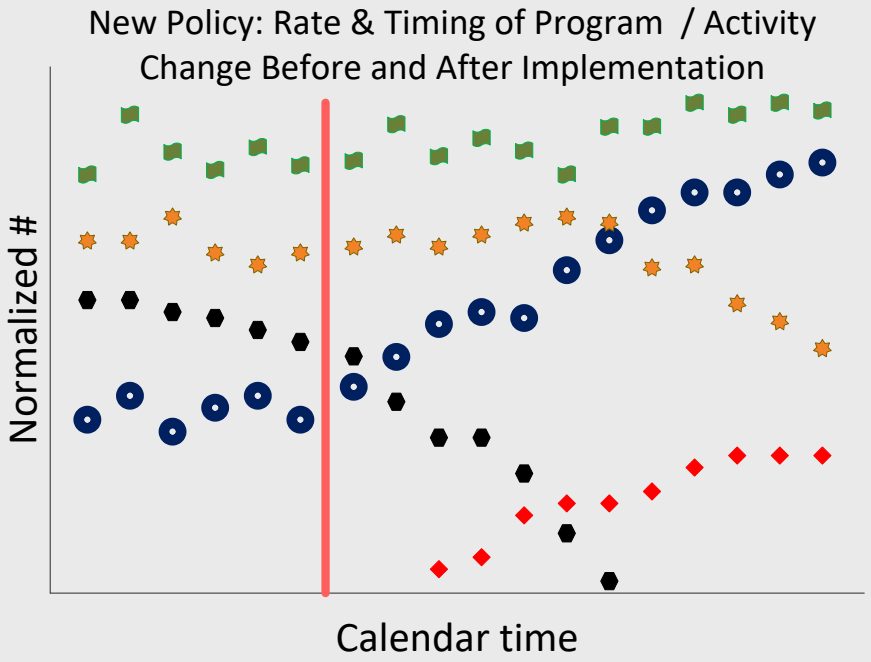
What would we conclude if data conformed to these scenarios?

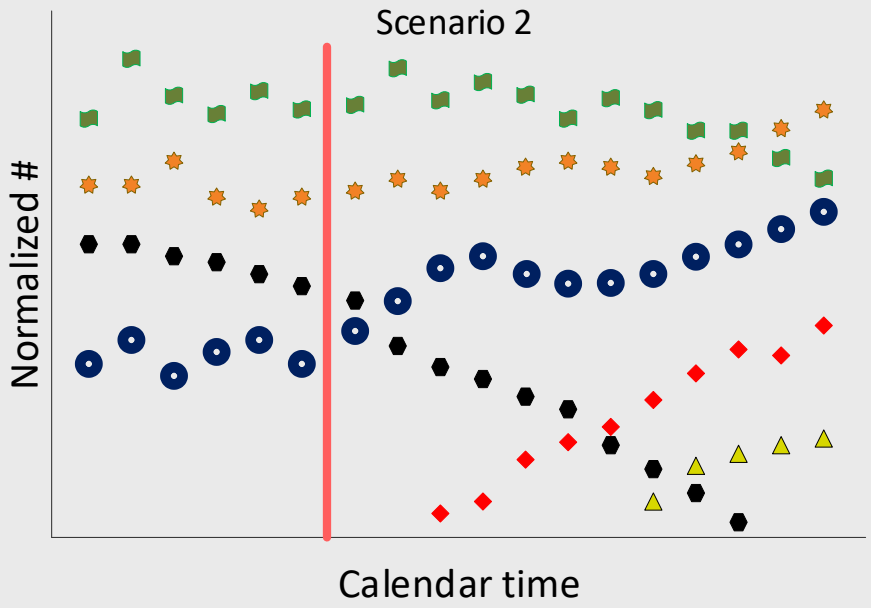




Policy can be thought of as an ecosystem

What would we conclude about the consequences of the new policy in each of these scenarios?





Questions that spring to mind through an ecosystem perspective

- Timing of changes
- Diversity of programs
- Description of the “organisms”
- Number, rate of old program decline
- Network formation and network effects
- Commonalities in programs that thrive or decline
- Number and rate of appearance of new programs

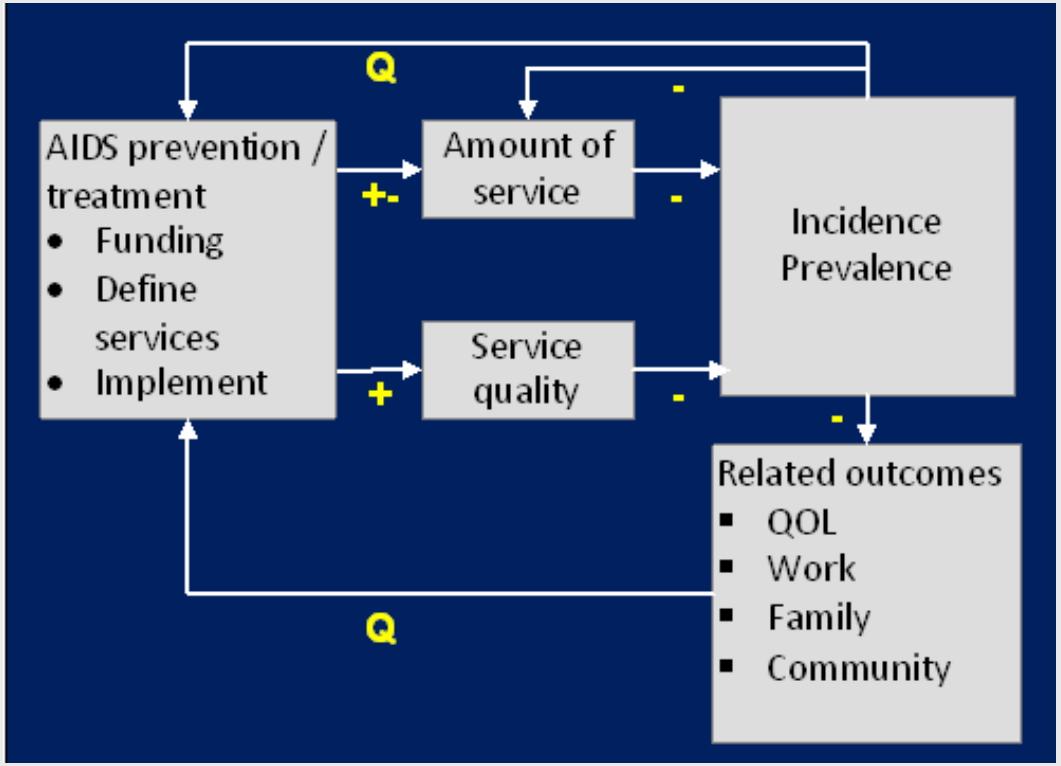
Thinking of theories of change in terms of evolutionary biology and ecology

A nice, traditional, comfortable model.

All outcomes are highly correlated

This is a fine program theory. I'd love a chance to do this work.

But let's recast the program theory in adaptive, evolutionary terms.

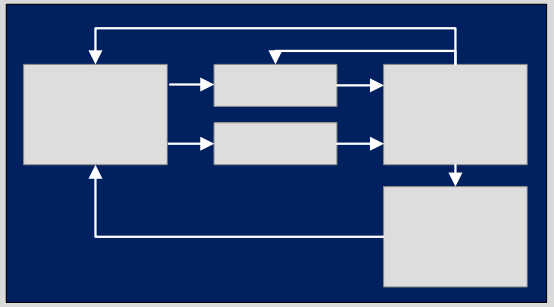


Neither program theory is inherently good or bad.

Each has implications for

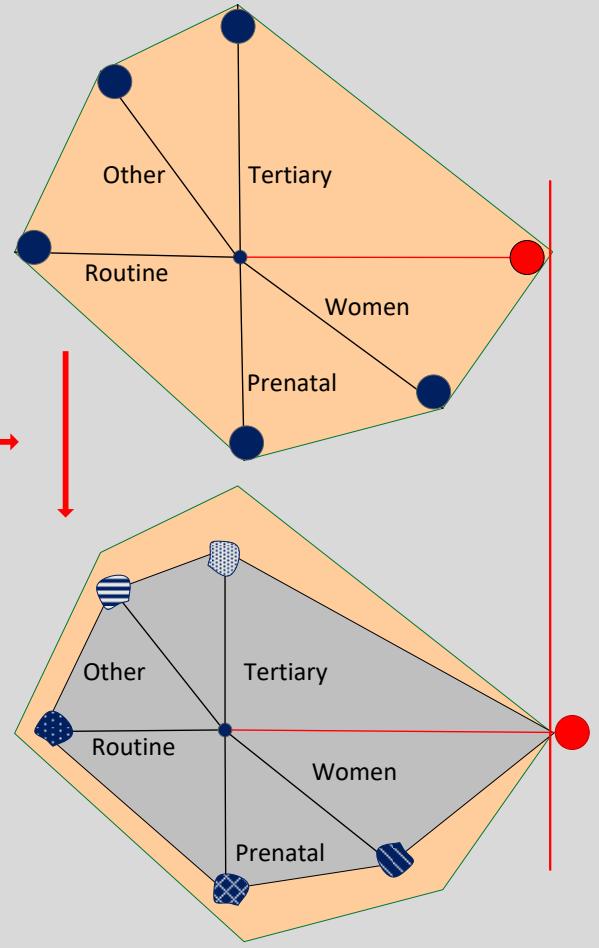
- Methodology
- Data collection
- Program theory
- Data interpterion
- Stakeholder involvement
- Use-promotion strategies
- Implications for informing policy
- Intellectual capital on evaluation team

Outcome Maximization Program Theory



	Public Health	AIDS
After: Public health system		X
▪ Career choices		X
▪ Policy synergies		X
▪ Political capital		X
▪ Intellectual effort		X
▪ Skills people develop		X
▪ Informal relationships		X
▪ Supporting structures		X

Evolutionary / Adaptive Program Theory



Some interesting references

1- http://www.gefieo.org/council-documents/evaluation-multiple-benefits-gefs-multifocal-area-mfa-portfolio

2- Joint optimization of unrelated outcomes – Part 6 of a 10-part series on how complexity can produce better insight on what programs do, and why

Example from a New Parent Support Program

Program:

- Parenting classes
- In-home coaching
- Five-years of funding
- Three pilot site communities
- Provided by community based civic organizations

Evaluation

- Case studies: Three pilot sites and two non-pilot communities
- Random assignment coaching and phone support only
- Surveys of 20 similar communities – services, demographics, civil society etc.
- No test community did well. 2 showed decrease in participation, 1 stopped operating.
- How might knowledge of birth and death rates help inform community-based in-depth case studies?

Two birth/death rate scenarios for parent support programs in 20 communities		
	Birth Rate	
Death Rate	High	Low
High		Scenario 2 Decrease population
Low	Scenario 1 Increase population	

Cases + population data imply that the environment is not supportive of new parent support programs. Why might that be?

Why did the test communities fail in an environment were these kinds of programs flourish?

Sustainability from an Ecological perspective

Biotic hierarchy might be a useful way to categorize the system

- What are the organisms?
- How many of each “species” are there?
- What does the community look like – all the populations together?
- What does the ecosystem look like? What interacts with the species, populations, and communities to **keep the system stable?**

Attractors” are states where a system returns after it has been perturbed.

- In our business, change does not usually last. The attractors are deep.

Thinking in ecological terms leads to questions that may not be asked in many evaluations

- What changes did the novel organism (aka program) induce in the ecosystem?
- How quickly does the ecosystem revert to stable condition once funding is removed?
- How close to its original state does it get?
  - Population sizes
  - Population diversity
  - etc.
- At what rate does each species approach its original condition?

[How can the concept of “attractors” be useful in evaluation? Part 8 of a 10-part series on how complexity can produce better insight on what programs do, and why]