Selection or facilitation: Is the gang membership-psychopathic tendencies link a product of individual differences or social influences?

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Gang Membership & Psychopathic Tendencies (PT)

- A controversial topic
    - **Perspective 1:** Psychopathic tendencies are characteristic of the individuals who ultimately join gangs (Sanchez-Jankowski, 1991; Yablonsky, 1962)
        - The gang membership-psychopathic tendencies link is a consequence of homophily
    - **Perspective 2:** The gang context is a source of psychopathic tendencies
        - Group influences are the mechanisms of onset, continuity, and change in psychopathic tendencies
    - **Perspective 3:** Gang members are no different from non-gang members on psychopathic tendencies (Klein, 1971)

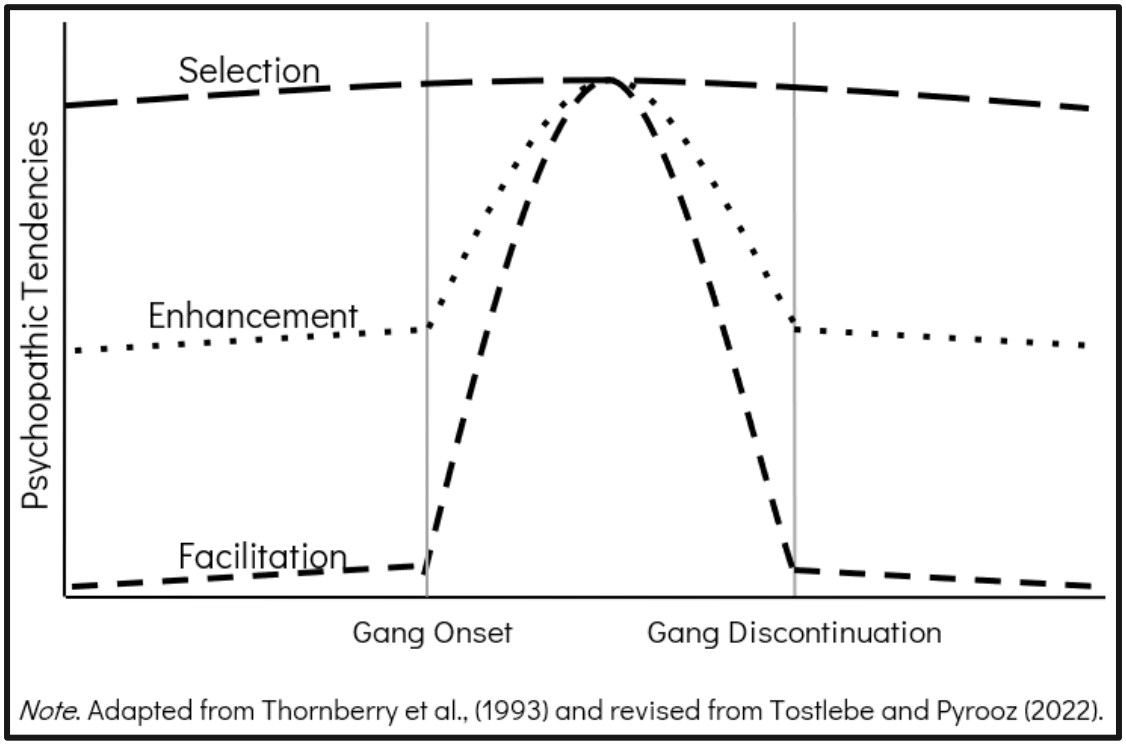
Evidence on the Gang Membership–Psychopathic Tendencies Link

1. Despite the gang-psychopathic tendencies relationship's relevance for sociology and psychology literatures, there is not much research on the topic
2. The evidence on the gang-psychopathic tendencies relationship is unclear
3. The research design for nearly all these studies is cross-sectional rather than longitudinal
4. Lack of attention on *how* the gang-psychopathic tendencies relationship may manifest

Table 1. Summary of studies on the psychopathic tendencies-gang membership link

STUDY	SAMPLE	STUDY DESIGN	PSYCHOPATHIC TENDENCIES MEASURE	FINDING(S)
Ang et al. (2015) Singapore	– Student sample – 1,027 adolescents – 5% gang	Cross-sectional design with a questionnaire	– Antisocial Process Screening Device (APSD) – General psychopathy	– No association – Psychopathy was not a significant predictor of self-reported gang membership.
Carson & Ray (2019) Philadelphia and Phoenix, USA	– Offender sample – 1,264 adolescents – 17.3% gang	Prospective longitudinal design with interviews every six months (years 1-4) and then annually (years 4-7)	– Psychopathy Checklist: Youth Version (PCL:YV) – General psychology + the two factors of psychopathy	– + Association – Compared with non-gang members, the adult joiner, persister group had lower scores on Factor 1, but higher scores on Factor 2. Compared with the adolescent desister group, the adult joiner, persister group scored lower on Factor 1.
Chu et al. (2014)	– Offender sample	Cross-sectional	– Youth Psychopathic	– No association

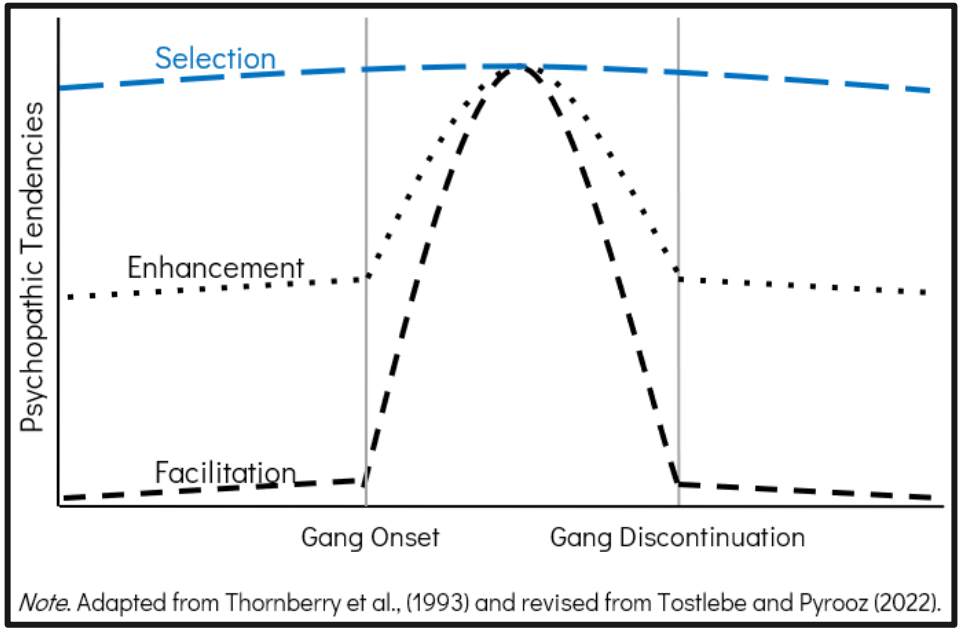
The Gang Membership-Psychopathic Tendencies (GM-PT) Link – Theoretical Model



Note. Adapted from Thornberry et al., (1993) and revised from Tostlebe and Pyrooz (2022).

The Gang Membership-Psychopathic Tendencies (GM-PT) Link – Selection

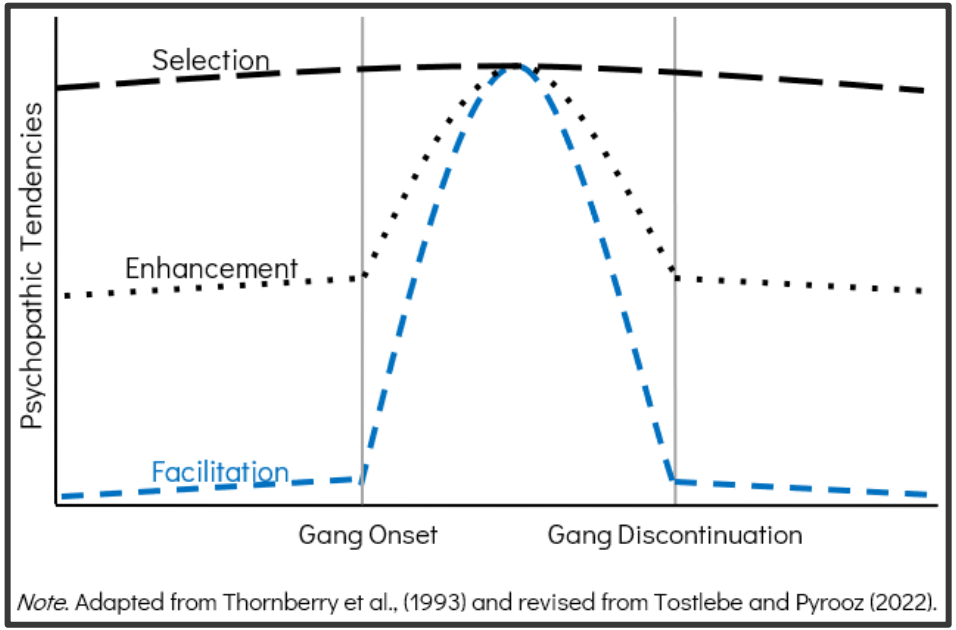
"...individuals tend to **select into environments** that suit his or her personality, propensities, and preferences..." (Fox, 2017)



Note. Adapted from Thornberry et al., (1993) and revised from Tostlebe and Pyrooz (2022).

The Gang Membership-Psychopathic Tendencies (GM-PT) Link – Facilitation

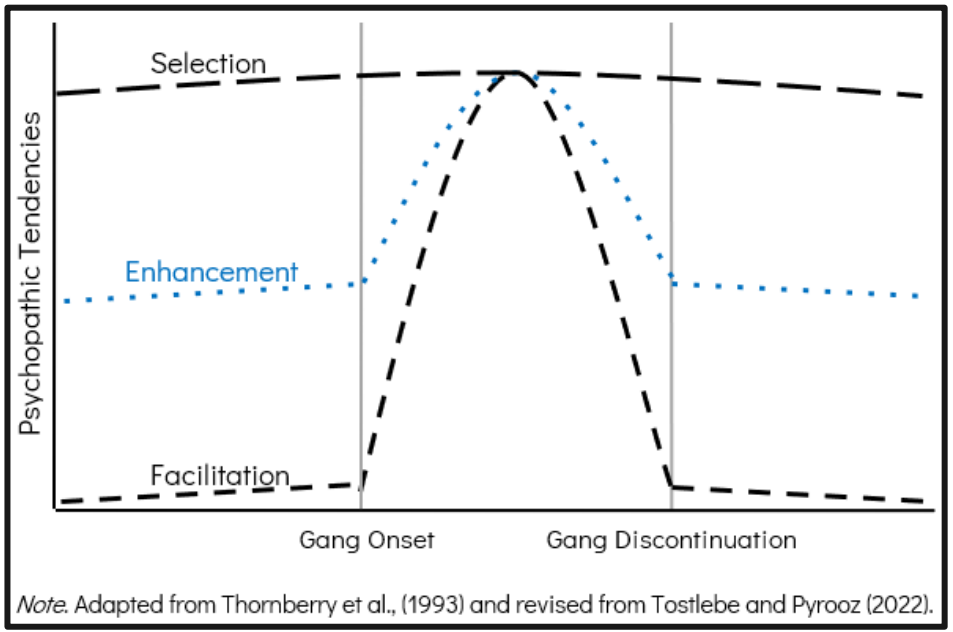
"[G]ang members and terrorists **may be trained**—very effectively, as history has proved over and over again—to view the enemy as less-than-human, as an objective without an inner life." (Hare, 1999)



Note. Adapted from Thornberry et al., (1993) and revised from Tostlebe and Pyrooz (2022).

The Gang Membership-Psychopathic Tendencies (GM-PT) Link – Enhancement

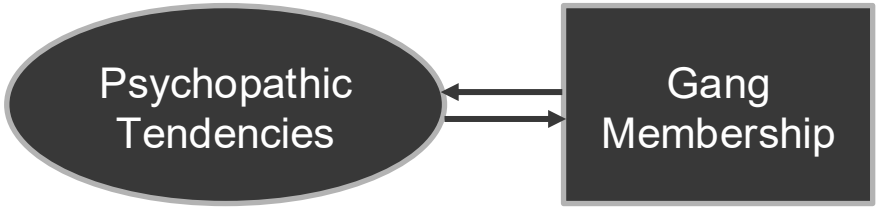
"[T]he 'truth' no doubt lies somewhere in between. That is, psychopathic attitudes and behaviors very likely are the result of a combination of biological factors and environmental forces." (Hare, 1999)



Note. Adapted from Thornberry et al., (1993) and revised from Tostlebe and Pyrooz (2022).

Research Questions

- **Overall aim:** Are psychopathic tendencies a source *or* consequence of gang membership
- **RQ1:** Do individuals who select into gangs have higher levels of psychopathic tendencies than those who refrain from gang involvement? (i.e., selection)
- **RQ2:** Do levels of psychopathic tendencies change when in states of gang membership as opposed to non-gang membership? (i.e., facilitation)



Data and Measures

Data

- Pathways to Desistance
  - Follow-up interviews
  - *N* = 1,315
  - Sample:
    - 86.2% male
    - 40.7% Black, 33.9% Hispanic, 20.6% non-White Hispanic

Variables of Interest

- Gang membership (self-report)
  - Non-gang member (=0)
  - Gang member (=1)
- Psychopathic tendencies
  - Youth Psychopathic Traits Inventory (YPI)
  - Sum of all 50 items
  - Example: "I'm better than everyone on almost everything"
- Variety of time-stable and time-varying control variables

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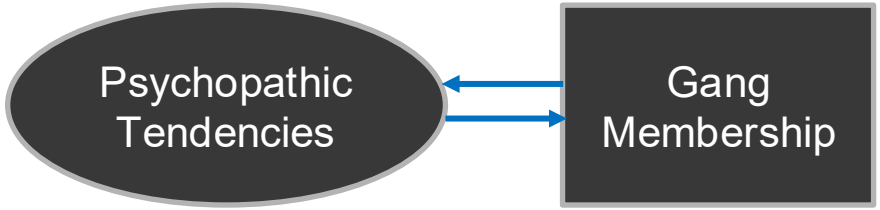
- Variety of time-stable and time-varying control variables

Research Questions – Review

- **RQ1:** Do individuals who select into gangs have higher levels of psychopathic tendencies than those who refrain from gang involvement? (i.e., selection)
  - A *between-individual* difference (random effects)

- **RQ2:** Do levels of psychopathic tendencies change when in states of gang membership as opposed to non-gang membership? (i.e., facilitation)
  - A *within-individual* change (fixed effects)



- **Analytic Strategy:** Cross-lagged hybrid panel model (Allison, 2009)

Results: Bivariable Cross-Lagged Hybrid Panel Model

Table. Regression coefficients from a two-structural simultaneously estimated hybrid panel model examining the gang membership-psychopathic tendencies link, no controls

	Outcome: Psychopathic Tendencies		Outcome: Gang Membership		
	b	(SE)	*b*	(SE)	OR
Between-Respondent Variability					
Gang Membership	35.34***	(0.98)			
Psychopathic Tendencies (L)			0.30***	(0.01)	1.35
Within-Respondent Variability					
Gang Membership	6.17***	(1.01)			
Psychopathic Tendencies (L)			0.02***	(0.00)	1.02
Constant	98.99	(0.50)	-35.80	(1.47)	

Notes. Both outcomes were run simultaneously in a GSEM framework with robust standard errors clustered by respondent. The predictor, psychopathic tendencies, is lagged (w - 1). Psychopathic tendencies outcome: N = 1,315; N x W = 11,948. Gang membership outcome: N = 197; N x W = 1,631.

Abbreviations: b = unstandardized coefficient; OR = odds ratio; SE = robust standard error; (L) = lagged predictor

*** $p < .001$

Results: Multivariable Cross-Lagged Hybrid Panel Model

Table. Regression coefficients from a two-structural simultaneously estimated hybrid panel model examining the gang membership-psychopathic tendencies link, full model

	Outcome: Psychopathic Tendencies		Outcome: Gang Membership		
	b	(SE)	*b*	(SE)	OR
Between-Respondent Variability					
Gang Membership	34.36***	(1.25)			
Psychopathic Tendencies (L)			0.33***	(0.02)	1.39
Age	0.17	(0.47)	-0.08	(0.19)	0.92
Prior Victimization	9.60***	(2.06)	-2.61***	(0.73)	0.07
Neighborhood Conditions	2.35*	(0.98)	-0.55	(0.39)	0.58
Time on Street	1.09	(2.04)	-1.02	(0.82)	0.36
Within-Respondent Variability					
Gang Membership	4.68***	(1.28)			
Psychopathic Tendencies (L)			0.02***	(0.01)	1.02
Age	-1.40***	(0.11)	-0.49***	(0.09)	0.61
Prior Victimization	1.93***	(0.36)	0.48***	(0.13)	1.62
Neighborhood Conditions	2.26***	(0.40)	0.34*	(0.17)	1.40
Time on Street	-2.43**	(0.93)	-1.36***	(0.36)	0.26
Constant	92.86	(8.39)	-34.10	(3.41)	

Notes. Both outcomes were run simultaneously in a GSEM framework with robust standard errors clustered by respondent. All models include respondent fixed effect: gender, race/ethnicity, education, living arrangement, and site. The predictor, psychopathic tendencies, is lagged (*w* - 1). Psychopathic Tendencies Outcome: *N* = 1,293; *N* x *W* = 9,285. Gang Membership Outcome: *N* = 144; *N* x *W* = 947.

Abbreviations: b = unstandardized coefficient; OR = odds ratio; SE = robust standard error, (L) = lagged predictor

*p < .05; **p < .01; ***p < .001

Discussion and Conclusion

- Summary of Findings
  - Psychopathic tendencies are a source *and* consequence of gang membership

- Implications
  - Mechanisms of selection are *not* irrelevant
  - "...[R]elatively little attention has been given to the question of *what* exactly changes when young people enter a gang...to produce this effect." (Weerman et al., 2015)
  - Selection = prevention; Facilitation = intervention

- Future Directions
  - Further tease apart *how* psychopathic tendencies relate to gang membership capitalizing on the three domains of psychopathic tendencies (interpersonal, affective, and behavioral)

THANK YOU

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THE GM–PT LINK – STUDIES (1)

Table 1. Summary of studies on the psychopathic tendencies-gang membership link

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Carson & Ray (2019) Philadelphia and Phoenix, USA	– Offender sample – 1,264 adolescents – 17.3% gang	Prospective longitudinal design with interviews every six months (years 1-4) and then annually (years 4-7)	– Psychopathy Checklist: Youth Version (PCL:YV) – General psychology + the two factors of psychopathy	– + Association – Compared with non-gang members, the adult joiner, persister group had lower scores on Factor 1, but higher scores on Factor 2. Compared with the adolescent desister group, the adult joiner, persister group scored lower on Factor 1.
Chu et al. (2014) Singapore	– Offender sample – 168 adolescent males – 64% gang	Cross-sectional design with questionnaires and a semi-structured interview	– Youth Psychopathic Traits Inventory (YPI) – General psychopath + the three dimensions of psychopathy	– No association – The impulsive-irresponsible dimension significantly predicted gang membership. After controlling for covariates, that could be endogenous to psychopathy, this difference disappeared.
Dmitrieva et al. (2014) Philadelphia and Phoenix, USA	– Offender sample – 1,170 adolescents – 26% gang; 11% gang leadership over the last 7 pooled-period years	Prospective longitudinal design with interviews every six months (years 1-4) and then annually (years 4-7)	– Youth Psychopathic Traits Inventory (YPI) – The three dimensions of psychopathy	– + Association – Psychopathy was not predictive of low-level gang membership. The GM dimension was predictive of gang leadership, which changed from a negative to a positive relationship over age. Over the course of membership, gang members and leaders developed GM and II traits. Years spent as a low-level member increased CU traits.
Dupéré et al. (2007) Canada (nationally representative sample)	– Community sample – 3,522 adolescents – 6% gang	Prospective longitudinal design with interviews every 2 years	– Parent reported scales (hyperactivity, low-anxiety, and low prosociality) – General psychopathy	– + Association – Adolescents with preexisting psychopathic tendencies had 1.75 times greater odds of joining a gang than their peers without such tendencies.

THE GM-PT LINK – STUDIES (2)

STUDY	SAMPLE	STUDY DESIGN	PSYCHOPATHY MEASURE	FINDING(S)
Joseph & Rembert (2021) Philadelphia and Phoenix, USA	– Offender sample – 948 adolescents – 24% gang	Cross-sectional design using the baseline interview	– Psychopathy Checklist: Youth Version (PCL:YV) – General psychology	– + Association – Psychopathy significantly predicted gang membership in both males and females. Youth with psychopathic characteristics were 1.05 times more likely to be a gang member.
Mallion & Wood (2021) United Kingdom (Category C public sector training prison)	– Offender sample – 73 male adults – 60% gang	Cross-sectional within-participants design with an interview	– Inventory of Callous-Unemotional Traits (ICU) – The callous-unemotional (CU) dimension of psychopathy	– No association – Callous-unemotional traits could not differentiate between street gang and non-prisoners.
Thornton et al. (2015) Jefferson Parish, LA; Orange County, CA; Philadelphia, PA	– Offender sample – 1,216 adolescent boys – 5% gang during the past 6-months; 5% gang during life	Cross-sectional design with an interview	– Inventory of Callous-Unemotional Traits (ICU) – The callous-unemotional (CU) dimension of psychopathy	– + Association – Callous-unemotional traits were associated with gang membership.
Valdez et al. (2000) Texas, USA	– Community sample – 75 adolescent boys – 67% gang	Cross-sectional design with an interview	– Psychopathy Checklist—Screening Version (PCL-SV) – General psychopathy + the two factors of psychopathy	– + Association – Gang members demonstrated higher levels of overall psychopathy and higher levels on the affective and behavioral psychopathy factors than non-gang members. More than half of both the gang (52%) and non-gang (76%) samples were categorized as non-psychopathic.
Vaughn et al. (2009) Missouri, USA	– Offender sample – 267 adolescents – 46% gang	Cross-sectional design with an interview	– APSD + modified Psychopathic Personality Inventory Short-Form (PPI-SF) – General psychopathy, used to construct subgroups	– + Association – Secondary psychopaths, characterized by traits within the affective and lifestyle facets, were more likely to join a gang (59.8%) than primary psychopaths, characterized by traits within the interpersonal facet (50.0%) and individuals without psychopathic traits (37.8%).

Note. This table comes from Tostlebe and Pyrooz (2022) and Tostlebe and Sanchez (2023)

Motivation

Origins of Psychopathic Tendencies

- Genetic/epigenetic and biological/neuroscience factors
- Social influences
    - Antisocial experiences & environments
        - Lack of socialization
            - Lack of parental warmth
            - Child abuse and neglect
        - *Product of socialization*
            - Exposure to violence
            - Intergenerational
            - Social interactions

(In)stability of Psychopathic Tendencies

- Absolute stability over the life course
- Developmental malleability in measured psychopathic tendencies

(e.g., Hawes et al., 2018; McCuish & Lussier, 2018, 2020)

Addressing Potential Harms

- Potential harms:
  - Labels could be used as exclusionary rather than inclusionary criterion for treatment and entrance into other prosocial environments (e.g., employment and education)
  - Harsher treatment by police, juries, and judges owing to the sigma surrounding gang membership and psychopathy
  - Permanence

- Necessity of better understanding the reasons for gang joining and the etiology of psychopathic tendencies → treatment

- Considering the benefits of labeling versus potential harm

Data & Analytic Strategy

Data: Controls

- Time-Stable Variables
  - Sex
    - Self-report indicator
    - Dichotomous
  - Race/Ethnicity
    - Self-report indicator
    - Mutually exclusive: White (reference), Black, Hispanic, Other
  - Educational Attainment
    - Self-report indicator at baseline
    - Highest level of school completed
  - Living Arrangement prior to baseline
    - Two self-report dichotomous indicators
    - 2 biological parents; 1 biological parent
  - Site
    - Philadelphia, PA and Phoenix, AZ

- Time-Varying Variables
  - Age
    - Self-report indicator at each recall
  - Prior Victimization
    - Self-report indicator at each recall
    - Count of six victimization experiences
  - Neighborhood Conditions
    - Self-report indicator at each recall
    - Neighborhood Conditions Measure (Sampson and Raudenbush, 1999)
      - Four-point scale (0 = Never, 3 = Often)
    - Assess physical and social disorder surrounding the adolescent's home
  - Exposure Time
    - Amount of time respondent was in the community

DESCRIPTIVE STATISTICS

Table. Mean pooled-period descriptive statistics for Objective 1 (N = 1,315)

	N x W[a]	Mean/%	SD	Min	Max
Psychopathic Tendencies[b]					
Total	11,942	102.83	23.42	21	197
Interpersonal (Grandiose Manipulative)	11,942	37.50	11.29	8	80
Affective (Callous Unemotional)	11,942	31.76	6.83	4	60
Behavioral (Impulsive Irresponsible)	11,942	33.57	8.61	9	60
Self-Report Gang Membership					
Gang Affiliate	12,127	11.08%		0	1
Non-Gang Affiliate	12,127	88.92%		0	1
Control Variables					
Age (truncated)	12,154	19.22	2.35	14	26
Sex					
Male		86.16%		0	1
Female		13.84%		0	1
Race/Ethnicity					
White		20.61%		0	1
Hispanic		33.92%		0	1
Black		40.68%		0	1
Other Race		4.79%		0	1
Living Arrangement (at baseline)					
Two Biological Parents		14.90%		0	1
One Biological Parent		67.60%		0	
Education (at baseline)		9.08	1.30	6	12
Prior Victimization	12,137	0.20	0.59	0	5
Neighborhood Conditions	9,431	1.29	0.82	0	3
Site					
Phoenix		49.05%		0	1
Philadelphia		50.95%		0	1
Exposure Time	12,149	0.67	0.42	0	1

[a] if not indicated N = 1,315 and N x W = 13,150

[b] individual item responses range from 1-4.

WHY THE YPI COMPARED TO PCL?

- PCL imperfectly maps the domain of interest by
  - excluding lack of anxiety or fearlessness, which may be central to defining psychopathy
  - including criminal behavior, which may not be central

- PCL-YV has questionable long-term predictive validity

- PCL has been critiqued for conflating *measures* of psychopathy with the *construct* of psychopathy
  - Uses measures that assess *stability* rather than possible instability

YPI Scale Items (1)

Appendix B. Mean-pooled descriptive statistics for psychopathy scale items (N^*W = 11,942)

Scales and items	Mean	SD
YPI Overall	102.83	(23.42)
Interpersonal Domain: Grandiose-Manipulative[a]	37.50	(11.29)
Dishonest charm	9.71	(3.72)
1. It's easy for me to charm and seduce others to get what I want from them.		
2. I have the ability to con people by using my charm and smile.		
3. When someone asks me something, I usually have a quick answer that sounds believable, even if I've just made it up.		
4. Pretty often I act charming and nice, even with people I don't like, in order to get what I want.		
5. When I need to, I use my smile and charm to use others.		
Grandiosity	10.70	(3.18)
1. I'm better than everyone on almost everything.		
2. I have talents that go far beyond other people's.		
3. The world would be a better place if I was in charge.		
4. I'm more important and valuable than other people.		
5. I am destined to become a well-known, important, and influential person.		
Lying	8.03	(3.06)
1. It's fun to make up stories and try to get people to believe them.		
2. Sometimes I lie for no reason, other than because it's fun.		
3. Sometimes I find myself lying without any particular reason.		
4. I like to spice up and exaggerate when I tell about something.		
5. I've often gotten into trouble because I've lied too much.		
Manipulation	9.06	(3.62)
1. I can make people believe almost anything.		
2. I am good at getting people to believe in me when I make something up.		
3. It's easy for me to manipulate people.		
4. To get people to do what I want, I often find it efficient to con them.		
5. It has happened that I've taken advantage of (used) someone in order to get what I want.		
Affective Domain: Callous-Unemotional[b]	31.76	(6.83)
Callousness	11.56	(2.66)
1. I think that crying is a sign of weakness, even if no one sees you.		
2. When other people have problems, it is often their own fault, therefore, one should not help them.		
3. It's important to me not to hurt other people's feelings. (R)		
4. I often become sad or moved by watching sad things on TV or film. (R)		
5. I usually become sad when I see other people crying or being sad. (R)		
Unemotionality	10.92	(4.16)
1. I usually feel calm when other people are scared.		
2. To be nervous and worried is a sign of weakness.		
3. What scares others usually doesn't scare me.		

YPI Scale Items (2)

Scales and items	Mean	SD
4. What scares others usually doesn't scare me.		
5. I don't understand how people can be touched enough to cry by looking at things on TV or movie.		
6. I don't let my feelings affect me as much as other people's feelings seem to affect them.		
Remorselessness	9.26	(3.18)
1. I have the ability not to feel guilt and regret about things that I think other people would feel guilty about.		
2. I seldom regret things I do, even if people feel that they are wrong.		
3. When someone finds out about something that I've done wrong, I feel more angry than guilty.		
4. To feel guilty and remorseful about things you have done that have hurt other people is a sign of weakness.		
5. To feel guilt and regret when you have done something wrong is a waste of time.		
Behavioral Domain: Impulsive-Irresponsible[b]	33.57	(8.61)
Impulsiveness	11.05	(3.49)
1. I prefer to spend my money right away rather than save it.		
2. I consider myself as a pretty impulsive person.		
3. It often happens that I talk first and think later.		
4. If I get the chance to do something fun, I do it no matter what I had been doing before.		
5. It often happens that I do things without thinking ahead.		
Thrill-seeking	12.73	(3.42)
1. I like to be where exciting things happen.		
2. I get bored quickly when there is too little change.		
3. I like to do things just for the thrill of it.		
4. I get bored quickly by doing the same thing over and over.		
5. I like to do exciting and dangerous things, even if it is forbidden or illegal.		
Irresponsibility	9.79	(3.32)
1. I have probably skipped school or work more than most other people.		
2. If I won a lot of money in the lottery, I would quit school or work and just do things that are fun.		
3. I have often been late to work or classes in school.		
4. It has happened several times that I've borrowed something and then lost it.		
5. I often don't/didn't have my school or work assignments done on time.		

Note. Individual items are not available.

[a] Response set ranging from 20-80.

[b] Response set ranging from 15-60.

Neighborhood Conditions Measure Scale Items

Appendix D. Items contributing to the Neighborhood Conditions Measure

Neighborhood conditions items
How often do each of the following occur within your neighborhood?
Physical Disorder
Cigarettes on the street or in the gutters?
Garbage in the streets or on the sidewalk?
Empty beer bottles on the streets or sidewalks?
Boarded up windows on buildings?
Graffiti or tags?
Graffiti painted over?
Gang graffiti?
Abandoned cars?
Empty lots with garbage?
Condoms on sidewalk?
Needles or syringes?
Political messages in graffiti?
Social Disorder
Gangs (or other teen groups) hanging out?
Adults hanging out on the street?
People drinking beer wine or liquor?
People drunk or passed out?
Adults fighting or arguing loudly?
Prostitutes on the streets?
People smoking marijuana?
People smoking crack?
People using needles or syringes to take drugs?

Notes. Individual item statistics are unavailable. Response categories range from 0 "Never" to 4 "Often."

Prior Victimization Items

Appendix E. Items contributing to the Prior Victimization Measure

Victimization items
In the past N months, have you...
Been chased where you thought you might be seriously hurt?
Been beaten up, mugged, or seriously threatened by another person?
Been raped, had someone attempt to rape you, or been sexually attacked in some other way?
Been shot at?
Been shot?

Note. Individual item statistics are unavailable.

Method: Cross-Lagged Hybrid Panel Model

- Decomposing between-individual differences and within-individual change
- Cross-lagged hybrid panel model (Allison, 2009)

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- Decomposing between-individual differences and within-individual change
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  - $PsychTend_{it} = \beta_0 + \beta_1\overline{Gang}_i + \beta_1(Gang_{it} - \overline{Gang}_i) + \beta_k\boldsymbol{X}_i + \beta_j\boldsymbol{Z_{it}} + u_i + \varepsilon_{it}$ AND
    $Gang_{it} = \beta_0 + \beta_1\overline{PsychTend}_i + \beta_1\left(PsychTend_{it} - \overline{PsychTend}_i\right) + \beta_k\boldsymbol{X}_i + \beta_j\boldsymbol{Z_{it}} + u_i + \varepsilon_{it}$
- Importantly, this can be separated into its between- and within-person elements
  - **Within:**
    - $(PsychTend_{it} - \overline{PsychTend}_i) = \delta_1(Gang_{it} - \overline{Gang}_i) + \beta_j(\boldsymbol{Z_{it}} - \overline{\boldsymbol{Z}}_{\boldsymbol{it}}) + (\varepsilon_{it} - \bar{\varepsilon}_i)$ AND
    - $(Gang_{it} - \overline{Gang}_i) = \delta_1\left(PsychTend_{it} - \overline{PsychTime}_i\right) + \beta_j(\boldsymbol{Z_{it}} - \overline{\boldsymbol{Z}}_{\boldsymbol{it}}) + (\varepsilon_{it} - \bar{\varepsilon}_i)$

Preliminary: Variation in Gang Membership Measure

- Three steps taken to ensure sufficient variation in gang membership to continue

1. Variance component – separate out between- and within-individual variation **(part 1)**

Table. Variance component model for gang membership, full sample (melogit)

	1,315 Individuals	
Parameters (Fixed Effects)	Coefficient	SE
Gang Membership		
Between-Individuals Grand Mean	-7.83	0.41
Error Variance Components (Random Effects)		
var(_cons)	42.49	6.26

Notes. N groups = 1,315, N x W = 12,127.

- $ICC = \frac{\tau}{\tau + \frac{\pi^2}{3}} = \frac{42.49}{42.49+3.29} = 92.8\%$ of the variation in GM is between-persons
- However, this is likely driven by the high prevalence of 0's

Preliminary: Variation in Gang Membership Measure

- Three steps taken to ensure sufficient variation in gang membership to continue

1. Variance component – separate out between- and within-individual variation **(part 2)**

Table. Variance component model for gang membership, restricted sample (melogit)

	291 Individuals	
Parameters (Fixed Effects)	Coefficient	SE
Gang Membership		
Between-Individuals Grand Mean	0.03	0.10
Error Variance Components (Random Effects)		
var(_cons)	2.10	0.28

Notes. N groups = 291, N x W = 2,727.

- 39.0% of the variation in gang membership is between-persons

Preliminary: Variation in Gang Membership Measure

- Three steps taken to ensure sufficient variation in gang membership to continue

    1. Variance component – separate out between- and within-individual variation

    2. Descriptive results

        1. Percent of respondents in a gang for at least one wave of the Pathways study
            - 22.13% of respondents
        2. Number of waves the average gang member was gang involved (*n* = 291)
            - *Mean* = 4.62 waves, *SD* = 2.88
        3. How many people changed change status over the panel
            - 19.2% (*n* = 252/1,315)
            - However, most people in a gang at some point changed gang status over the panel (86.6%)

- **Suggests that there is important variability w/in & b/w respondents on GM**

Preliminary: Variation in Psychopathic Tendencies Measure

- Four steps taken to ensure sufficient variation in psychopathic tendencies to continue

1. Variance component – separate out between- and within-individual variation

Table. Variance component model for psychopathic tendencies (xtmixed)

	1,315 Individuals	
Parameters (Fixed Effects)	Coefficient	SE
Youth Psychopathic Inventory Overall Score		
Between-Individuals Grand Mean	102.85	0.49
Error Variance Components (Random Effects)		
var(_cons)	279.74	12.07
var(residual)	265.40	3.64

Notes. N groups = 1,315, N x W = 11,942.

- $\rho = \frac{279.74}{279.74 + 265.40} = 0.513$
- 51.3% of the variation in psychopathic tendencies is between-persons

Preliminary: Variation in Psychopathic Tendencies Measure

- Four steps taken to ensure sufficient variation in psychopathic tendencies to continue

1. Variance component – separate out between- and within-individual variation
2. Bivariable regression – psychopathic tendencies regressed on age

Table. OLS regression coefficients regressing psychopathic tendencies on age, no controls

	Psychopathic Tendencies	
	b	(SE)
Age	-1.11***	(0.12)
Constant	124.27	(2.42)

Notes. Estimated with robust standard errors clustered by respondent. N x W = 11,942.
Abbreviations: b = unstandardized coefficient; SE = robust standard error
*** $p < .001$

Preliminary: Variation in Psychopathic Tendencies Measure

- Four steps taken to ensure sufficient variation in psychopathic tendencies to continue

1. Variance component – separate out between- and within-individual variation
2. Bivariable regression – psychopathic tendencies regressed on age
3. Means for psychopathic tendencies across waves
    - Wave 1 *mean* = 109.2, *SD* = 23.4
    - Wave 5 *mean* = 102.7, *SD* = 23.4
    - Wave 10 *mean* = 98.9, *SD* = 22.1

Preliminary: Variation in Psychopathic Tendencies Measure

- Four steps taken to ensure sufficient variation in psychopathic tendencies to continue
    1. Variance component – separate out between- and within-individual variation
    2. Bivariable regression – psychopathic tendencies regressed on age
    3. Means for psychopathic tendencies across waves
    4. Change scores between waves
        - Wave 1 to Wave 5 = 56.1% of respondents changed by ½ *SD* or more
        - Wave 5 to Wave 10 = 57.6%
        - Wave 1 to Wave 10 = 60.7%
- **Suggests that there is important variability w/in & b/w respondents on PT**

Multivariable Cross-Lagged Panel Model, Fully Specified

Appendix F. Regression coefficients from a two-structural simultaneously estimated hybrid panel model examining the gang membership-psychopathic tendencies link, fully specified

	Outcome: Psychopathic Tendencies		Outcome: Gang Member		
	b	(SE)	*b*	(SE)	OR
Between-Respondent Variability					
Gang Member	34.36***	(1.25)			
Psychopathic Tendencies (L)			0.33***	(0.02)	1.39
Age	0.17	(0.47)	-0.08	(0.19)	0.92
Prior Victimization	9.60***	(2.06)	-2.61***	(0.73)	0.07
Neighborhood Conditions	2.35*	(0.98)	-0.55	(0.39)	0.58
Time on Street	1.09	(2.04)	-1.02	(0.82)	0.36
Within-Respondent Variability					
Gang Member	4.68***	(1.28)			
Psychopathic Tendencies (L)			0.02***	(0.01)	1.02
Age	-1.40***	(0.11)	-0.49***	(0.09)	0.61
Prior Victimization	1.93***	(0.36)	0.48***	(0.13)	1.62
Neighborhood Conditions	2.26***	(0.40)	0.34*	(0.17)	1.40
Time on Street	-2.43**	(0.93)	-1.36***	(0.36)	0.26
Time-Stable Controls					
Male	5.94***	(1.45)	-1.91**	(0.63)	0.15
Race *(ref: White)*					
Black	-4.95**	(1.60)	1.50*	(0.64)	4.48
Hispanic	-9.23***	(1.35)	3.21***	(0.58)	24.78
Other	-6.76*	(2.61)	1.52	(1.04)	4.57
Living Arrange. *(ref: Other)*					
Two Biological Parents	1.47	(1.82)	-0.18	(0.73)	0.84
One Biological Parent	0.50	(1.33)	-0.09	(0.53)	0.91
Philadelphia	-2.28	(1.48)	-0.33	(0.55)	0.72
Constant	92.86	(8.39)	-36.75	(4.01)	

Notes. Both outcomes were run simultaneously in a GSEM framework with robust standard errors clustered by respondent. All models include respondent fixed effect: gender, race/ethnicity, education, living arrangement, and site. The predictor, psychopathic tendencies, is lagged (w - 1). Psychopathic Tendencies Outcome: N = 1,293; N x W = 9,285. Gang Membership Outcome: N = 144; N x W = 947.

Abbreviations: b = unstandardized coefficient; OR = odds ratio; SE = robust standard error; (L) = lagged predictor; arrange = arrangement

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

Marginal Effects – Fully specified

Average marginal effects — Number of obs = 8,184
Model VCE : **Robust**

dy/dx w.r.t. : **mzypilag**
1._predict : **Marginal predicted mean (Standardized values of (ypi)), predict(mu outcome(zypi))**
2._predict : **Marginal predicted mean (gnginvrecall), predict(mu outcome(gnginvrecall))**

	dy/dx	Delta-method Std. Err.	z	P>|z|	[95% Conf.	Interval]
mzypilag						
_predict						
1	0	(empty)				
2	.2693023	.0083946	32.08	0.000	.2528491	.2857554

Cross-Lagged Hybrid Model – By Site

Appendix G. Regression coefficients from a two-structural simultaneously estimated hybrid panel model examining the gang membership-psychopathic tendencies link, fully specified, by site location

Model 1: Phoenix

	Outcome: Psychopathic Tendencies		Outcome: Gang Membership		
	b	(SE)	*b*	(SE)	OR
Between-Respondent Variability					
Gang Membership	32.28***	(1.40)			
Psychopathic Tendencies (L)			0.33***	(0.23)	1.39
Age	-0.60	(0.67)	0.11	(0.26)	1.12
Prior Victimization	8.28**	(2.42)	-2.62**	(0.95)	0.07
Neighborhood Conditions	3.00*	(1.44)	-0.66	(0.54)	0.52
Time on Street	5.15†	(2.77)	-3.50**	(1.03)	0.03
Within-Respondent Variability					
Gang Membership	3.39*	(1.46)			
Psychopathic Tendencies (L)			0.03**	(0.01)	1.26
Age	-1.43***	(0.15)	-0.62***	(0.10)	0.54
Prior Victimization	2.12***	(0.49)	0.47**	(0.18)	1.60
Neighborhood Conditions	3.28***	(0.53)	0.12	(0.18)	1.13
Time on Street	-3.02*	(1.39)	-1.44**	(0.46)	0.24
Constant	102.44	(12.41)	-38.99	(5.80)	0.00

Model 2: Philadelphia

	Outcome: Psychopathic Tendencies		Outcome: Gang Membership		
	b	(SE)	*b*	(SE)	OR
Between-Respondent Variability					
Gang Membership	45.43***	(3.28)			
Psychopathic Tendencies (L)			0.29***	(0.02)	1.34
Age	1.15†	(0.62)	-0.18	(0.26)	0.84
Prior Victimization	10.24**	(3.57)	-2.27*	(0.98)	0.10
Neighborhood Conditions	1.20	(1.29)	-0.01	(0.56)	0.99
Time on Street	-6.06*	(2.94)	3.29**	(1.26)	26.84
Within-Respondent Variability					
Gang Membership	7.44**	(2.49)			
Psychopathic Tendencies (L)			0.02	(0.01)	1.02
Age	-1.39***	(0.16)	-0.19	(0.16)	0.83
Prior Victimization	1.57**	(0.52)	0.52**	(0.19)	1.68
Neighborhood Conditions	1.13†	(0.59)	1.00*	(0.45)	2.72
Time on Street	-1.91	(1.26)	-1.62**	(0.58)	0.20
Constant	81.18	(11.34)	-35.14	(5.08)	0.00

Notes: Both outcomes were run simultaneously in GSEM frameworks with robust standard errors clustered by respondent. All models include fixed effects: gender, race/ethnicity, education, and living arrangement. The predictor, psychopathic tendencies, is lagged (w- 1).
Phoenix Model: Psychopathic Tendencies Outcome N= 633 and Nx W= 4,647; Gang Membership Outcome N= 106 and Nx W= 679.
Philadelphia Model: Psychopathic Tendencies Outcome N= 660 and Nx W= 4,638; Gang Membership Outcome N= 38 and Nx W= 268.
Abbreviations: b = unstandardized coefficient; OR = odds ratio; SE = robust standard error; (L) = lagged predictor
† p< 0.1; * p< 0.05; ** p< 0.01; *** p< 0.001

Cross-Lagged Hybrid Model – By Race/Ethnicity

Appendix H. Regression coefficients from a two-structural simultaneously estimated hybrid panel model examining the gang membership-psychopathic tendencies link, fully specified, by race/ethnicity

	Model 1: White				
	Outcome: Psychopathic Tendencies		Outcome: Gang Membership		
	b	(SE)	*b*	(SE)	OR
Between-Respondent Variability					
Gang Membership	39.49***	(3.96)			
Psychopathic Tendencies (L)			0.30***	(0.05)	1.35
Within-Respondent Variability					
Gang Membership	4.94+	(2.92)			
Psychopathic Tendencies (L)			0.05**	(0.01)	1.05
Constant	73.08	(18.87)	-27.43	(9.68)	
	Model 2: Black				
	Outcome: Psychopathic Tendencies		Outcome: Gang Membership		
	b	(SE)	*b*	(SE)	OR
Between-Respondent Variability					
Gang Membership	44.44***	(3.07)			
Psychopathic Tendencies (L)			0.30***	(0.27)	1.35
Within-Respondent Variability					
Gang Membership	2.51	(2.55)			
Psychopathic Tendencies (L)			0.01	(0.01)	1.01
Constant	74.07	(12.57)	-34.03	(5.80)	
	Model 3: Hispanic				
	Outcome: Psychopathic Tendencies		Outcome: Gang Membership		
	b	(SE)	*b*	(SE)	OR
Between-Respondent Variability					
Gang Membership	33.66***	(1.69)			
Psychopathic Tendencies (L)			0.32***	(0.03)	1.38
Within-Respondent Variability					
Gang Membership	4.80**	(1.72)			
Psychopathic Tendencies (L)			0.02+	(0.01)	1.02
Constant	105.81	(14.66)	-41.49	(6.69)	

Notes. Both outcomes were run simultaneously in GSEM frameworks with robust standard errors clustered by respondent. All models include fixed effects for: gender, education, living arrangement, and site; and time-varying predictors: age, prior victimization, neighborhood conditions, and time on the street. The predictor, psychopathic tendencies, is lagged (w - 1). Other race n = 63, so it is not included in this breakdown. White Respondents Model: Psychopathic Tendencies Outcome N = 269 and N x W = 2,134; Gang Membership Outcome N = 25 and N x W = 164. Black Respondents Model: Psychopathic Tendencies Outcome N = 522 and N x W = 3,624; Gang Membership Outcome N = 33 and N x W = 224. Hispanic Respondents Model: Psychopathic Tendencies Outcome N = 441 and N x W = 3,107; Gang Membership Outcome N = 80 and N x W = 512.

Abbreviations: b = unstandardized coefficient; OR = odds ratio; SE = robust standard error, (L) = lagged predictor

+ $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Dissertation – Methods and Measures

	Chapter 4: RQ1 and 2	Chapter 5: RQ3 and 4	Chapter 5: RQ5	Chapter 6: RQ6-9
Method	Cross-Lagged Hybrid Panel Model with clustering	NB and logistic regression with clustering	NB and logistic regression with clustering and an interaction	Same as RQ1, 2, 4, and 5, but with psychopathic tendencies split into the domains: (a) Interpersonal (i.e., grandiose-manipulative) (b) Affective (i.e., callous-unemotional) (c) Behavioral (i.e., impulsive-irresponsible)
Dependent Variable(s)	Gang Membership/ Psychopathic tendencies	Offending/ Arrest and Incarceration	Offending/ Arrest and Incarceration	
Independent Variable(s)	Gang Membership/ Psychopathic tendencies	Gang Membership/ Psychopathic tendencies	Psychopathic tendencies	
Moderating Variable	N/A	N/A	Gang Membership	