International development through use inspired research

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The context

- <u>2017-2019</u>   Honduras Justice, Human Rights, and Security Strengthening
PI's Vincent Webb, Charles Katz, Cassia Spohn, Ed Maguire. USAID.
    - Community policing conference
    - Gender, police, prosecution, and victimization
    - Applied Research Training (ART)

- <u>2016-2019</u>   Secondary Violence Prevention Activity (SVPA) Proponte Mas.
Chief of Party Robyn Braverman, Deputy Chief of Party Guillermo Cespedes.
PI: Charles M. Katz, Co-PI Scott Decker. USAID
    - YSET support
    - Evaluation of program

- <u>2017-present</u>   Secondary Prevention Activities under the Communities, Families, and Youth
Resilience Project in the Eastern and Southern Caribbean.
PI. Charles Katz. USAID.

Applied Research Training Team
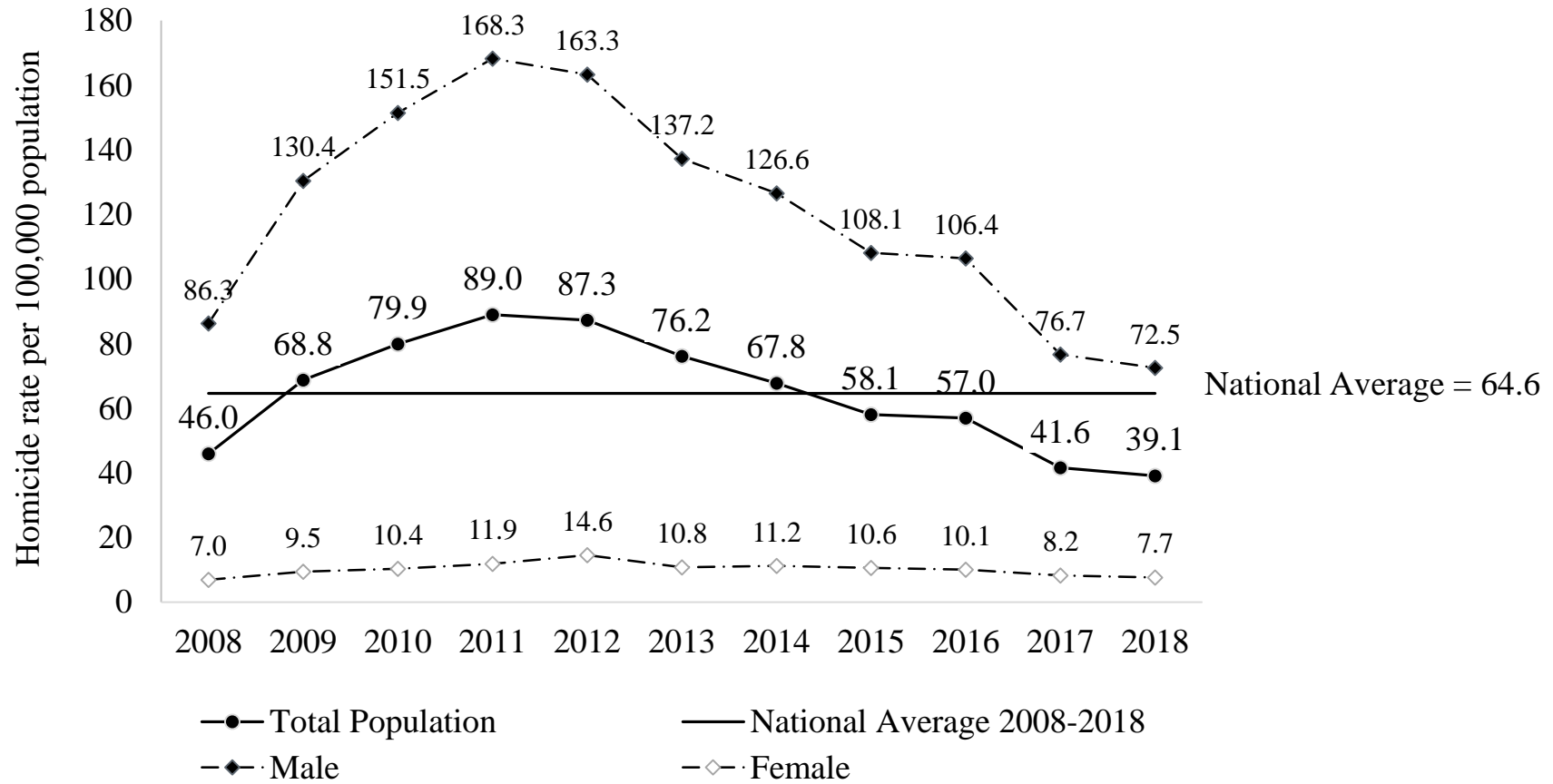
Charles Katz

Hyunjung Cheon

Cassia Spohn

Vincent Webb

Homicide rate per 100,000 population in Honduras, 2008-2018

Average Homicide Rates and Percentages by Victim's Sex and Age, 2008-2018 (N=58,543)

Age group	Total Rate	Male Rate[a]	Female Rate[b]	Male (%)	Female (%)	Unknown (%)
0-4	2.4	3.1	1.6	64.2%	32.5%	3.4%
5-14	3.2	4.7	1.6	74.6%	24.8%	0.5%
15-29	102.2	196.6	14.7	92.1%	7.7%	0.2%
30-44	118.4	233.4	16.9	92.0%	7.9%	0.2%
45-59	79.4	151.2	13.3	90.9%	8.9%	0.1%
60 and over	38.6	72.9	6.9	89.9%	9.9%	0.2%
Unknown[c]	--	--	--	85.2%	7.5%	7.3%
All ages	64.6	120.7	10.2	91.1%	8.3%	0.6%

a. Rate per 100,000 male population.
b. Rate per 100,000 female population.
c. Rate is not calculated.

Percentage of Homicides by Victim's Sex, Victim's Age, and Weapon Used, 2008-2018 (N = 58,543)

Weapon[a]	Victim's sex		Victim's age						Total
	Male	Female	0-4	5-14	15-29	30-44	45-59	60 +	
Firearm	81.0%	74.0%	49.2%	71.6%	82.3%	81.1%	79.2%	68.0%	80.3%
Sharp or Blunt	14.2%	16.9%	20.4%	17.4%	12.2%	14.7%	17.6%	27.2%	14.4%
Suffocation	2.9%	6.4%	14.2%	7.4%	3.9%	2.4%	1.5%	2.0%	3.2%
Other	1.6%	2.2%	11.9%	2.9%	1.4%	1.6%	1.5%	2.4%	1.7%
Unknown	0.4%	0.5%	4.2%	0.7%	0.3%	0.2%	0.3%	0.4%	0.4%

Note. Other weapons include poisoning, burning, etc.

a. Chi-square test indicated that the relationship between victim's sex and weapon used was significant, $X^2(3, N = 57,892) = 229.4393, p < .001$; also, the relationship between victim's age and weapon used was significant, $X^2(15, N = 56,612) = 1.1e+03, p < .001$.

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Research agenda with the national police

➢ Violence in Honduras from 2008 though 2018 (accepted, Injury Prevention)

➢ Social structural factors and homicide

➢ The homicide drop in Honduras
- Officer integrity checks/officer dismissals*
- USAID funding
- Programming
- Training
- Migration*
- New hires
- Police strength

Toward the Improvement of a Risk Assessment Tool for Identifying Youth and Evaluating Prevention and Intervention Services in Honduras

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Measurement team

Charles Katz   Hyunjung Cheon   Yi Zheng

Background

The risk & protective factor paradigm and what we know about it

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Proponte Mas Program processes

Community referral → YSET/IMC Diagnostic (20% qualify) Evaluative → Family based intervention → YSET/IMC Evaluative
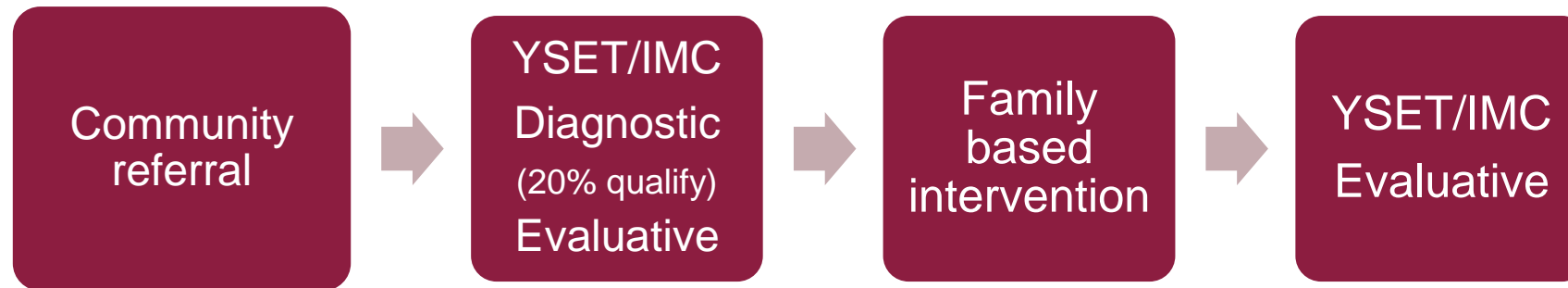
Klein & Maxson (2006) review of U.S. based gang research, which lead to the L.A. YSET

Concluded that five risk factors are largely responsible for gang joining

1. experiencing a critical life event;
2. displaying antisocial tendencies, that did not necessarily include delinquency, such as risk taking or impulsivity;
3. having attitudes favorable to delinquency;
4. low levels of parental supervision;
5. associating with delinquent peers.

Noted that:

- These risk factors help predict gang joining AND other problem behaviors

- More risk factors=more problem behavior

- The number of risk factors and the number of domains represented by the risk factors are the best predictors of the individuals most likely to become delinquent.

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Los Angeles YSET

Risk factors used to predict gang membership

1. Anti-social tendencies
2. Impulsive risk taking
3. Guilt neutralization
4. Parental monitoring
5. Family gang influence (specific gang marker)
6. Friends negative influence
7. Friends delinquency
8. Critical life events
9. Self-reported delinquency (specific gang marker)

Peer reviewed research found:

- Strong predictive validity for self-reported gang membership

- More valid for males than females

See: Hennigan et al. 2014; Hennigan et al. 2015

We know from prior research that reducing risk factors and increase protective factors can impact a broad set of problems

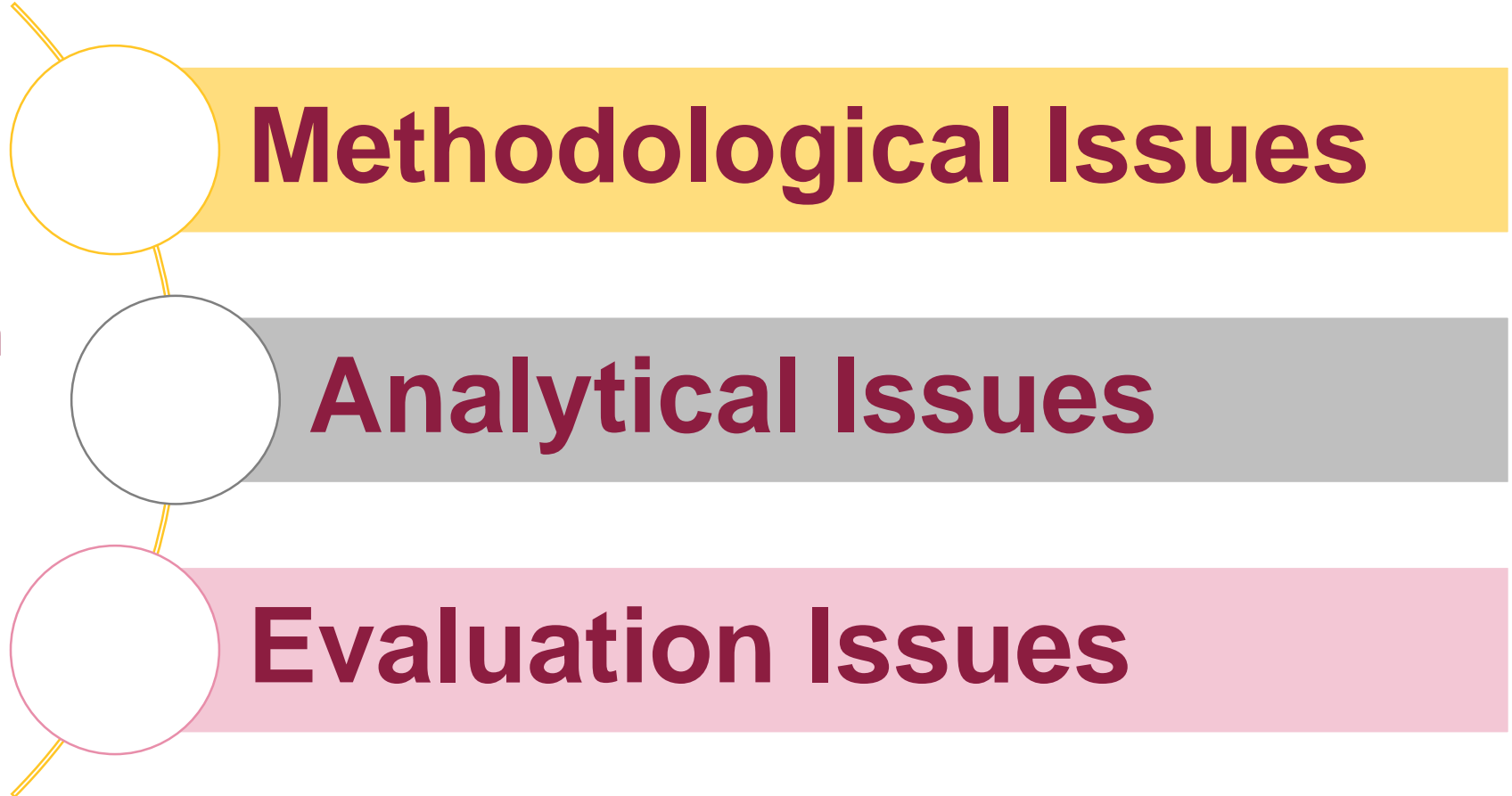| Crime & delinquency Drug use Alcohol use Tobacco use Gang joining	School dropout Academic achievement Teen pregnancy Early sexual intercourse STIs	Depression Suicidal ideation Employment

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ASU reviewed the YSET for use in Honduras following program implementation

ASU's review of the YSET/IMC

Examination of IMC

Methodological Issues

Analytical Issues

Evaluation Issues

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ASU's review of the YSET/IMC

Methodological Issues

Examination of IMC

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Methodological Issues

1. We found that risk factors are not tied to outcomes
   - What are we trying to prevent?
   - The validity of the IMC risk factors in predicting an outcome are unknown in Honduras.

2. Includes outcomes as risk factors (e.g., delinquency and drug use are used as a risk factor)
   - Those at high risk are more likely to engage in problem behavior but problem behavior is part of the definition of being at high risk.
   - This is because delinquency is a risk factor for gang joining. So while it made sense for the LA project, it might not make sense in Honduras depending on the outcomes desired.

3. Risk and protective factors and their association with problem behavior have never been examined in Honduras.

4. Cut points based on small, at-risk sample of youth from high risk neighborhoods.

Identifying at-risk youth in the nation of Honduras

All youth from all neighborhoods

High risk youth

Average risk youth
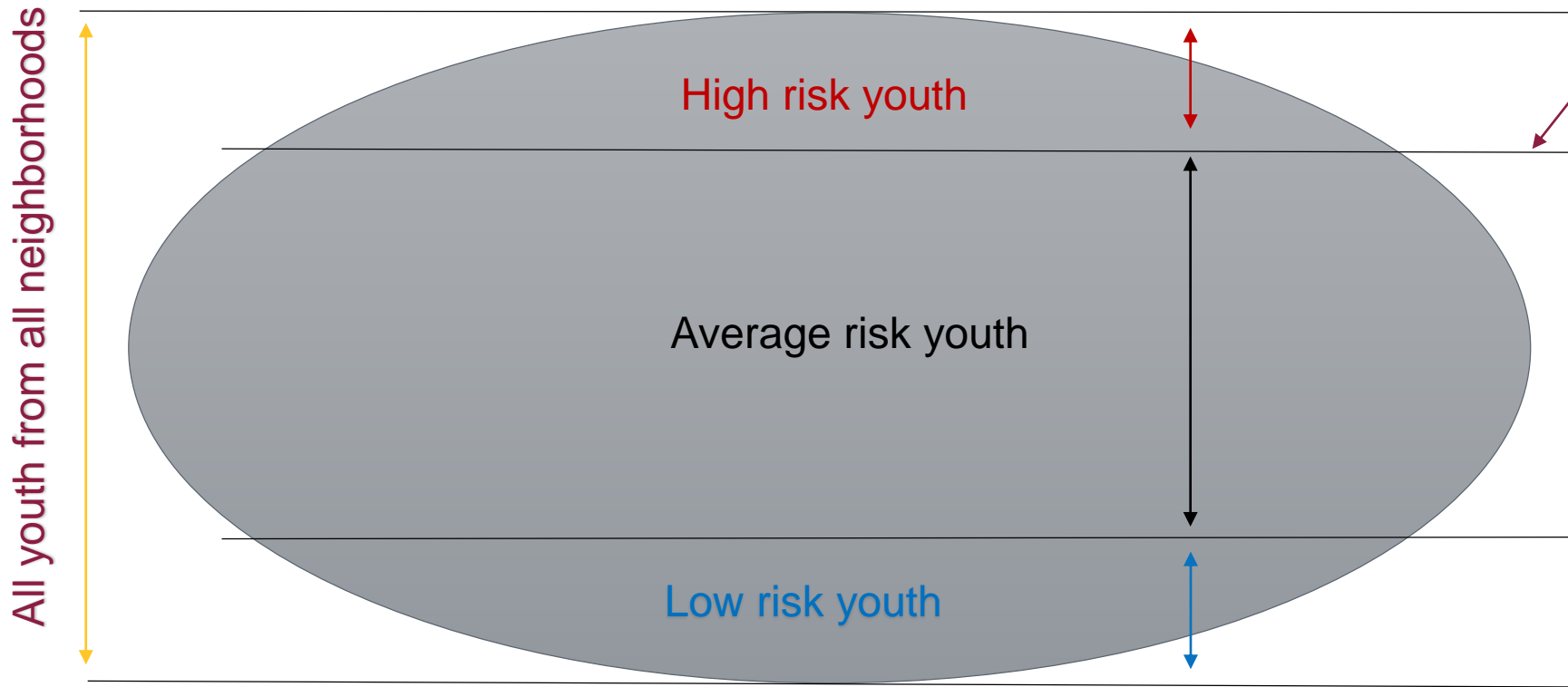
Low risk youth

If we had a **random sample of all youth in Honduras** we could determine this cut point

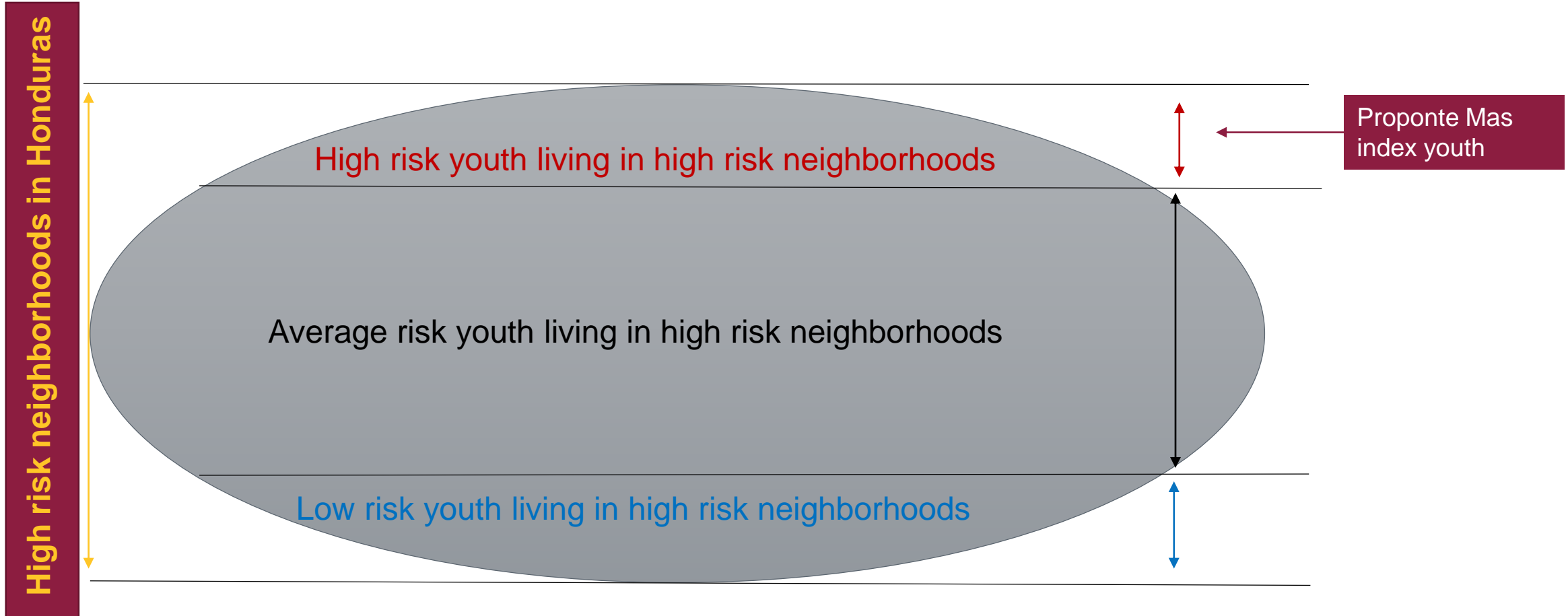BUT WE DO NOT! We have a purposive sample of referred high risk youth from high risk neighborhoods

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Identifying at-risk youth from youth who have been referred as at-risk in at-risk neighborhoods in Honduras

All neighborhoods in Honduras

High risk neighborhoods

Average risk neighborhoods

Low risk neighborhoods
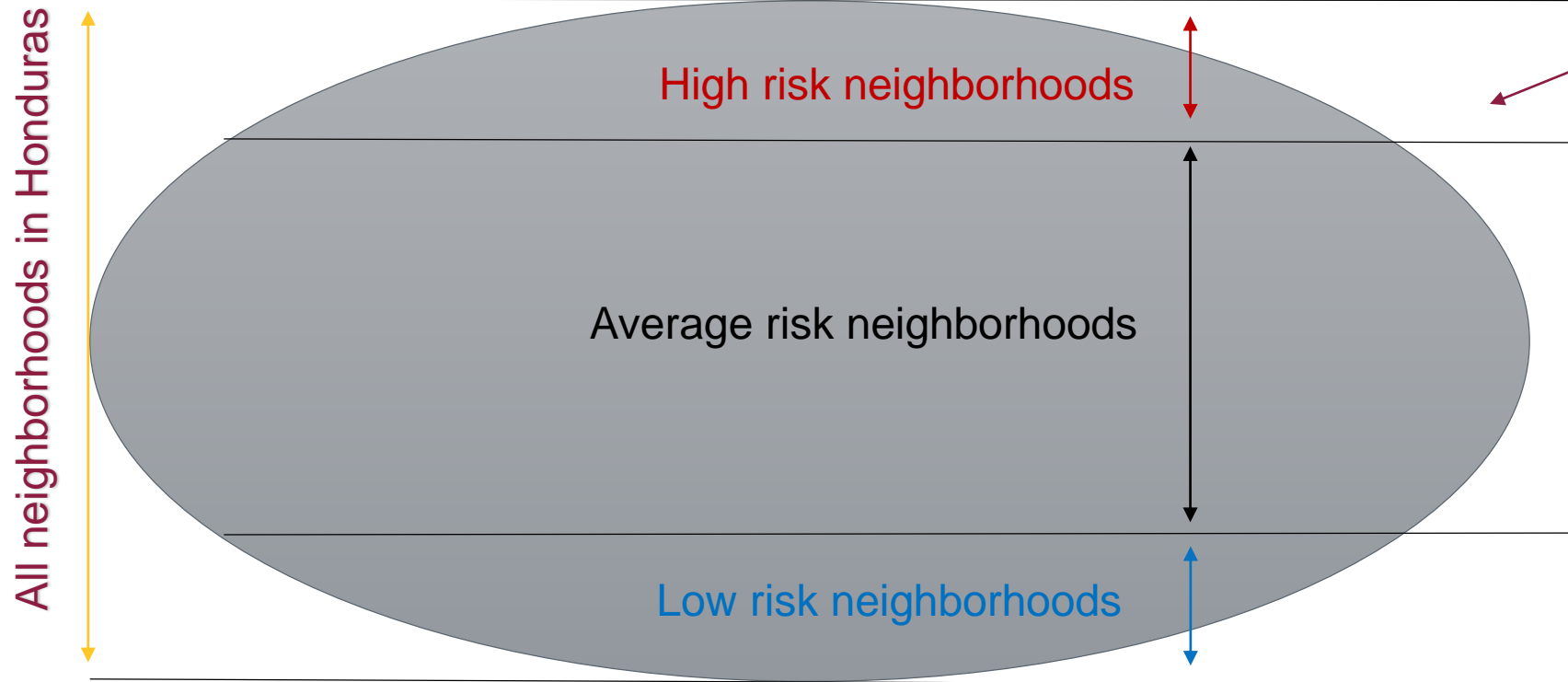
These neighborhoods have been identified by USAID –such as San Miguel, Carrizal, Pedregal, Villanueva, etc.—and are those served by Proponte Mas

On average, high risk neighborhoods contain more high risk youth than average or low risk neighborhoods

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How high risk youth are currently identified in Honduras

High risk neighborhoods in Honduras

High risk youth living in high risk neighborhoods

Average risk youth living in high risk neighborhoods

Low risk youth living in high risk neighborhoods

Proponte Mas index youth

ASU's review of the IMC

Examination of IMC

Methodological Issues

Analytical Issues

Evaluation Issues

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Analytical Issues

1. Cut points lacked of analytical specification.

- Cut points were made to be empirically implemented but were based on "qualitative hunches" and "eye balling" the distributions.

2. Scales have unknown reliability.

- Analytical analysis regarding reliability was limited and in some cases used wrong statistical procedures. Examples include:
    - Alpha has limitations.
    - No invariance testing by gender, school status, age, etc.
    - No Confirmatory factor analysis
- Some scales exhibited marginal reliability (e.g., anti-social tendencies, critical life events).

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Analytical Issues (cont.)

3. Scales not validated.

- Analytical analysis regarding validity had not been conducted.
  - Cross-sectional or longitudinal
  - Use of different data types
  - No examination of validity by gender and school status

ASU's review of the IMC

Examination of IMC

Methodological Issues

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1. Unnecessarily restricted outcome measures included in instrument

- Only 9 risk factors available for evaluation
    - Parental supervision
    - Family gang involvement

- We <u>think</u> we know that other risk and protective factors could be influenced by a family based program
    - Especially protective factors within the family domain

- Placed an unnecessary "ceiling" on programmatic effectiveness (i.e., 9 risk factors)

- Restricted specificity of diagnostic instrument

If you were a doctor how precise would you like to be?

- "IMC" is restricted to measuring change with 9 scales.
  - Change is upwardly bound
  - More difficult to identify a change

Old YSET °C

New YSET °C
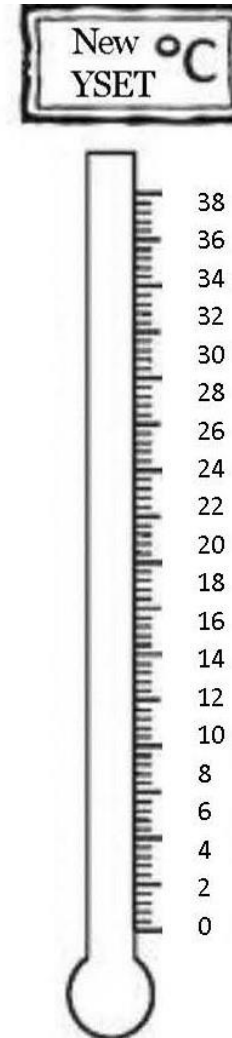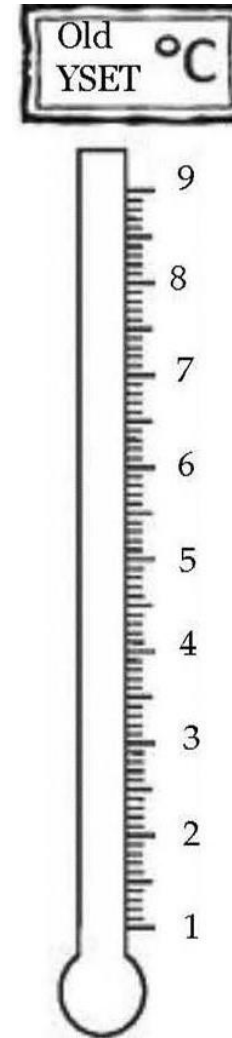
Implications of Findings with Low Reliability and Validity

- Measurement error, reduces correlations and predictive strength of variables

- Reduces statistical power

- Increases possibility of Type I and Type II Error
  - Type I Error: False Positive, i.e. saying a program works when it doesn't
  - Type II Error: False Negative, i.e. saying a program does not work when it does

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2. Many scales used a temporal period of reference that is problematic

- Many items contain scales that ask whether the respondent had ever engaged in the problem behavior, which makes it difficult to examine change in behavior.

- The Critical Life Events scale relies on a timeline that is inconsistent with the IMC protocol--items reference a 12 months period when the IMC is administered every 6 months.

3. Limited amount of data being collected on problem behaviors that could be impacted by program as a result of reduced risk

- Once again, we know from prior research that reducing risk factors and increase protective factors can impact a broad set of problems.

Crime & delinquency Drug use Alcohol use Tobacco use Gang joining	School dropout Academic achievement Teen pregnancy Early sexual intercourse STIs	Depression Suicidal ideation Employment

Rebuilding the YSET

What have we learned from the R&P research the Central America and the Caribbean?

1. Risk and protective factors are related to problem behavior.

2. The five domains are important.

3. Risk and protective factors related to problem behavior vary by:
    a. problem behavior
    b. nation

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How we proceeded

1. Reliability Testing

2. Concurrent Validity Testing

3. Predictive Validity Testing

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The revised YSET is based on a large (but not exhaustive) pool of items and scales to be tested in Honduras

- YSET-keep all current risk factors being used
- Communities that Care
- GREAT 1 & 2
- Eurogang survey
- ADAM
- Others

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How we proceeded

1. **Reliability Testing**

2. Concurrent Validity Testing

3. Predictive Validity Testing

Reliability testing

Examined inter-item reliability (ω)	
Family Risk Factors	
Family History of Antisocial Behavior	0.861
Parental Attitudes Favorable Toward Drug Use	0.890
Poor Family Management	0.837
Family Conflict	0.847
Weak Parental Supervision	0.779
Family Gang Influence	0.454
Family Protective Factors	
Attachment	0.879
Opportunities for Prosocial Involvement	0.797
Rewards for Prosocial Involvement	0.723

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And more reliability testing

Confirmatory factor analysis	Example
Multivariate statistical procedures testing how well items represent a construct.	
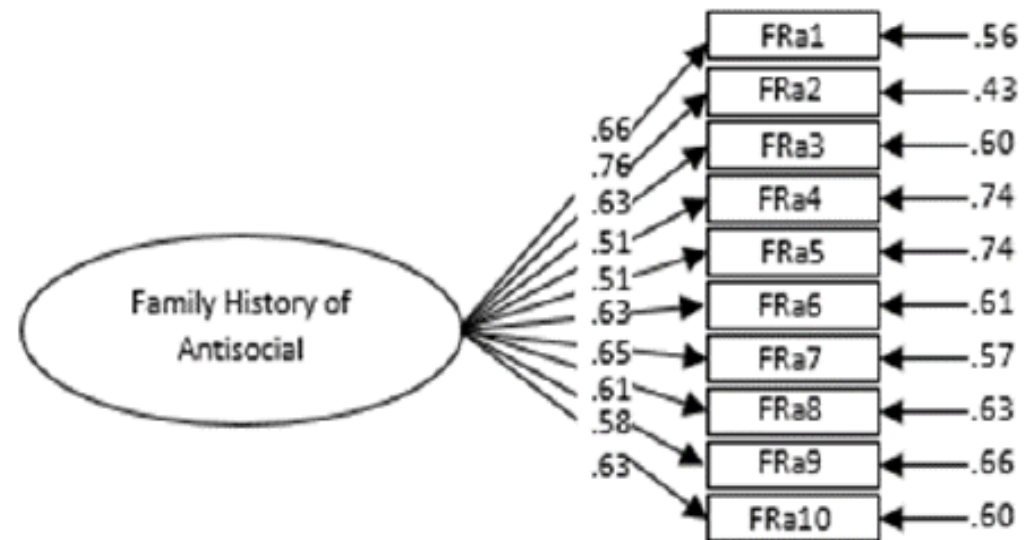
And still more reliability testing

- Invariance tests to examine if scales remained reliable by:
  - Gender
  - Age
  - School status

How we proceeded

1. Reliability Testing

2. Concurrent Validity Testing

3. Predictive Validity Testing

Tested for concurrent validity

- Were risk factors associated with a wide variety of problem behavior in Honduras?

- If so, which risk factors are correlated with which problem behavior in Honduras?

- Invariance testing
  - School attendance matters!

Revised YSET

RISK FACTORS	DOMAIN	PROTECTIVE FACTORS
Transitions and Mobility Low Neighborhood Attachment Community Disorganization Laws and Norms Favorable to Drug Use Perceived Availability of Drugs	COMMUNITY	Opportunities for Prosocial Involvement Rewards for Prosocial Involvemen
Family History of Antisocial Behavior Parental Attitudes Favorable Toward Drug Use Poor Family Management Family Conflict Weak Parental Supervision Family Gang Influence	FAMILY	Attachment Opportunities for Prosocial Involvement Rewards for Prosocial Involvemen
Rebelliousness Rewards for Antisocial Involvement Favorable Attitudes Toward Drug Use Favorable Attitudes Toward Antisocial Behavior Perceived Risks of Drug Use Friends' Use of Drugs Interactions with Antisocial Peer Intentions to Use Antisocial Tendencies Critical Life Events Impulsive Risk Taking Neutralization of Guilt Negative Peer Influence Peer Delinquency	PEER/INDIVIDAUL	Belief in the Moral Order Rewards for Prosocial Involvemen Interaction with Prosocial Peers Social Skills
Academic Failure Low Commitment to School	SCHOOL	Opportunities for Prosocial Involvement Rewards for Prosocial Involvemen

How we proceeded

1. Reliability Testing

2. Concurrent Validity Testing

3. Predictive Validity Testing
- Cut point determination

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Receiver operator characteristics (ROC) curve analysis

- "Receiver operating characteristic" came from tests of the ability of World War II radar operators to determine whether a blip on the radar screen represented an object (signal) or noise.

- The science of "signal detection theory" was later applied to diagnostic medicine.

- The determination of an "ideal" cut-off value is almost always a trade-off between sensitivity (true positives) and specificity (true negatives).

Example of ROC results

Sensitivity=true positive=probability youth is at risk

Optimum Cut-off value

Area under the curve (AUC) = 0.97
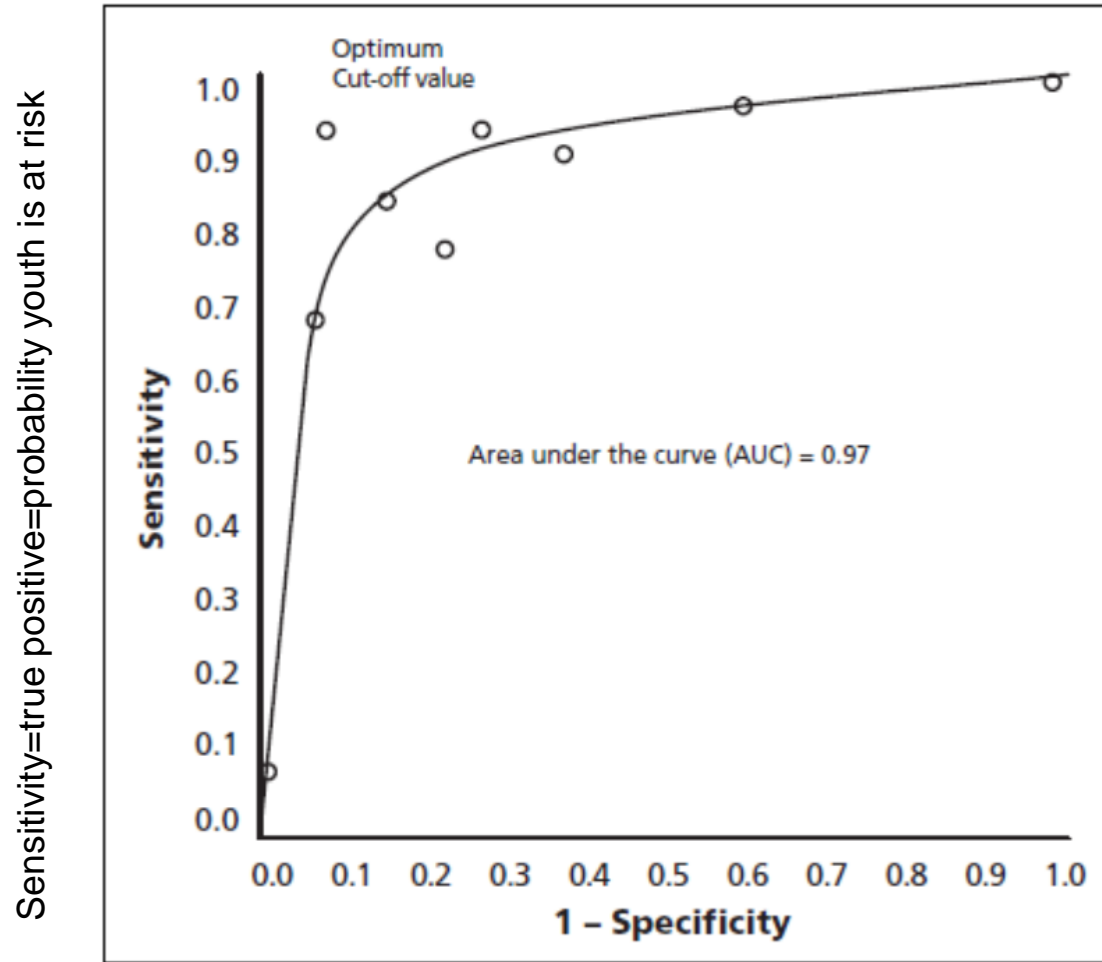
Specificity=True negative=probability youth is not at risk

Example of empirical identification of cut points

Area under ROC curve at cut point (AUC) for self-reported drug selling among Honduran School Sample

Optimal Cut-Point	AUC
19.9	.896
21.4	.786
26.9	.922
28.3	.897
30.4	.919
31.5	.933

Area under curve revised YSET

Violence	**77.9**
Property crime	**74.1**
Gangs	**79.6**
Drug use	**82.3**
Drug sales	**92.2**
Weapons carrying	**84.6**
Truancy	**74.8**

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Research agenda

- Using risk and protective factors to predict problem behavior through machine learning (R&R at Applied Psychological Measurement)

- Reliability and Validity of the Honduran YSET (in preparation)

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Impact of Family-Based Secondary Prevention Programming on Risk, Resilience, and Delinquency: A 6-month follow up within a Randomized Control Trial in Honduras

Authors:
Charles M. Katz, PhD
Hyunjung Cheon, M.S.
E.C. Hedberg, PhD
Scott H. Decker, PhD

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The Program

- The Proponte Más model posits that it is necessary to work with the entire family, providing it with appropriate interventions and linking both youth and their families with community services

The Goal

- To reduce risk factors among youth

Our Purpose

- Evaluate the impact of Proponte Más

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Evaluation team

Evaluation design

- Randomized Control Trial
  - ➢ Stratified by 14 zones

- 4,495 youth assessed via IMC/Revised YSET

- 944 were found to be at risk
  - ➢ 463 assigned to the treatment group
  - ➢ 481 were assigned to the control group

- No differences between treatment and control groups

Willingness to participate

- Case tracking data showed that 778 (82.4%) of 944 youth who were determined to be at risk and eligible for services **_agreed_** to participate and completed the six-month program.

- Youth completing the program were more likely to be:
  - ➤ younger (mean age of those completing=12.39 vs. dropped out 13.44)
  - ➤ attending school (85.4% versus dropped out=75.9)
  - ➤ live in urban area (6% dropped out vs. 12.7% of rural sample)

Dosage

	Range	Mean	SD
Time Spent with Family			
Total Minutes Reported	830 - 1615	1201.14	134.22
Family Meeting Minutes	470 - 1031	712.05	109.49
Individual Meeting Minutes	165 - 400	277.79	46.25
Strategic Team Meeting Minutes	110 - 300	211.30	55.01
Number of Assignments			
Total Number of Assignments	20 - 57	29.13	5.37
Family Meetings	14 - 46	21.90	3.98
Individual Meetings	5 - 18	7.23	2.43
Number of Completed Assignments			
Total Number of Completed Assignments	12 - 87	30.26	12.87
Family Meetings	4 - 70	22.79	11.41
Individual Meetings	5 - 19	7.47	2.86
Average Assignment Completion Ratio			
Total Number of Completed Assignments	0.6 - 3.1	1.10	0.35
Family Meetings	0.4 - 4.0	1.13	0.48
Individual Meetings	0.8 - 2.4	1.04	0.17

Finding #1

- Family counseling model can be carried out in the most dangerous communities in the world.

- Given an opportunity, youth and their families will commit to improvement, regardless of the many challenges they face when living in a complex environment replete with poverty, violence, poor education and poor living arrangements.

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Regression analysis comparing change in family adaptability & cohesion between groups pre-post test

	Sig.	Effect size
Balanced scales:		
Balanced cohesion	**	0.47
Balanced flexibility	***	0.47
Unbalanced scales:		
Disengaged	***	-0.57
Enmeshed		0.06
Rigid	*	0.35
Chaotic	***	-0.91
Family scales:		
Family communication	***	0.28
Family satisfaction	***	0.52

- Cohesion is defined as the emotional bonding that family members have toward one another.

- Flexibility has in the past been defined as the amount of change in family leadership, role relationships and relationship rules.

- Communication is defined as the positive communication skills utilized in the couple or family system.

Finding #2: Moderate to large changes took place in family adaptability, cohesion, & communication over a short period of time

Prior research has shown that this type and level of change is related to improvements in:

- Medication compliance and adjustment to chronic illness (Chaney & Peterson, 1989)
- Use of prenatal care (Kugler, Yeash, & Rumbaugh, 1993)
- Recovery from drug addiction (Kouneski, 2000)
- Treatment of depression (Warner, Mufson, & Weissman, 1995)
- Improved coping behavior, social acceptance, and academic success (Kouneski, 2000)
- Less aggressive behavior, rule breaking, fighting, assault and other problem behavior (Đurišić, 2018)

Changes in Participants Risk Status from Pre- to Post-test

	Treatment group (n=372)		Control group (n=406)	
	n	%	n	%
Remained eligible at post-test	94	25.27	123	30.30
No longer eligible at post-test	278	74.73	283	69.70

Note. Differences in frequencies were tested using chi-squared test. No significant difference between treatment and control group regarding eligibility change (X^2 = 2.439, p = 0.118); effect size (d) = -0.11

Changes in IMC Diagnostic Scale Scores from Pre to Post-test

| | At Risk → No Risk | | | | | |
| | Treatment group (n=372) | | Control group (n=406) | | | |
	%	n	n	%	Sig.	Effect size
Antisocial Tendencies	188	50.5	173	42.6	*	-0.16
Weak Parental Supervision	164	44.1	140	34.5	**	-0.20
Critical Life Events (not in regression)	121	32.5	173	42.6	**	0.21
Impulsive Risk Taking	205	55.1	152	37.4	***	-0.36
Neutralization of Guilt	199	53.5	209	51.5		-0.04
Negative Peer Influence	109	29.3	139	34.2		0.11
Peer Delinquency	120	32.3	143	35.2		0.06
Family Gang Influence	95	25.5	106	26.1		0.01
Delinquency and Drug Use	101	27.2	116	28.6		0.03

Regression analysis comparing change in risk & protective factors between groups pre-post test

	Sig.	Effect Size
Community Protective Factors		
Opportunities for Prosocial Involvement	***	0.20
Family Risk Factors		
Family History of Antisocial Behavior	*	0.16
Poor Family Management	*	-0.11
Family Conflict	*	-0.19
Weak Parental Supervision	***	-0.31
Family Protective Factors		
Attachment	*	0.12
Opportunities for Prosocial Involvement	**	0.16
Rewards for Prosocial Involvement	**	0.18

|	Sig.	Effect Size
Peer/Individual Risk Factors		
Rebelliousness	***	-0.38
Favorable Attitudes toward Antisocial Beh.	*	0.18
Perceived Risks of Drug Use	*	0.18
Antisocial Tendencies	*	-0.14
Impulsive Risk Taking	*	-0.20
Negative Peer Influence	*	-0.17
Peer Delinquency	**	0.14
Peer/Individual Protective Factors		
Interaction with Prosocial Peers	*	0.25

Finding #3: Over a short time period of time (6 months) risk and protective factors improved significantly

- The effect sizes of these changes are considered small (ranging from d=0.11 -.38), but are the same as or larger found in prior evaluations of the Communities that Care model (odd ratio 1.25), one of the most widely recognized risk factor reduction programs (Feinberg et al., 2007).

- These findings provide support for the program's theory of change, which posits that providing support to families with at-risk youth can mitigate their overall level of risk and increase their resilience.
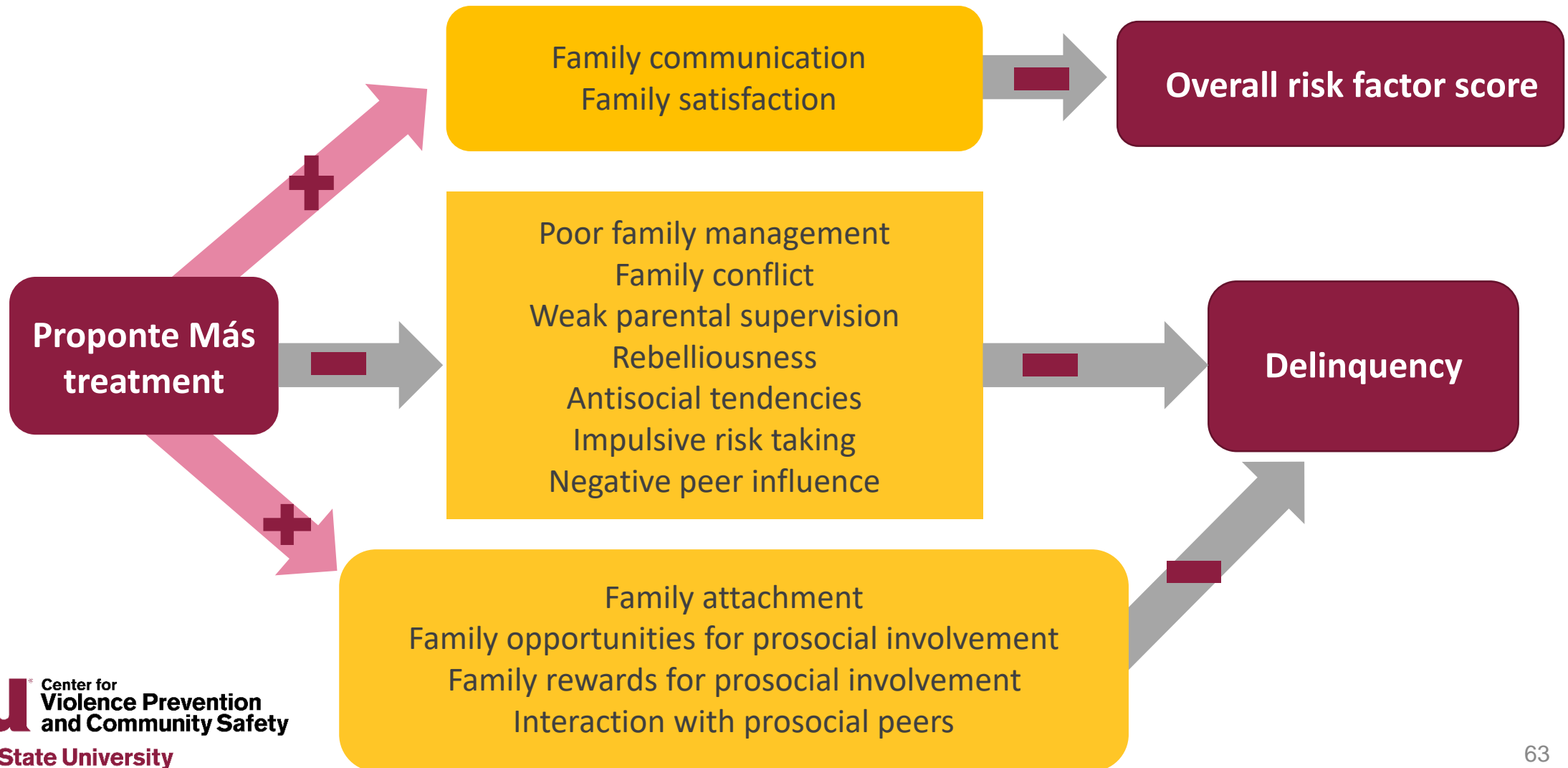
Regression analysis comparing change in problem behavior between groups pre-post test (direct effects)

	Sig.	Effect size
Violent Behavior		1.10
Property Crime		1.14
Gang involvement		1.25
Drug Use		0.77
Drug Selling		1.42
Carrying Weapon		0.69
Truancy		0.76
Overall Delinquency		0.92

Hypothesized causal pathways between treatment, FACES, and outcomes
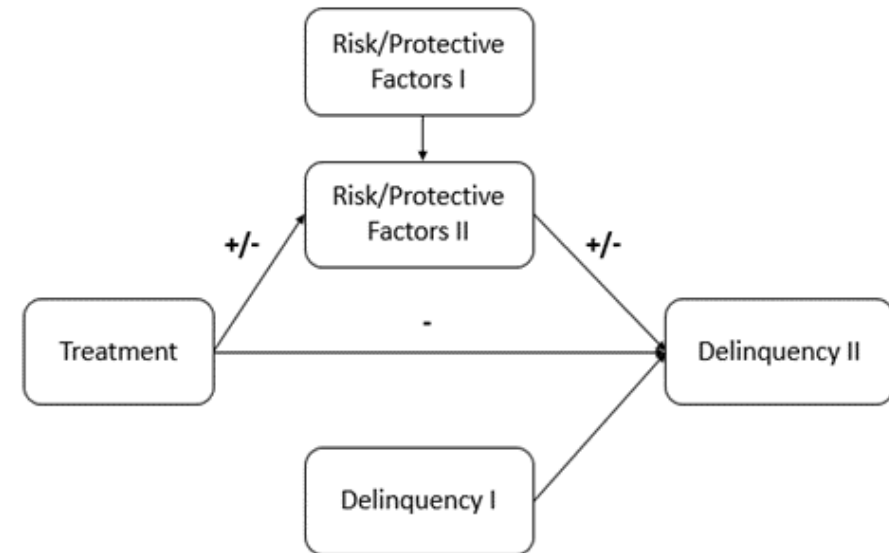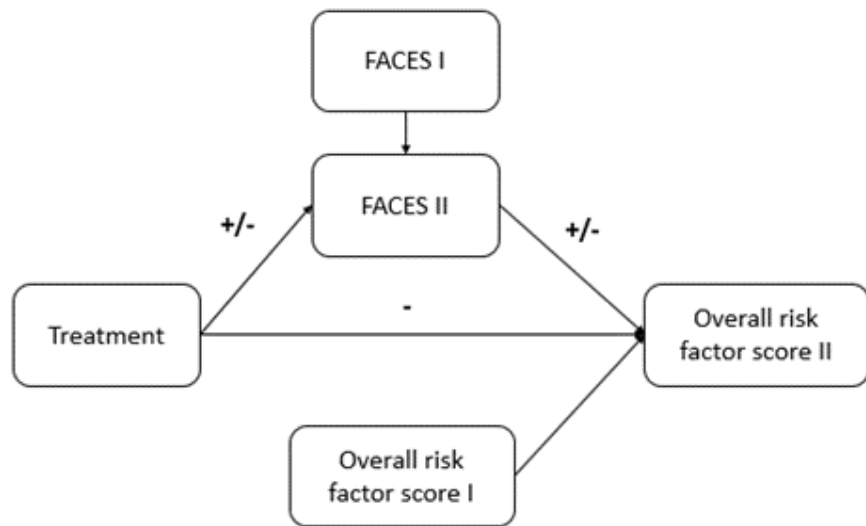
Final outcome of results illustrating causal mechanisms

Proponte Más treatment

+ → Family communication / Family satisfaction → (−) → Overall risk factor score

(−) → Poor family management / Family conflict / Weak parental supervision / Rebelliousness / Antisocial tendencies / Impulsive risk taking / Negative peer influence → (−) → Delinquency

+ → Family attachment / Family opportunities for prosocial involvement / Family rewards for prosocial involvement / Interaction with prosocial peers → (−) → Delinquency

Finding #4

- Treatment increased family communication and family satisfaction, which in turn reduced risk factors.

- Treatment reduced poor family management, family conflict, weak parental supervision, rebelliousness, antisocial tendencies, impulsive risk taking, and negative peer influence, which in turn reduced delinquency.

- Treatment increased family attachment, family opportunities for prosocial involvement, family rewards for prosocial involvement, and interaction with prosocial peers, which in turn decreased delinquency.

Recommendations for consideration

- Implement the program with higher risk populations in Honduras.

- Continue implementation of the program in other high risk nations.

- Integrate the program into other USAID interventions/approaches related to health, school, and immigration.

- Examine the impact of the program on outcomes related to immigration, school, physical health, mental health and employment.

- Employ alternative outcome measures (e.g., administrative data) that allow for triangulation.

- Evaluate the impact over a longer period, at least 10-years, would be necessary to fully understand the effect on multiple outcomes.

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Thank You

Circumplex Model & FACES IV Scores