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Combining treatment effect models with mediation analysis for comprehensive Social & Behavior Change Communication evaluation

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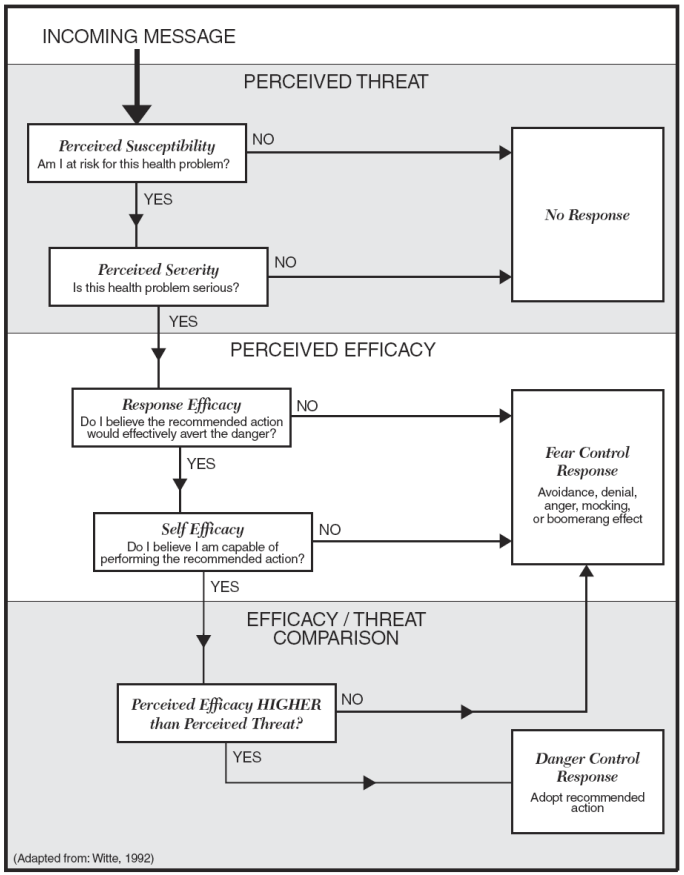
Priority research questions for evaluating SBCC programs…and challenges

Research Question	Challenge
Did the program change the intended behavior?	• Randomized trials typically not feasible • Most evaluations fail to account for self-selection
How did the program change the intended behavior? • Did the program messages target the appropriate psychosocial variables that influence the relevant decisions?	• Few evaluations address this question • Theory used by program often not explicit • Often, surveys do not measure the potential intermediate concepts

Communication and Malaria Initiative in Tanzania (COMMIT)

- Implemented between 2007 - 2013
- Multiple channels – media, community
- Emphasis on promoting use of bed nets

Theoretical Guidance:
Extended Parallel Processing Model (Witte, 1994)



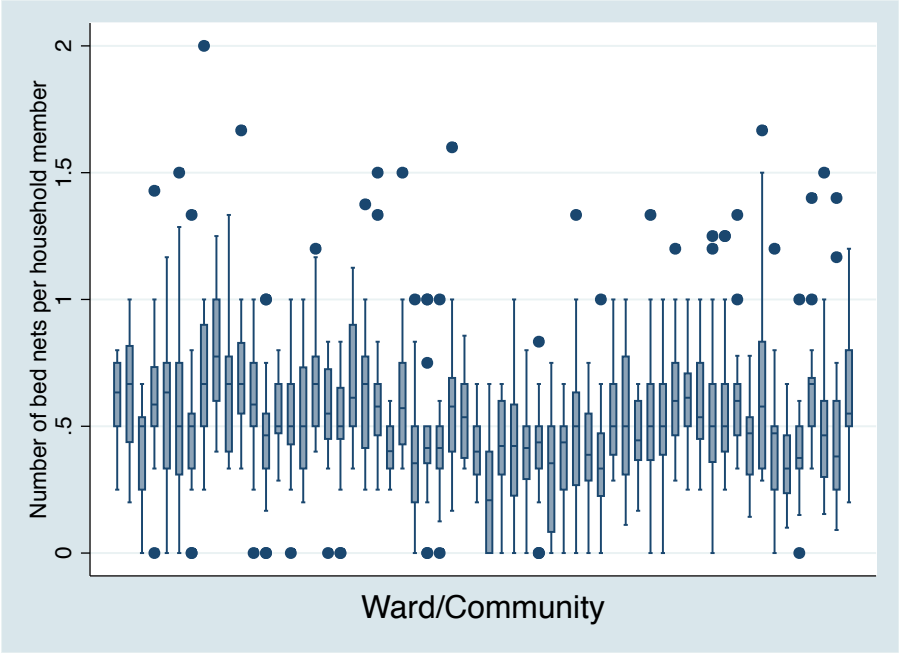
- **Susceptibility**: Many people get malaria
- **Severity**: Malaria is dangerous
- **Response efficacy**: ITNs help you avoid malaria
- **Self-efficacy**: You can obtain and use ITNs

Study Design

- Post-implementation household survey
- Data collected in Oct-Nov 2011
- 1200 households from 3 regions:
  - Lindi, Rukwa, Mwanza

Outcome of Interest:
Number of nets owned by the household

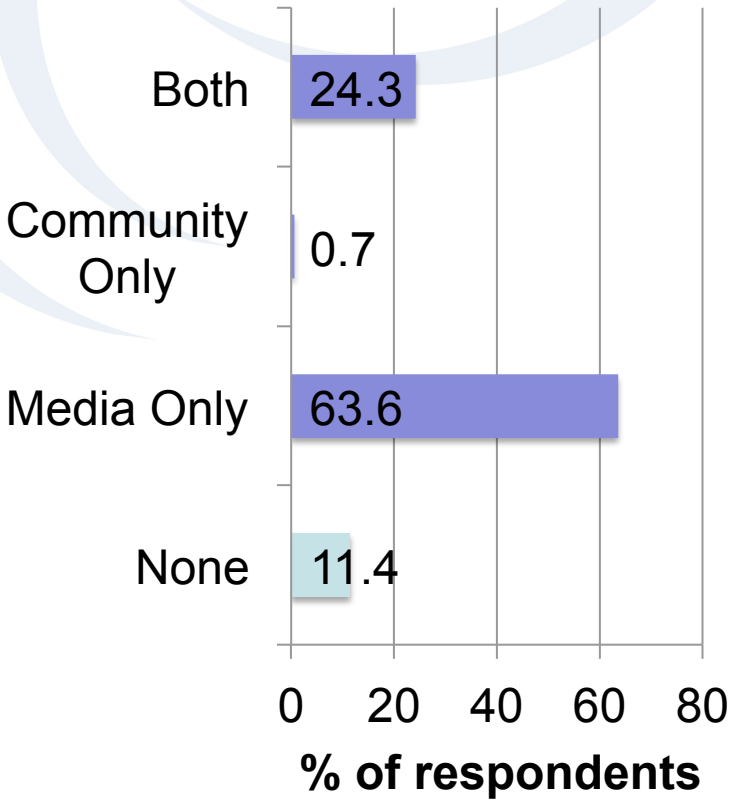
- Net use in Tanzania strongly determined by net ownership
- Net ownership reflects 3 behaviors:
  - Acquisition
  - Maintenance
  - Retention
- Converted to **Net Ratio** to adjust for household size

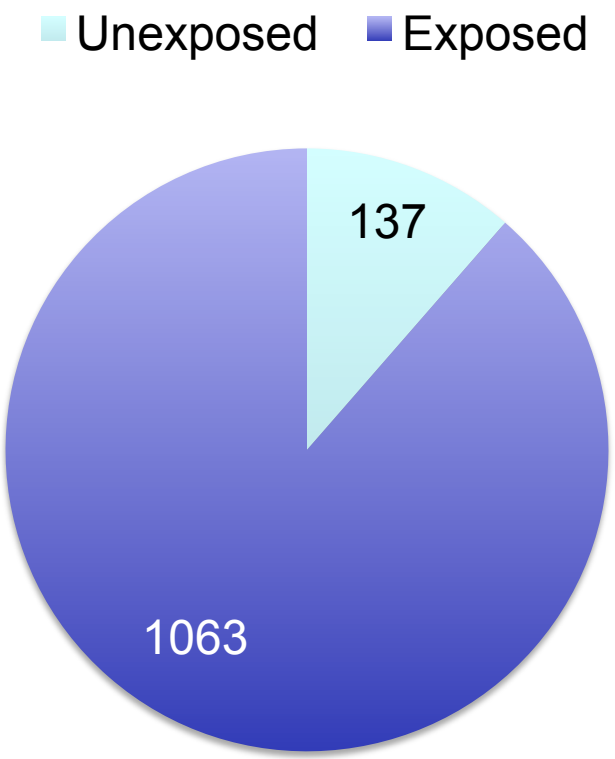


Analytic Approaches

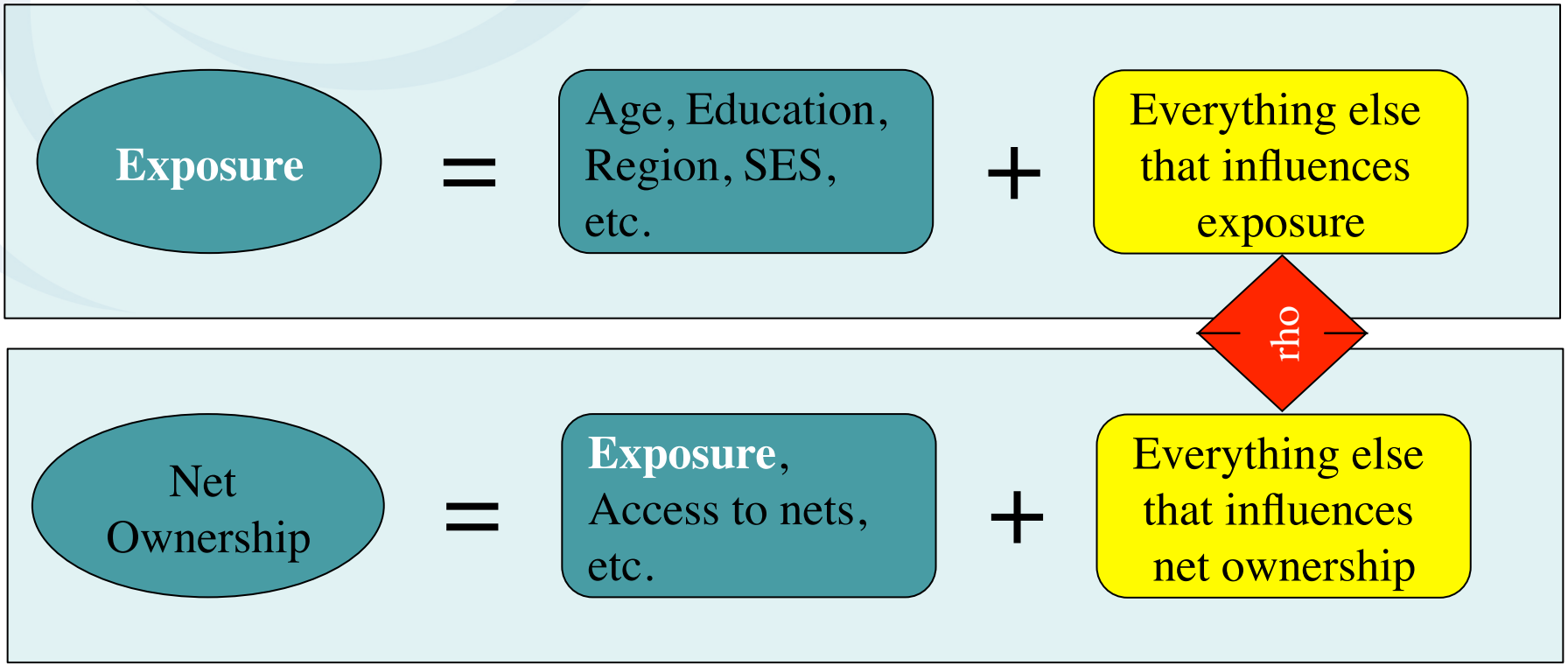
Evaluation Question	Analytic Approaches
Did the COMMIT activities effect net ownership?	Treatment Effects Model
How did COMMIT activities effect net ownership?	Mediation Analysis

These approaches require a binary measure of exposure to the intervention





Treatment effect models estimate two equations simultaneously



Measured | Unmeasured

rho = correlation between residuals

Predicting exposure to COMMIT

Variable	Coefficient
Gender	-0.50**
Education (Ref = None)	
Primary	0.24*
Greater than Primary	0.89*
SES quintiles (Ref = Lowest)	
Lower	0.19
Middle	0.16
Higher	0.54*
Highest	0.43
Frequency of Newspaper Reading	0.18***
Frequency of Radio Listening	0.37
Frequency of Television Viewing	0.52
Region (Ref = Lindi)	
Rukwa	-0.52***
Mwanza	0.25
Own a radio	0.58***
Own a television	0.19
Constant	1.38
r2	0.28

*p<0.05; **p<0.01; ***p<0.001

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Predicting household net ratio

Variable	Coefficient
Number of children under the age of 8	-0.04***
Average number of nets in the Kata	0.15***
Education (Ref = None)	
Primary	0.06***
Greater than Primary	0.11***
Region (Ref = Lindi)	
Rukwa	-0.07***
Mwanza	-0.08***
Exposure to Commit	0.09*
Constant	0.129
rho = -0.11 Test that rho = 0; p= 0.324	

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*p<0.05; **p<0.01; ***p<0.001

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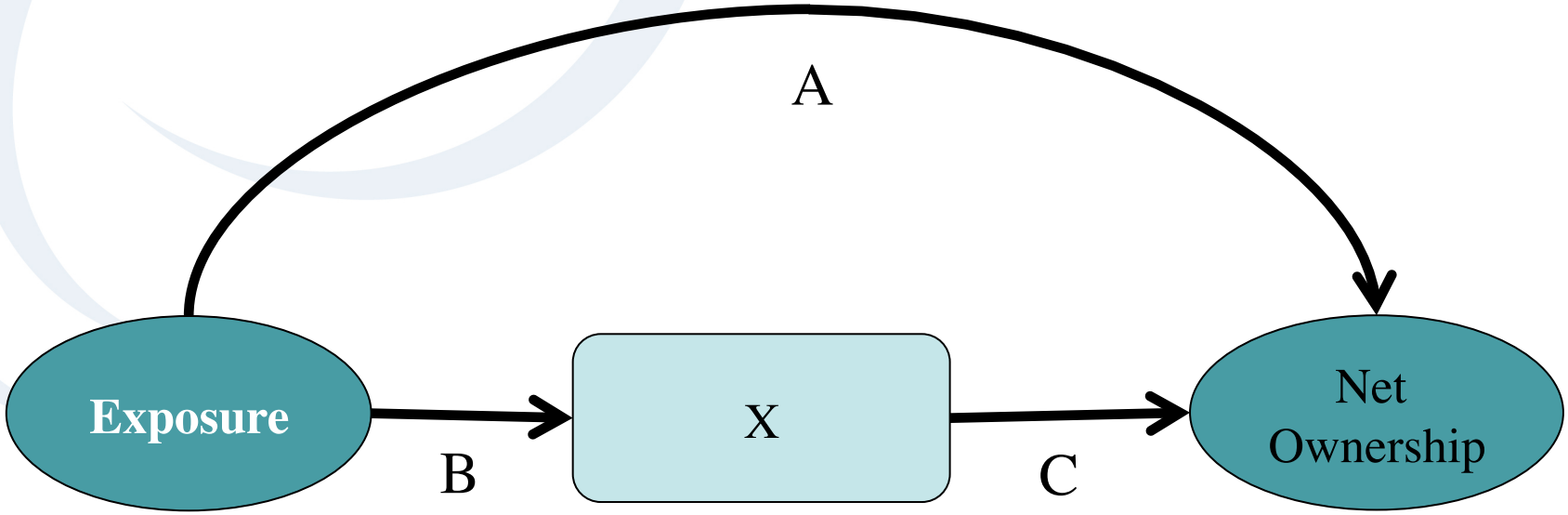
Mediation Analysis



Direct Effect = A

Indirect Effect = B * C

Total Effect = A + (B * C)

Regression coefficients from multivariate model predicting Net Ratio

Potential Mediator	Regression Coefficient
Perceived severity	-0.004
Perceived susceptibility	-0.012
Response efficacy	-0.002
Self efficacy	0.032***
Perceived comfort of bed nets	0.009
Perceived social norms	0.018**

Models included: number of children under 8 in HH, Education, SES, Region of residence, and Average number of bed nets owned by households in the ward
P-value: *p<0.05; **p<0.01; ***p<0.001

Direct, Indirect and Total Effects of Exposure on Net Ratio

Total Effect	**0.055**
Direct Effect	**0.028**
Indirect Effect	**0.028**
Perceived severity	-0.003
Perceived susceptibility	-0.001
Response efficacy	-0.001
Self-efficacy	0.017***
Perceived comfort of bed nets	0.003
Perceived social norms	0.012**
Proportion of total effect mediated	**50.0**

Models included: number of children under 8 in HH, Education, SES, Region of residence, and Average number of bed nets owned by households in the ward

P-value: *p<0.05; **p<0.01; ***p<0.001 (developed using a bootstrap approach with 2000 iterations)

Conclusion: Combining these two analytic approaches answers the two priority evaluation questions for SBCC

- The treatment effect model tells us if the program worked
  - Yes, exposure to the program's messages increased a household's net ratio

- Mediation analysis tells us if we used the right message
  - Messages targeting self efficacy appeared to work
  - But, also illustrates the important role that perceived norms seem to play and suggests incorporating messages targeting those norms