

Predicting Gang Embeddedness Through Public Social Media Presence

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Abstract

Misconceptions about gang-affiliated youth directly impact the type and quality of psychosocial support services for youth inclined to join and participate in gang activity (Gushue & Wong, 2018; Hazlehurst, 2018; Winfree Jr et al., 1992). Viewing individuals in gangs as unilaterally deviant reduces the ability to implement constructive and rehabilitative social interventions and increases the role of the criminal justice system and its reliance on disciplinary penalties (Gravel et al., 2018). Contemporary research suggests that effective dissidence and prevention efforts hinge on matching the type of intervention to the level of gang commitment experienced by a young person (Carson & Vecchio, 2015; Roman et al., 2017; Weerman et al., 2015), and that gang dissidence efforts are more effective when targeted at that youth's level of enmeshment (Alleyne & Wood, 2010; Carson & Vecchio, 2015; O'Neal et al., 2016; Roman et al., 2017). The current study tested the assumption that online communication of gang affiliation is similar to offline statements of affiliation by examining the types and quantity of communication of gang affiliated youth on Facebook. Six distinct groupings emerged with signaling patterns consonant to off-line signaling in "unaffiliated," "tangential," "wannabe," "active," and "core" gang members. These groupings have previously been found in the literature and correspond to individual levels of affiliation and their stage of gang joining and commitment (Center, 2015b; Densley, 2012; Pyrooz & Densley, 2016; West, 2016). The findings suggest that gang members communicate varying levels of affiliation through their online social media presence in a way that has direct parallels to their real-world communication. These findings suggest that the current dichotomous gang/nongang definition utilized in policing and criminal justice, may lead to erroneously over criminalizing the majority of youth accused of gang offenses. Future directions for research and potential psychosocial and policy implications are discussed.

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Keywords: youth, gang affiliation, social media, dissidence and prevention, psychosocial services, peer affiliation, criminal justice reform, gang indicators

Literature Review

Gangs are defined by criminal justice and gang dissidence organizations as a named group that commits crimes together, hangs out together, has a power structure, displays specific signals, and claims a specific territory (Center, 2015b). Gangs can be further differentiated as delinquent and non-delinquent. Delinquent gangs have a known history of criminal activity in the community (Center, 2015a). Gang membership is defined differentially by state and, in many cases, left legally undefined (Center, 2015a). In the New York State senate bill S2410A, known as the “Criminal Street Gang Act,” gang members are defined as meeting two or more of the following criteria:

(a) admits to criminal street gang membership (b) is identified as a criminal street gang member by a documented reliable informant; (c) resides in or frequents a particular criminal street gang's area and adopts its style of dress, its use of hand signals or its tattoos and associates with known criminal street gang members; (d) has been arrested more than once in the company of known criminal street gang members for offenses which are consistent with usual criminal street gang activity; (e) is identified as a criminal street gang member by physical evidence, such as photographs or other documentation; (f) has been stopped in the company of known criminal street gang members four or more times; (g) has been identified as a criminal street gang member by other law enforcement agencies; or (h) is identified as a criminal street gang member by a family member (p. 2, ("Criminal street gang related crimes act," 2018).

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This bill contains sentence enhancements and mandatory minimums for crimes deemed to be gang related. In this context, gang related is defined as being committed by or in proximity to a gang member ("Criminal street gang related crimes act," 2018).

In contrast to these legal definitions, modern social science research defines gang affiliation along a spectrum (Esbensen et al., 2001). Rather than a dichotomous measure of “gang” and “non-gang,” individuals are classified along a spectrum reflecting a wider range of current and former membership. These classification systems further differentiate between the “type of gang,” non-delinquent, delinquent, and organized, as well as the level of leadership the individual takes on within the gang (Center, 2015b; Esbensen et al., 2001; Pyrooz et al., 2016; Spergel, 1990).

The current definition is supported by differences in a wide range of measurable outcomes in core gang members compared with more peripherally involved individuals (Pyrooz & Densley, 2016; Pyrooz et al., 2012). Core gang members are more actively involved in delinquent acts than unaffiliated members, even when holding other factors like race, social economic status, neighborhood quality, and prior traumatic experiences constant (Alleyne & Wood, 2010; Decker, Pyrooz, Sweeten, et al., 2014). Core gang members are also more likely to meet criteria for significant mental illness, including conduct disorder and antisocial personality disorder (Boxer et al., 2015). Core gang members are more likely to stay in gangs for the long term, having significantly lower rates of gang dissidence than peripheral members (Decker, Pyrooz, & Moule, 2014; Pyrooz et al., 2012; Spergel, 1990). In addition, core gang members have lower rates of employment and academic achievement (Esbensen et al., 2001; Pyrooz, 2014a).

Social Mechanisms of Group/Gang Affiliation

A core need of adolescence is membership in a group (Newman & Newman, 1976). Research on need fulfillment as it occurs in peer group activity has shown its importance to the social emotional and cognitive development of young people (Sprinthall & Collins, 1984; Steinberg & Morris, 2001; Tarrant, 2002). Groups satisfy the adolescents with the affiliation, identity and sense of achievement that they need to build their own sense of identity (Johnson et al., 2006). Unfortunately for some adolescents, these needs are fulfilled by membership in a gang (Leverso & Matsueda, 2019; Vigil, 1988). The support network provided by gang membership, for many youth, are the most available, and often only available, means of achieving the group membership that is such a core part of adolescent development (Johnson et al., 2006; Richardson et al., 2015; Roman et al., 2017; Vigil, 1988). Understanding the social mechanisms behind the youth's level of gang affiliation and engagement is important so that the poorer life course outcomes of gang membership can be avoided (O'Neal et al., 2016; Roman et al., 2017; Weerman et al., 2015)

Gang membership is linked to poorer outcomes across the life course (Johnston, 2013; Sanchez-Jankowski, 1991; Spergel, 1990). These negative outcomes increase the longer the individual is involved in gang activity (Carson & Vecchio, 2015; Decker, Pyrooz, & Moule, 2014; Wingood et al., 2002). Long-term gang members have greater incidence of delinquent and antisocial behaviors, including drug use, truancy, and criminal activity (Gilman et al., 2014), greater engagement with the criminal justice system as well as higher rates of misconduct while incarcerated (Varano et al., 2011).

Incarceration begets more incarceration (Brown, 2010). Imprisoned youth are exposed to significant trauma, report increased incidence of PTSD, depression, anxiety, and continued

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criminal behaviors due to exposure to adverse prison conditions, abuse and isolation from their non-criminal social networks (Dierkhising et al., 2014). In contrast to decreasing crime, research suggests that prison stays increase future arrests, detentions and incarceration in violent high-risk individuals and low-risk nonviolent offenders (Ogle & Turanovic, 2016). Incarceration decreases later life outcomes resulting in lower employment and poorer outcomes for dependents and family members (Hagan & Dinovitzer, 1999). The negative outcomes that stem from incarceration, coupled with the criminal justice system's reliance on incarceration in addressing gang involvement are exacerbated by the criminal justice system's binary definition of "gang member." (Pyrooz & Densley, 2016; Roman et al., 2017) Rather than encouraging youth to disengage from gang life, failing to differentiate between peripherally involved youth and core gang members in effect pushes low affiliation youth into deeper and more sustained gang membership (Pyrooz & Densley, 2016; Roman et al., 2017; Thornberry et al., 1993).

Current law allows for adolescents to be identified by law enforcement as a gang member solely by their own stated affiliation and representation of one or more gang-specific indicators in a gang identified area ("Criminal street gang related crimes act," 2018). Any offenses, even minor status offenses, would then carry mandatory minimums and sentencing enhancements ("Criminal street gang related crimes act," 2018). In opposition to contemporary understandings of gang embeddedness, the lack of gradation in gang identification typically utilized by law enforcement agencies creates a false dichotomy of gang-nongang. This results in a one-size-fits all approach that treats even tangentially affiliated youth in the same manner as lifetime core gang members. This has significant consequences for these individuals, increasing their embeddedness and adversely impacting their life outcomes (Braga et al., 2015; Brown, 2010; Esbensen et al., 2001).

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Current law allows for adolescents to be identified by law enforcement as gang members solely by their own stated affiliation and representation of one or more gang-specific indicators in a gang identified area ("Criminal street gang related crimes act," 2018). Any offenses, even minor status offenses, would then carry mandatory minimums and sentencing enhancements ("Criminal street gang related crimes act," 2018). In opposition to contemporary understandings of gang embeddedness, the lack of gradation in gang identification typically utilized by law enforcement agencies ignores differences in criminal behavior and openness to dissidence by shunting all gang-affiliated adolescents into the criminal justice system. This has significant

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consequences for these individuals, increasing their embeddedness and adversely impacting their life outcomes (Braga et al., 2015; Brown, 2010; Esbensen et al., 2001).

The severity of the impact of gang affiliation on youth differs based on the level of commitment the individual has towards their gang. Increased gang embeddedness correlates with lower levels of employment, higher reliance on criminal capital, greater ties to criminal networks, isolation from non-criminal peers and a greater adaption of criminality as a personal identity and overarching value structure (Alleyne & Wood, 2010; Howell & Egley Jr, 2005; Krohn et al., 2011; Pyrooz, 2014b; Pyrooz et al., 2012).

This downward trajectory can be explained by the goals of the group superseding the goals of the individual to greater extents at higher levels of embeddedness (Krohn et al., 2011). Gang embeddedness affects gang dissidence. Increased group salience decreases the desire to leave the group in the face of alternatives, even when the alternatives have benefits (Goldman et al., 2014; Roman et al., 2017). In contrast, youth with lower levels of group salience are more likely to distance themselves from the group when faced either with conflicting alternatives or experience negative costs associated with membership (Forsyth, 2009; Van Vugt & Hart, 2004).

Despite many known adverse consequences of gang membership, it has been argued that gang membership also provides some seemingly positive benefits from the perspective of some youth; gangs provide a source of income, especially when other options are less readily available (Estrada et al., 2018; Neely, 1997; Pitts, 2017; Sanchez-Jankowski, 1991). Gangs also offer increased social status both within the group and in the local community (Alleyne & Wood, 2010). Gangs provide protection in dangerous environments (Lenzi et al., 2015; Shelley & Peterson, 2018). Gangs increase access to sexual partners for members (Fleisher & Krienert, 2004). Gangs provide a readily available support network (Miller, 1958). Often friends and

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family are gang affiliated themselves, which means that individuals' main social network options could be through gang life (Lenzi et al., 2015; Pitts, 2017; Pyrooz, 2014b).

But, how can outsiders differentiate core gang members from tertiary members who are less likely to commit serious offenses and can be more easily encouraged to disengage from gang life? The answer could lie in the type and quantity of gang specific signals the individuals use.

Social norms in gangs mirror norms and patterns of behavior in other small groups (Densley, 2012; Garot, 2007; Pyrooz & Densley, 2016; Sosis & Bressler, 2003). All small groups rely on group-specific methods of communication to differentiate in-group from out-group members. Different signals claim ownership of territory (Alonso, 1998; Krims, 2007; Ley & Cybriwsky, 1974). Other signals communicate the individual's identity (Alonso, 1998; Garot, 2007; Hethorn, 1994; Leverso & Matsueda, 2019; Phelan & Hunt, 1998; Vigil, 1988). These signals also function to increase intergroup affiliation and cohesion (Goldman et al., 2014). In addition, these messages are important for communicating the status of the group and for recruiting new members (Pyrooz & Densley, 2016), which itself contributes to intergroup cohesion and the primacy of group in individual self-conception (Densley, 2012).

These significant group benefits and individual costs incentivize youth to feign or seek out greater affiliation (Alleyne & Wood, 2010, 2012; Goldman et al., 2014). Similarly, gang members, especially highly involved members, are incentivized to differentiate themselves from individuals who seek to benefit from membership without paying the costs (Carson & Esbensen, 2019). In addition, adolescents who aspire to greater gang membership are motivated to advertise their quality as a future gang member, demonstrating their willingness to subsume personal benefits for the benefit of the group (Densley, 2012; Pyrooz & Densley, 2016). These factors motivate individuals to over-represent their gang affiliation (Lauger & Densley, 2018). Thus, the

amount of gang affiliation an individual claims may not be an accurate reflection of their true membership (Carson & Esbensen, 2019). By understanding the differing patterns of signals and the relation between these signals and the individual's affiliation, other gang members can more effectively differentiate another's commitment to the group and evaluate their fitness for deeper membership. This pattern of communication in small groups is explained by costly signal theory.

Costly Signal Theory

Small groups and subcultures function within the larger society through their own unique mechanisms. Many factors serve to hold the group together against the pressures to assimilate into the wider, dominant culture. (Hodkinson & Deicke, 2007). One such mechanism is group-specific messages. This type of communication is an in-group way that is unique to the group enabling members to communicate their belonging to others within that group (Sosis, 2006).

Group specific signals are particular to that group and are invisible to members of the out-group. In addition, these signals often come at a cost, be it in time, energy, physical pain or by isolating a person from the out-group (Pyrooz & Densley, 2016; Sosis, 2006; Sosis & Bressler, 2003). Group specific messages communicate the commitment of the individual to the group (Sosis, 2004). This fosters trust between members and minimizes the amount of individuals who seek to attach themselves to the group for status without the commitments that accompany true group membership (Densley et al., 2014; Sosis, 2006). Commitment to the group is communicated by costly signals to other members. The higher the cost of the signal, the higher the individual status becomes within the group (Dias & Sá, 2014; Sosis, 2006). Members that identify primarily with the group are more likely to signify their membership in overt and permanent ways that come with a personal cost. These costly signals also serve to increase the cohesion of the group itself (Densley, 2012; Sosis, 2006; Sosis & Bressler, 2003).

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Signaling theory defines a signal as a method of communication that is difficult to observe, that communicates something that the recipient wants to know about, and the signaler wants the receiver to believe (Sosis & Bressler, 2003). Strategic costs of signals are related to hardships or effort required to give the signal, and increase the value and trustworthiness of the signal (Densley, 2012). Cooperation is more likely to occur when individuals in a group can guarantee their commitment to the group (Hall et al., 2015; Sosis & Bressler, 2003), which often takes the form of group specific signals. These signals in turn increase the overall cohesion of the group itself, increase the primacy of the group in individual identity construction, and increase the likelihood that others will see the group as desirable (Pyrooz & Densley, 2016; West, 2016). Though the impact of costly group signifiers and increased group cohesion is visible in gangs (West, 2016), it is also a phenomenon that is visible across cultural and social groups. Religions require specific diets, attire, and participation in rituals (Seul, 1999; Sosis, 2006; Sosis & Bressler, 2003). Guilds, clubs, and organizations have their own rites, rituals, and signals that show commitment to membership in order to belong (Snoek, 2014) College fraternities share group specific signals and rituals as costs of membership (Callais, 2005; Drout & Corsoro, 2003; Kiesling, 1998). Athletic fandom involves colors, signs, chants, degenerating statements against rival groups, and occasionally violence (Battenfield, 2013; Holman et al., 2004). In this way, group specific messages serve to maintain the integrity of the small groups despite the pull of conforming to the dominant culture's communication style of messaging. (Just wanted to reword this because you state it almost exactly the way it's worded at the beginning of this section).

Costly signaling mechanisms are seen in the way that gang members communicate between each other. Similar to other small groups, costly signals serve to differentiate committed

members from those less invested and hold the group together in the face of outside pressure to disengage (Densley, 2012; Densley & Pyrooz, 2017; Pyrooz & Densley, 2016).

Differentiating Tertiary Gang Members from Core Members

As discussed above, gang membership is nuanced and expressed differently among different people, waxing and waning over the individuals' life course (Pyrooz, 2014b). The different levels of affiliation in youth directly relate to their sense-of-self and correspond to dramatically different outcomes (Bergen-Cico et al., 2014). Left alone, gang affiliation peaks in early adolescence and dissipates in most as they age into early adulthood. In most cases, youth disengage from the gang on their own (Pyrooz, 2014b). Gang dissidence efforts are more successful the more peripheral youth involvement becomes (Krohn et al., 2011). However, in the case of core gang members, their gang affiliation increases as they age (Melde & Esbensen, 2011).

Individual overrepresentation of gang affiliation has significant impact for adolescents. In some instances, the number of gang-identified youth is upwards of 40% greater than youth that meet more restrictive criteria utilized by the well-validated Youth Gang Survey (Pyrooz et al., 2016). This discrepancy has been supported by other similar comparison studies (Center, 2015a, 2015b; Esbensen et al., 2001). This over identification has significant effects for peripherally involved youth.

Group-specific language/symbols used by gangs

There is a great deal of research into the different group-specific language and symbols used by gangs (Densley, 2012; Estrada Jr et al., 2016; Leverso & Matsueda, 2019; Lozon & Bensimon, 2017; Phillips, 2016; Pyrooz & Densley, 2016; Wijeratne et al., 2016). This research is similar to other small groups studied across the globe. Specifically, more committed

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individuals will use more signals that are both more difficult to fake and carry a more significant personal cost, including physical pain, personal risk, permanent markings, time commitment, exclusionary dress, and isolation from individuals from outside the group (Allen, 2010; Sosis, 2004, 2006; Sosis & Bressler, 2003). It stands to reason that patterns seen in small groups are mirrored in gangs, an assumption supported by research (Pyrooz & Densley, 2016). In gangs, the cost of signals mirrors other similar groups. For example, the physical pain of jumping-in rituals, personal risk carrying out “missions,” permanent tattoos or brands, time spent outside on the block, group specific colors and attire, and pruning of friends and family who are not affiliated or in rival gangs (Densley, 2012; Pyrooz & Densley, 2016). Signals with a greater personal cost express a higher level of group commitment and convey higher status within the group (Sosis & Bressler, 2003).

Prior research has demonstrated differences in communication that directly relate to the individual’s level of affiliation. Studies have shown a reliance on low-cost signaling for low-level gang affiliated youth (Estrada Jr et al., 2016; Goldman et al., 2014). High cost signals have been measured primarily in youth greater levels of gang affiliation with increasing high cost signal usage increasing as gang affiliation increases (Berger et al., 2017; Leverso & Matsueda, 2019; Pyrooz & Densley, 2016). Additionally, research has shown a pattern of increased cost signaling in individuals seeking to increase their gang affiliation that is especially linked to endorsement of deviant behaviors and criminal acts such as drug use and criminal behaviors that are used by youth to advertise their fitness for membership in the gang (Densley, 2012; Leverso & Matsueda, 2019; Pyrooz & Densley, 2016). In addition, research has shown that youth living in neighborhoods with high levels of gang activity use low-levels of low-cost gang indicators (Curry et al., 2002).

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Research into gang membership has likewise found some measurable patterns of gang embeddedness related to the rate that more- or less-affiliated youth appear in the total population of gang-affiliated individuals. The relative sizes of these groups decrease as affiliation increases. The most common type of gang member is the unaffiliated or tangentially affiliated youth, making up the majority of the population of gang members. This group has been measured to make up in the area of 50 to 75% of all gang affiliated youth in in-person studies (Center, 2015b). The prevalence of gang members in the population is slightly under 5% active membership (Alleyne & Wood, 2010). The smallest portion of the population has shown a population size of between 1 to 2% for core membership measured within the total population of gang affiliated youth (Alleyne & Wood, 2010; Esbensen et al., 2001). As there are distinct age and gender effects, with increasing wannabe and active affiliation in early adolescence and lower levels of affiliation in girls, these prevalence numbers are not consistent across studies (Decker, Pyrooz, & Moule, 2014; Esbensen et al., 1999; Hayward & Honegger, 2014; Melde & Esbensen, 2011; Tolan et al., 2003).

Many of these signals are observable to outsiders, such as colors (Leverso & Matsueda, 2019; Pyrooz, 2014a), signs (Ctr & America, 2015; Leverso & Matsueda, 2019; Sánchez-Jankowski, 2018), and brands and tattoos (Phelan & Hunt, 1998; Poljac & Burke, 2008; Valdemar, 2006; Zackasee, 2004). However, many others are shared only within groups, including jumping in or criminal activities taken on the behest of the gang (Hansen & Freitag, 2016; Shelley & Peterson, 2018). However, these acts must be communicated between group members to carry the benefits of such signals (Pyrooz & Densley, 2016; Sosis & Bressler, 2003). One place for an outside observer to see these communications is on social media.

Gangs Move Online

There is a growing body of contemporary gang research that shows an increasing presence of gang members on social media. This is often termed “internet banging” (Patton et al., 2013). Researchers have found that gangs use social media in a manner comparable to communication in the real world. Gangs communicate their presence online to other gangs (Lauger & Densley, 2018). Individuals use Facebook to brag about their criminal acts, prove their commitment to the gang, and demonstrate the superiority of their gang over others (Patton et al., 2013). Other researchers have found that gangs use Facebook to explicitly share their crimes and engage combatively with rival gangs (Décary-Héту & Morselli, 2011). In addition,⁴ online behaviors mirror those offline. Gang members are more likely than those not in a gang to commit online crimes (Lauger & Densley, 2018; Pyrooz et al., 2015), such as engaging in sexual harassment (Forber-Pratt & Espelage, 2018), cyber bullying (Shelley & Peterson, 2018), financial crimes, and drug sales (Lauger & Densley, 2018; Neely, 1997; Sierra-Arevalo & Papachristos, 2015). This is a fact well known by prosecutors and law enforcement officers who regularly use social media posts for generating gang databases, justifying probable cause for arrests, and as evidence in court (Behrman, 2015; D. U. Patton et al., 2017).

Gang signals online follow similar patterns to communication offline. Individuals represent their affiliations using colors, signs, language, and tagging as they do offline, however they do so using the new tools available to them (Pyrooz et al., 2015). Gang members use specific hashtags, emojis and argots unique to the online space, in addition to the medley of communicators seen offline (Wijeratne et al., 2015). Gangs also utilize emojis and abbreviations that may appear innocuous in specific contexts (Morselli & Décary-Héту, 2013; Patton et al., 2014). Innocuous emoji such as the top hat, Star of David, and wheelchair are used to reference

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gang affiliation while others, such as spirals, a plant leaf, and the syringe, are often used in sequence to communicate different actions. The function of social media as a mechanism of the communication of identity in young people has been explicitly measured on the Facebook platform. Young people have been shown to use their profile and public interactions to validate themselves through interactions with an audience (Bazarova, 2012, 2015). The role of public status updates, wall posts, and tagging aligns with similar mechanisms to self-disclosure (Bazarova & Choi, 2014). In addition, studies of gang members' public social media presence support the use of online presence as an accurate indicator of self-identity, group affiliation, and endorsement of group norms (Lauger & Densley, 2018; Morselli & Décary-Héту, 2013). These trends appear specifically on Facebook. Newer platforms, like Instagram and Snapchat, have spread into the digital space (Patton et al., 2013; Wijeratne et al., 2015). However, Facebook was the most popularly used social media platform until 2018 (Meeker & Wu, 2018; Perrin, 2018). The current trend away from Facebook towards other social media platforms has only occurred since 2018. Additionally, Facebook remains the most utilized social media platform for self-expression, self-documentation, and social interaction (Alhabash & Ma, 2017). Therefore historical data from Facebook can still provide a valid measure of an individual's public social media presentation for the current study, while eliminating possible ethical considerations by detecting current criminal activity from one's public social media postings.

Secondly, gang members' level of embeddedness could likely be inferred through the type and quantity of signals publicly posted on Facebook. Current research reviewed above shows how the type and quantity of group-specific signals offline directly relates to the member's gang embeddedness (Densley, 2012; Pyrooz & Densley, 2016). As social media is used as an extension of the public forum (Lauger & Densley, 2018), we would expect that a

similar pattern of signaling would emerge online. Were this to be the case, one would expect to see signal patterns emerge comparable to those previously measured offline.

The Current Investigation

The current study examined youths' online communication of gang affiliation on Facebook by comparing the types and quantity of communication observed in studies of offline communication (Densley, 2012; Densley & Pyrooz, 2017; Goldman et al., 2014; Pyrooz & Densley, 2016). Specifically, it was hypothesized that four groups would emerge. I expected that one group representing non-gang youth would present with only a few gang-specific signals, and that this "unaffiliated" group would comprise the bulk of the sample, as has been found in studies of gang affiliation offline. I expected that a second "peripheral gang" group would use modest amounts of low-cost signals and minimal high-cost signals, and would represent the next largest portion of the sample. I expected that the third largest group would represent "wannabe gang members," and would evidence a large amount of low-cost signals and a small amount of high-cost signals. I expected that the final and smallest group would represent "active gang members," and would utilize the largest amount of both low- and high-cost signals. I also expected that these patterns would be apparent both when taking into account the users' own self-generated posts as well as when including posts and reactions that have been generated by others but were retained as a part of users' public pages.

In addition, current research indicates that some types of signaling are used more frequently by gang members, especially as their level of commitment to their gang increases (Densley, 2012; Pyrooz & Densley, 2016). Specifically, evidence of physical pain, sexualized content, violent acts, and denigrating statements about rival gangs are more indicative of the communication of core gang members (Hansen & Freitag, 2016; D. Patton et al., 2017; Stretesky

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& Pogrebin, 2007). A second communication pattern with broader statements of criminality, sexualized content, and gang specific emoji and argot, is more common amongst “wannabe” youth angling for increased membership (Densley, 2012; Patton et al., 2013; Pyrooz & Densley, 2016). Current research also suggests that signals of loss can be indicators of highly embedded youth on the verge of disengaging (Densley & Pyrooz, 2017; O’Neal et al., 2016). Therefore, I hypothesized that these three described groupings would likewise emerge in the data.

Hypothesis 1: When grouping individuals using aggregate high-cost and low-cost signals, four different groups would emerge, listed here in order of their predicted size, largest to smallest:

- 1) “unaffiliated” group with few low-cost signals and few high-cost signals;
- 2) “peripheral” group with moderate low-cost signals and few high-cost signals;
- 3) “wannabe” group with many low-cost signals and few high-cost signals;
- 4) “active” group with many low-cost signals and many high-cost signals.

Further, these groupings will be present when using both:

- a) total public posts;
- b) only user-generated public posts.

Hypothesis 2: When grouping individuals by distinct signal types, rather than signals aggregated by cost, three additional groups would emerge:

- 1) “core gang” group with high levels of sexualized content, overt criminal behavior, violent acts, and negative and aggressive statements about rival gang members;
- 2) “wannabe gang” group with high levels of implied criminal activity, sexualized content, gang specific emoji and argot;
- 3) “dissidence” group with high levels of loss indicators and low levels of all other signals

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Hypothesis 2 was planned to be evaluated using whichever methodology (total public posts or only user-generated posts) from Hypothesis 1 that emerged as more valid, or if none did, self-generated signals alone would be used.

Methods

Participants

This study collected the publicly available data from 300 Facebook accounts. The sample size of 300 was selected as it is comparable to similar studies in the literature that range in size from 150 to 700 participants (Alleyne & Wood, 2010; Esbensen et al., 1993). All information was collected from public profiles and public activity from the 2017 calendar year. All demographic and personal information collected was publicly available on the Facebook profile of that individual.

Identified profiles were from individuals aged 16-24 who lived or frequented the 73th police district of South Brooklyn during the 2017 calendar year. The 73rd precinct of Brooklyn was selected as it is a known area of gang activity containing 7 gangs active during the period studied. The 73rd police precinct is one of the most violent precincts in New York City having the highest shooting incidence in 2019, with 73 recorded shootings ((NYPD), 2019b). From 2006 – 2018, this district was the second highest in reported violence with 1063 shooting incidents, second only to the neighboring 75th district ((NYPD), 2019a) and highest homicides per capita of any area in New York City (NYPD, 2019b). It had the historically highest rates of assault and incarceration, often coming in first or second citywide (Bureau, 2018; Jensen et al., 2016; King L, 2015). Including the 7 major felonies, there were 440 felonies within the last year (NYC COMPSTAT, 2019). It was assumed that by containing the study to one Brooklyn neighborhood, the number of group-specific signals identified would be kept to a minimal number. As gangs use hyper-local intergroup indicators, limiting the study to one neighborhood was also expected to minimize miscoding errors. Names and operating locations for local gangs were identified through prior communication with the police neighborhood coordinating officer supervisor from

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the 73rd district. This information was then crosschecked with several local sources to ensure accuracy.

Individual participants were identified by two methods, self-identifying and peer-identifying. Self-identifying individuals included participants who actively indicated gang affiliation on their profile page. These participants were located through keyword searches in the Facebook database for the previously identified gang names. Each local gang name was searched in the Facebook database along with several spelling variations and associated hashtags. These searches were refined by specifying the geographic area to include only individuals residing within the target area that mention the known street gang. The location of individual posts and user profiles is accessible by the individual's profile or by geotagged locations.

Peer-identified individuals were located through their activity on self-identified user's pages. Individuals who publicly posted gang-affiliated signals were then narrowed down to only include individuals who resided in the study area during the 2017 timeframe and showed evidence of gang signaling on their personal public feed. Once they met the minimum criteria, they were considered eligible for inclusion in the study. Individuals who were peer-identified but did not engage in gang signaling on their personal pages or who were not active in the study area were excluded. This method of gang identification through a combination of peer affiliation, area of residence, and gang signaling is reflective of the current New York State methodology for identifying gang members ("Criminal street gang related crimes act," 2018). Therefore, using this inclusion criteria provided a range of individuals that was likely comparable to those currently identified by local police as gang affiliated.

The demographics of study participants were difficult to ascertain due to limited available information. No participants explicitly stated their race or ethnicity however, demographic data

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from the area shows that, during the time of the study, 70% of area residents identified as Black, 26% as Hispanic, 2% White, 1% Asian, and 1% Biracial (Bureau, 2018). Only 28% of the sample provided age data, which were of questionable validity, often directly contradicting other user-provided data such as high school graduation dates, 21st birthday parties, and other age-related life events. Similarly, provided education and work history, when available, were of questionable validity and often of a comical nature, such as “street-smarts”; “works at... Why Do You Care”; or “attended school at... Beats Bitches Up Academy.” The demographic information on age, race, gender and educational attainment which was collected using the public profile data for each post on the individual’s timeline during the 2017 calendar year was then coded for gang signaling.

Area census data show a medium income reported for the area at 32,448 per household per year with a per capita income reported to be averaging at \$21,238 annually (Bureau, 2018). Both of these numbers are half the claimed income in both New York City and the United States. Twenty-seven percent of local residents fall below the poverty line, again double the rate of the city and more than double the rate of the United States (Bureau, 2018). In contrast, gender information was readily provided. The majority of the sample was male ($n=273$, 91%). The remaining participants included 1 transgender male identifying individual (.3%) and 26 female participants (8.7%).

Procedures

Data were collected using historical data from public posts on the Facebook platform. Self-report is the most common measure of gang affiliation, therefore, statements made by individuals on their public profile were used as equivalent to self-report measures for the purposes of this study. Dichotomous self-report measures have consistently been shown to have

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high levels of reliability and validity and to correlate strongly with police report and official records of gang membership (Curry, 2000; Curry et al., 2002). Similar research has likewise utilized a combination of police department and academic resources to decode gang specific signals online (D. Patton et al., 2017). Therefore, were individual gang members to demonstrate similar patterns in their online activity, they would likewise publicly state their gang affiliation in their profile, “about me” section, through gang-referencing street names and explicit statements on their public feed.

All data collected were from the 2017 calendar year. This time frame allows for data to be comparable across profiles and minimizes possible exposure to ongoing criminal acts. Each post within the 2017 time frame was counted as well as every type of gang signaling contained in the post and in reaction to the post. Data were used to calculate percentages of posts that included high-cost signaling as well as low-cost signaling out of the total posts coded. A random sub-sample comprising 10% of the sample was coded by two individuals and was compared using Cohen’s Kappa to establish inter-rater reliability for the measure. The entirety of the dataset was collected by the principal investigator. The dual-coded subsample was only used for establishing reliability of the measure and was not utilized for the primary statistical analysis. The second coder was recruited from the available trained local psychology graduate students. After an initial in-person training, these duplicate measurements were completed independently.

To prevent repeated sampling and for use in calculating checklist validity, the individual’s Facebook administrative ID was collected. This randomly generated numeric ID is used by Facebook to identify different profiles and is unique to each account. Though it would not be able to directly link back to the account without additional information, the numbers were destroyed after data cleaning to ensure anonymity.

Measures

Indicators of group-specific signals were counted for each profile. Each category on the checklist of group specific signaling was coded at most one-time per post, with information collected indicating if the origin was self- or other-generated. Coding each post only once per signaling subcategory enabled measuring of the individual's overall presentation on social media without giving undue weight to signal-dense posts and media types. Limiting the number of data points of a given type that were collected per post likewise controlled for media type where multiple examples of the same signaling subcategory could be repeated per post. This is especially relevant as pictures and videos often provided multiple examples of the same category. Some such posts would include picture collages or group images. Coding each subcategory, such as hand signs, peer affiliation, or gang colors only once per post ensured that more visually dense media were not given undue weight.

Signaling

To identify gang signaling, a checklist of gang signals was utilized to record each instance of intergroup communication. This checklist was generated prior to data collection using validated online gang databases (Décary-Héту & Morselli, 2011; Decker & Pyrooz, 2015; Huff & Barrows, 2015; Wijeratne et al., 2016; Wijeratne et al., 2015), as well as information provided by the 73rd precinct and local gang dissidence organizations (Gang Resistance Organization and Training; National Gang Center), to develop a list of signals used by gangs in the study area. Each signifier had a prior determination of "high-cost" and "low-cost" based on the level of permanency and danger associated with the signal. A complete list of these signals with their frequencies and standard deviations is in Table 1.

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Each post on the individual's timeline within the 2017 timeframe was coded separately for signaling using the checklist. All posts on the timeline during this timeframe were entered, including self-generated and other-generated posts. All publicly visible content on the user's timeline was included, though the origin of the content was indicated as being "self-generated" or "other-generated." Prior research indicated that users' passive choice to leave other-generated content visible on their timeline implies tacit endorsement of the content (Siibak, 2009; Zhao et al., 2008). Additionally, New York State uses peer group gang affiliation as one of the indicators of gang membership ("Criminal street gang related crimes act," 2018). Therefore, any other-user generated posts were studied for the presence of gang-related content in the same manner as posts generated by the individual in question. The origin of the signal was indicated as self-generated or other-generated.

To improve the ability to control for differing social media usage patterns, signal rates were calculated. These numbers indicate the rate that signals of this type appear per individual posts and were calculated by dividing the total amount of self- and other-generated signals observed during the 2017 calendar year by the individual's total posts generated during that time frame. In addition, aggregate variables were calculated that described the individual's total rate of high and low-cost signal usage for the study period. The values reflect the likelihood that a given post would contain one or more high or low-cost signals. Values above 1 indicate that an individual's post would, on average, contain more than one signal of that weight. For example, in an individual with a low-cost signal rate of 3.00, a randomly selected post would most likely contain 3 low-cost signals such as: gang names, argot, and gang-specific emoji use.

Low-cost signals. Low-cost signals were signals that were either easy to fake or carried minimal risk to the signaler. Low-cost signals include those that can be easily put on or taken off

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when the individual does or does not want to leverage their gang affiliation (Densley, 2012; Pyrooz & Densley, 2016; Sosis & Bressler, 2003). The signals included in the measure include gang references and statements regarding endorsement of criminal and delinquent acts.

Gang affiliation. Explicit statements of affiliation were measured through overt statements of gang membership, gang name hashtags, and explicit references to known group names (Fessler et al., 2016). Claims of gang membership were collected as a separate category. Additional low-cost gang signifiers coded were: wearing colors, showing hand signs, presenting gang-associated symbols (such as specific stars, sports teams and imagery), wearing specific types of attire (such as bandanas and beads), using gang specific argot and nontraditionally used emoji for gang-specific meanings (Densley, 2012; Densley & Pyrooz, 2017; Pyrooz & Densley, 2016). Though pejorative and aggressive statements towards rival gang members were originally included as low-cost symbols, difficulties ascertaining tone and intent behind aggressive posts led to the elimination of this variable during the data collection process.

Delinquency. Statements about criminal activities, criminal justice involvement, overly sexualized content, and drug use without supportive evidence constitute a low-cost signal. This is due to the fact that these statements are easy to fake and therefore do not construe the same level of risk for the participant. However, they do serve to advertise the individual's commitment to gang norms and values (Densley, 2012). Unlike the gang-affiliated symbols, these symbols were not used to include members in the study group but were coded once individuals demonstrated affiliation through the inclusion of low- or high-cost gang signifiers. Variables included in the measure were "stated criminal justice involvement" and "stated drug use." Due to difficulties operationalizing "sexualized content" this variable was eliminated during the coding process.

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High-cost signals. High-cost signals were identified as necessitating physical pain, personal safety, criminality, and loss. These signals are difficult to fake and therefore convey individual commitment to a much higher degree than low-cost signals. Each category has been linked to gang-specific signaling offline in prior research and has been used to communicate commitment to individual gangs and the associated lifestyle (Densley, 2012; Densley & Pyrooz, 2017; Pyrooz & Densley, 2016). As with low-cost signals, high-cost signals can be broken down into gang affiliated and deviancy categories. Additionally, high-cost signals include personal loss both through injury, death, and the criminal justice system. In contrast to low-cost signals, high-cost signals carry a personal expense in terms of pain or risk.

Gang affiliation. High-cost signals of gang affiliation include painful and permanent indicators such as jumping in rituals and physical modifications like branding and tattoos. As painful rituals are not easily apparent on social media and often undocumented, this category was not included in the final check sheet (Fessler et al., 2016; Pyrooz & Densley, 2016; Sosis & Bressler, 2003). “Tattoos” were coded as high-cost signals and included physical modifications that contained explicit gang references.

Deviancy. Research has shown that demonstrating active and efficient criminality is an important component of gang joining. Joint offending is a core component of gang membership, so concretely demonstrating a willingness and ability to engage in criminal activity is key to being a valuable gang member (Densley, 2012). High-cost signals endorsing gang life include personal safety risks and engagement with the criminal justice system that are missing from low-cost deviancy signaling. This includes eliciting inter-gang fights, completing “missions,” or incursions into rival gang territory. These are high-cost due to the level of commitment communicated about putting one’s personal safety at risk in service to the gang (Densley, 2012).

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These were coded as “risky criminal behavior” as it is often unclear to the outside observer their specific intent. Evidence of one’s criminal activity itself constitutes a high-cost signal. Concrete evidence of this both conveys the risk inherent in the performance of the initial criminal act as well as opening up the user to the use of the evidence by prosecutors or law enforcement (Patton et al., 2016). This included pictures and video of drug use, drug sales or firearm use, which is illegal in the study location. Signals coded for this domain included “criminal justice involvement,” “overt drug use,” “overt criminal acts,” and “risky criminal behavior.”

Loss. Signaling loss of fellow gang members demonstrates the individual’s commitment to the gang as they continue their affiliation in the face of the personal danger and loss associated with membership. Individuals who share their emotions regarding hurt, killed or incarcerated gang members concretely show the level of cost they have already paid in personal sacrifice to the gang. (Densley, 2012). Injury to, and loss of, friends and relatives to gang-related factors was coded as “injury/death.” Due to the fact that it was difficult to separate the loss and deviancy factors, a separate category for loss to the criminal justice system was not utilized. Rather, these signals were coded as “criminal justice involvement” variable.

Finally, four aggregate variables were calculated using the signal categories above. These variables were based on the percent of total communication including gang signals on individuals’ public feeds. These variables reflect the likelihood of a particular category of signal appearing within that post and are therefore often over 100% for higher signaling individuals. In these incidences, this number reflects the fact that multiple types of low and/or high-cost signals are likely to appear in a random post from that individual’s profile during the 2017 timeframe. These aggregate variables were calculated both for only user-generated signals as well as total

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signals. The total signals category included all posts and comments on the page that were generated by the user as well incorporating gang signals generated by other users.

The aggregate variables were calculated by dividing the individual's total amount of self and other-generated signals by their total publicly visible posts during the 2017 calendar year. These variables were used to compare signal patterns between users with different rates of social media engagement. The values reflect the likelihood that a given post would contain one or more high or low-cost signals. Values above 1 indicate that an individual's post would on average contain more than one signal of that weight. For example, in an individual with a low-cost signal rate of 3.00, a randomly selected post would most likely contain 3 low-cost signals such as: gang names, argot, and gang-specific emoji use.

Inter-Rater Reliability

Table 2 includes interrater reliability statistics for the signaling variables on the measure. Kappa statistics of inter-rater reliability were between 1.00. and -0.029. Two variables, sexualized content and pejoratives expression about other gangs, did not show significance in agreement between coders and were eliminated from the study. The overall agreement between two coders was moderate, $\kappa = .62$ (95% CI, .59 to . 67), $p < 0.001$ for Total Low-Cost Signals and $\kappa = .52$ (95% CI, .48 to . 57), $p < 0.001$ for Self-Generated Low-Cost Signals, but was improved slightly with the elimination of the two unsuitable variables pejorative statements and sexualized content. With these changes, kappa was $\kappa = .70$ (95% CI, .668 to . 732), $p < 0.001$ for Total Low-Cost Signals and to $\kappa = .70$ (95% CI, .673 to . 735), $p < 0.001$ for Self-Generated Low-Cost Signals. Kappa was $\kappa = .80$ (95% CI, . 760 to .862), $p < 0.001$ for Total High-Cost Signals and to $\kappa = .81$ (95% CI, .792 to . 853), $p < 0.001$ for Self-Generated High-Cost Signals. The slightly higher interrater reliability for high-cost signals is to be expected, as a component of

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a signal's cost is visibility and more flagrant endorsement of subgroup norms. It is therefore to be expected that high-cost signals would have stronger inter-rater agreement due to the lower level of interpretation required.

The removal of Pejorative Statements and Sexualized Content likewise increased the interrater agreement for the entire measure from, $\kappa = .62$ (95% CI, .59 to .67), $p < 0.001$ for Total Signals and $\kappa = .67$ (95% CI, .61 to .72), $p < 0.001$ for Self-Generated Total Signals, to $\kappa = .70$ (95% CI, .668 to .732), $p < 0.001$ for Total Signals and to $\kappa = .701$ (95% CI, .673 to .735), $p < 0.001$ for Total Self-Generated Signals.

Results

Individuals demonstrated a wide range of public posting frequencies. Some individuals posted over 10,000 times per year whilst other profiles contained fewer than ten public posts. The mean number of public posts in the sample for 2017 was 481.05 (SD = 932.79). These numbers only reflect posts that were publicly visible at the time data were collected. Posting frequency almost certainly averaged at a higher rate for the group.

Low-cost signals were more common than high-cost signals (Table 1). This pattern was evidenced both in self-generated posts and total posts. Low-cost signals were consistently a higher percentage of individuals' total communication. High-cost signals appeared less frequently across all individuals, even those with a greater percentage of low-cost signals. These patterns were comparable when taking into account self-generated and other-generated signals. In addition, variability in usage patterns between users was greater with low-cost signals than high-cost signals. Within the broader low-cost and high-cost categories, there was a great deal of variation between both the rate that individuals utilized different signals and the frequency of individual signals.

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Individual signal use was varied. Certain high- and low-cost signals were generally more prevalent; however, there was a great deal of variability across profiles. The most frequently used signals were hand signs. Additionally, hand signs were often the most varied indicator in other-generated posts. This is likely due to the fact that they were both common and present in pictorial and video content where multiple parties were visible. Additionally, use of gang names had a wide range on profiles. The most common high-cost signals were overt drug use and statements of injury and death. The biggest variability in signal use was in overt drug use, hand signs, gang names, and total argot. Of the high-cost signals, tattoos and risky behavior were the least frequently observed.

Hypothesis 1: High- and Low-Cost Signal Patterns

Gang communication was used to classify members using a hierarchical clustering analysis with Wards method. This methodology was selected, as it creates groupings out of the data by using sets with the minimal within-cluster variance and is appropriate for quantitative variables (Milligan & Cooper, 1987). As the goal of this study was to identify groupings in which group members have the greatest similarities in terms of communication patterns, this methodology identifying groupings by minimizing differences amongst the group members was deemed to be the optimal analysis. Though this methodology has not previously been applied to the study gang members, hierarchical cluster analysis has been utilized before to study patterns of social networking and engagement in online communities (Aristeidou et al., 2017; Heer & Boyd, 2005).

To identify best fit, seven cluster solutions were produced and separately analyzed using multiple regressions with signal type as the dependent variable and cluster membership as the independent variable. This analysis identified group composition and size as well as providing

information regarding the amount of the variance explained for each variable by that cluster solution (Barbot, 2018).

To differentiate the role of user-generated or other-generated communication, two separate groups of analyses were conducted using total posts and self-generated posts. In the first set of analyses, individuals were sorted using the rate of high-cost and rate of low-cost aggregate variables.

Hypothesis 1 A - Total-Communication Model

Using the total-communication (both self- and other-generated posts) variables, Hypothesis 1 (that there would be an “unaffiliated” group with few low-cost signals and few high-cost signals, a “peripheral” group with moderate low-cost signals and few high-cost signals, a “wannabe” group with many low-cost signals and few high-cost signals, and an “active” group with many low-cost signals and many high-cost signals) was partially supported. Cluster analysis created statistically significant distinct categories that aligned with the four groupings predicted, but also included two additional unexpected small groupings of individuals with highly divergent signal patterns.

The results for the total communication model (Table 3) indicate that there are distinctions between groups of participants based on the quantity and type of signals used. In contrast to the predicted four-group solution, a six-group solution emerged as the most appropriate, as it accounted for a significant portion of the variance for both variables. This solution was selected based on a visual inspection of the dendrogram, level of variance explained by the solution and theoretical intelligibility of the clusters. Though the four-group and five-group solutions similarly provided adequate explanation of the variance, within-group differences remained sufficiently high as to provide more limited predictive utility. In these

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instances, the standard deviation between variables within the groups was higher than variance between items within the group. In addition, due to greater similarities between low-incidence groupings, differences between unaffiliated and peripheral youth were not apparent until the six-group solution.

The results of the cluster analysis suggest that there were six groups of individuals represented in the data that are labeled by the type affiliation that they likely represent. The first group likely represents unaffiliated youth whose profiles presented with a low rate of gang to non-gang content. This “unaffiliated” group contains individuals with very low levels of gang signaling. This largest group makes up 51.85% of the sample. A second “peripheral” group aligning with what would be expected in terms of signal patterns in tangentially affiliated youth presented with a low rate of low-cost signals and minimal high-cost signals. This is the second largest group making up 36% of the sample.

The two middle groupings likely relate to individuals with a deeper commitment to their gang. The third largest group signals in a manner that aligns with what would be expected for “wannabe” gang members. This “wannabe” group has a higher level of low-cost signals but they do not frequently utilize high-cost signals. This “wannabe” group makes up 5.39% of the sample. The fourth group aligns with the signaling patterns one would expect of active gang members. These individuals have higher levels of both low and high-cost signals, though still a great more low-cost signals than high. This “active” group makes up 3.7% of the sample. The level of high-cost signaling in both of these groups was not homogenous, with a high level of variability between members. This suggests both that there is a wider array of signal patterns in these groups of individuals and suggests that these particular groups are not as predictive as other groups may be.

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The final two groups contained only three individuals with vastly different signal patterns from the remainder of the sample. These three individuals evidenced a great many high- and low-cost signals with multiples of both categories likely per post. These groups were differentiated by the ratio of high- to low-cost signaling. Two individuals in the Core 1 group used many more low-cost signals, with fewer high-cost signals. Though their total high-cost signal rate was higher than the majority of the other individuals, they made up a less substantial part of their signal usage. In contrast, the remaining individual in the Core 2 group was the only one where the high-cost signaling rate exceeded the low-cost signal rate. There are two possible explanations for these individuals. Though these individuals appear on the surface to exhibit vastly different signal patterns, the high rate of both high- and low-cost signals far exceeds any other participants in the study. This high rate of signaling is more indicative of the behaviors of core gang members observed offline than the specific rates of either type of signal. On one hand, these three individuals might simply represent outliers that have a randomly divergent signal patterns unrelated to gang affiliation and could therefore be excluded. However, an alternate explanation is that these individuals represent the core gang members. This explanation is likely the case for several reasons. First, the signal patterns for these individuals align with what is predicted of core gang members by the research, with high usage of gang specific signals across all categories (Densley & Pyrooz, 2017; Pyrooz & Densley, 2016). Second, these individuals make up 1% of the total sample. When comparing the number of core gang members found during in-person research studies, the percentages align (Esbensen et al., 2001). Additionally, specific item analysis of these three members indicates that coding and data collection errors are not the cause of their divergent patterns. Notably, when these core gang members are removed from the sample, cluster analysis loses precision, especially with regards to high-cost signals.

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Analyses with these participants excluded were only able to account for at most 59.8% of the variance for high-cost signaling in a 6-group solution ($p < .001$) and 30.0% of the high-cost signal variance in a 4-group solution ($p < .001$). Additionally, with these “core gang” groups retained, the percentage of all the groups identified in the 6-group cluster analysis aligned with the rate these groups appear in the general population in prior in-person research (Bureau, 2018; Center, 2015b; Meehan, 2000). This evidence suggests both that these individuals represent core gang members and their uniquely extreme signal patterns, and that the six-group solution is the most accurate method of understanding patterns of gang signaling.

The distribution of groups in the Total Communication Model is shown below (Figure 1). To increase visibility of the different groups, the axes are presented in logarithmic transformation. This transformation serves to better illustrate the distinctions and overlap between groups without distortion by high level of signaling demonstrated by the outliers. In addition, scaling logarithmically more closely reflects the differences between the largest groups with minimal gang signaling and moderate gang signaling more accurately.

Hypothesis 1 B - Self-Generated Communication Model.

Using the self-generated signal variables (Table 5), results indicated distinctions between groups of participants based on the quantity and type of signals in the same manner as when using the total signals variables, again partially supporting Hypothesis 1. As with the total-communication model, the predicted groups emerged with the expected patterns of high- and low-cost signals, and two additional small groups with highly divergent signal patterns were present. Also as with the total-communication model, a six-group solution provided explanation for a significant portion of the variance for both variables as illustrated in Table 5.

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Clustering solutions with four groupings similarly explained a sufficient portion of the variance, but two of the generated groupings were significantly heterogeneous to the extent that they provided less utility in differentiating participants by signaling characteristics. The six-cluster solution was selected based on a visual inspection of the dendrogram, level of variance explained by the solution and theoretical intelligibility of the clusters. Additionally, the symmetry provided by similar groupings in both of the two models enabled cross-model comparisons that would not have been possible otherwise.

As the groups share similar characteristics to the total-communication model, the same naming conventions were retained as represented in Table 6. The first “unaffiliated” group contained individuals with very low-levels of gang signaling. This group was the largest, comprising 55.33% of the sample. The “peripheral” group presented with a low level of low-cost signals and minimal high-cost signals. This was the second largest group making up 37.33% of the sample.

The two middle groupings again likely relate to individuals with a deeper commitment to their gang. The third largest “wannabe” group had a higher level of low-cost signals and infrequent high-cost signals. This “wannabe” group made up 3% of the sample. In contrast to the total-communication model, high-cost signaling patterns within this group were more homogenous with less variability. The fourth group aligned with the signaling patterns one would expect of active gang members, with higher rates of both low- and high-cost signaling. This “active” group made up 2.67% of the sample. Though these two groups remained more heterogeneous in the range of high-cost signal rates, they were more homogeneous than comparable groups in the total-communication model. The increased clarity of group distinctions for the self-generated model is shown in Figure 2. There were fewer instances of overlap

between the “unaffiliated” and “peripheral” group members making distinctions between these groups clearer and providing improved differentiation between these two levels of presumed affiliation. In contrast to the Total-Communication Model, these groups contained individuals with little to no high-cost signaling. “Active” and “peripheral” groups in the self-generated model consistently presented with more high-cost signals than individuals in lower affiliation groups.

The final two groups contained only four individuals, again with vastly different signal patterns than the remainder of the sample. These four individuals evidenced a great many high- and low-cost signals with multiples of both categories visible in almost every, publicly visible post during the study period. Three individuals fell into the Core 1 grouping with higher low-cost than high-cost signals. One individual fell into the Core 2 grouping with higher high-cost signals than low-cost signals. This was the same profile as in the total-communication model. In all cases, individuals in these two groups utilized many more high- and low-cost signals than individuals in any other group. Of these four individuals, item analysis showed that all three cases identified through the total-communication model were represented in these groups. The one additional member in Core 1 was classified as “active” in the prior analysis. Similar to the previous model, these individuals made up a small portion (1.33%) of the total sample.

The distribution of groups in the Self-Generated Communication Model is shown below (Figure 2). As with the total-communication model, data is visualized below using a logarithmic transformation of the axes to increase visibility of low-affiliation groupings.

Hypothesis 2 - Groupings Using Individual Signal Types

Hypothesis 2, which predicted the appearance of three distinct subgroupings in the data based on the use of individual signal types (“core” group with high levels of sexualized content,

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pejorative statements about other gangs, overt criminal acts, and endorsement of explicit gang membership; “wannabe” group with higher levels of criminality, sexualized content, and gang specific emoji; and “contemplating dissidence” group with higher rates of loss indicators and lower rates of all other forms of gang signaling), was not supported. Due to the greater level of homogeneity between groupings in the Self-Generated Communication Model, only self-generated signals were used for these analyses.

Self-generated communication using individual signal types was used to classify members using a hierarchical clustering analysis with Wards method. As in the previous analyses, this methodology was selected due to prior use to analyze social networking patterns in online communities through the creation of groups with minimized within-cluster variance.

To identify best fit, 15 clusters solutions were produced and separately analyzed using multiple regressions with signal type as the dependent variable and cluster membership as the independent variable (Table 7). This analysis identified group composition and size as well as provided information regarding the amount of the variance explained for each variable by the cluster solution (Barbot, 2018). Exploring cluster of was determined based on a visual inspection of the dendrogram, which suggested groupings beyond the first 15 would only provide additional groups of one to two cases (Table 8). Given that the purpose of the analysis was to identify commonalities between individuals, this was determined to be unaligned with this purpose and therefore solutions over 15 were not explored. The first 14 solutions were then evaluated through the variance explained by the cluster solution and theoretical intelligibility of the clusters.

This hypothesis was not substantiated through this analysis. None of the three anticipated categories were evident in the data. Visual inspection of the dendrogram indicated a consistent

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clustering pattern with one large group comprising the bulk of the sample with additional groupings comprising on average between one to three individuals for each subsequent stage. Cluster analysis using the 14 variables did not result in any single solution with a clear model nor did any of the groupings suggest the presence of any of the three hypothesized groupings (Table 7). Effect size statistics at the individual variable level did not explain a significant portion of the variance for any set of variables from the anticipated groupings nor did any clear patterns emerge from the data.

The hypothesized Core Gang grouping was not supported due to the removal of key variables. The categories of sexualized content and aggressive/pejorative speech were both dropped because of low inter-rater reliability difficulties. As indicated above in Table 1, sexualized content ($\kappa = -.152, p < 0.101$) and pejorative statements ($\kappa = -.029, p < 0.803$) against other gangs were variables with very low kappa and were thusly eliminated.

The hypothesized wannabe gang group with a pattern of elevated criminality, sexualized content, and gang specific emoji, did not emerge in the variable-level cluster analysis. In all of the clusters explored, there was no one grouping which contained elevated levels of all four predicted variables, rather individual groupings appeared to contain elevations in one to two of the signal types.

No predicted grouping with elevations in loss signals and lower levels of all other types of high- and low-cost gang signals emerged in any of the cluster solutions. Loss indicators were not predicted significantly at a level above chance in any of the 15 generated solutions. The low incidence of loss signals could have contributed to its insignificance in these analyses due to mathematical weighting of higher-frequency variables.

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No meaningful patterns emerged through this analysis. However, cluster models were mathematically generated with high frequency signals like gang names, hand signs and argot, which could have obfuscated patterns in the data. This is supported by the prior research that indicates that high-cost/low-frequency signals, such as tattoos and loss, that were not explained by the cluster models have strong validity for identifying an individual's current level of commitment to their gang (Carson & Vecchio, 2015; Densley & Pyrooz, 2017; Phelan & Hunt, 1998; Poljac & Burke, 2008; Rozycki Lozano et al., 2011; Valdemar, 2006). This suggests that, though the hypothesis was not supported by this analysis, a different statistical methodology could provide more clarity.

Discussion

The current study examined the degree to which gang-affiliated youth could be classified based on their use of social media to communicate their affiliation, and whether their affiliation communicated through social media was comparable to their offline communication of their affiliation and embeddedness. The findings supported the hypothesized four groupings representing “unaffiliated,” “peripheral,” “wannabe,” and “active” individuals differentiated by the type and amount of signaling in a manner that aligned with prior research. This study found an additional two groupings likely representing core gang members. These two “core” groups contained between three to four individuals with significantly higher signal rates than all other groupings. The three groupings hypothesized to emerge based on individual variable level clustering, representing “core” gang members, “wannabe” gang members, and members contemplating dissidence, were not found in the data.

Of the initial predicted groupings, two models were tested, one that grouped individuals on the basis of their own self-generated posts and a second which took into account all visible

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posts on the individual's page, including posts, comments and responses from associates. This total-communication model reflected current criminal justice policies which use known gang-affiliated associates as a key factor in gang identification ("Criminal street gang related crimes act," 2018).

While both total communication and self-generated hypotheses were mostly supported due to presence of clear groupings based on individual signal patterns, the self-generated communication model provided more distinctions between groupings with small increases in the sizes in lower-affiliation groupings, one additional "core gang" member, and fewer youth in the "wannabe" group. The rates of high- and low-cost signaling within reflected patterns measured in gang members off-line while the size of the groups within the total sample aligned with the assumed group's size when measured in the population.

Both self-generated and total-generated models were similar in the groupings identified with an additional unanticipated "core" groups which corresponded to a low-incidence portion of the population. This grouping was not anticipated to emerge in the sample and ended up necessitating two additional groupings to account for their highly divergent signal patterns. As the six-group model illuminated categories reflecting current understanding of gang affiliation, this suggests that this methodology is able to identify groupings with a higher level of differentiation than was initially predicted. This model does contain a level of ambiguity in mid-level clusters, most pronounced when using the total-communication model, due to the presence of overlap between unaffiliated and peripheral groupings, as well as the higher level of variance within wannabe and active groupings.

In both analyses, the high- and low-cost signal patterns of the six groups aligned with what was observed through in-person gang research. This body of research shows distinct

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differences in communication corresponding to the individual's level of affiliation similar to those found in the current investigation. These studies show a reliance on low-cost signaling for low-level gang affiliated youth (Estrada Jr et al., 2016; Goldman et al., 2014), comparable to what was found in the “tangential” group that presented with low levels of low-cost signaling and few to zero high-cost signals. High cost signal usage measured primarily in youth with the greatest level of embeddedness (Berger et al., 2017; Liverso & Matsueda, 2019; Pyrooz & Densley, 2016) similar to the patterns seen in active and core individuals. Additionally, in person research has shown a high level of low cost signaling in individuals seeking to increase their gang affiliation (Densley, 2012; Liverso & Matsueda, 2019; Pyrooz & Densley, 2016) that was mirrored in the pattern observed in the “wannabe” groupings. In addition, non-gang youth in areas with high level of gang prevalence have been shown to employ low-cost gang indicators at low levels (Curry et al., 2002), which was likewise observed in the “unaffiliated” groupings.

Both models agreed on the relative sizes of the high-affiliation groupings. The rates of these groups in the sample align with the relative sizes of these groups observed in the population. Both methods revealed a small group of outliers with large numbers of both high- and low-cost signals representing around 1% of the total sample. Current in-person studies likewise show between 1 to 2% core membership in the total gang population (Alleyne & Wood, 2010; Esbensen et al., 2001). The prevalence in the population of slightly under 5% active membership is comparable to the 3% of the sample that fell into the “active” in both self-generated and total communication models (Alleyne & Wood, 2010).

In contrast, both models provided slightly different group sizes for low-level affiliation groupings. Lower commitment groups were all larger in the self-generated model than the total-communication model. This was most evident when comparing the “wannabe” grouping. These

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individuals represented 8% of the total sample when accounting for other-generated communication but only 3% of the sample when relying on self-generated signals.

In addition, self-generated communication provided more clear distinctions between groups. This indicates that, when taking into account the communication patterns of their peers, many youth present as more deeply gang affiliated than they might actually be. Alternatively, it could suggest a differential personal orientation towards publicly sharing gang signals. Given the lack of personal contact with individuals during this study, it is impossible to definitively determine the meaning of this finding. The prevailing assumption that peer associations are a defining factor in gang affiliation could lead to erroneous overidentification of nongang members in many cases ("Criminal street gang related crimes act," 2018; Curry, 2000). Given the well documented, significant, negative consequences across the life-course for involvement in the criminal justice system (Brown, 2010; Núñez-Eddy, 2020; Ogle & Turanovic, 2016; Varano et al., 2011; Wakefield et al., 2016), the dichotomy between the prevailing legal definition and what is suggested by research, is crucially important to address.

A second distinction between the self-generated and total-communication models was in the clarity of groupings. The boundaries between groups in the total-communication model were blurrier, with a certain level of overlap between members on the edges of the group. Group boundaries in the self-generated model were more distinct. This can be explained by several factors. The self-generated model only accounts for the communication patterns of one individual, whereas the total-communication model has to account for multiple individuals who may be expressing their own differential levels of affiliation while simultaneously interacting with the target. Higher population sizes in higher affiliation groups could also reflect the propensity for youth to use Facebook as a recruitment tool as higher affiliation youth actively

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engage with individuals who they seek to engage more in their organization. Most importantly, the distinct classifications between levels of gang affiliation are an artificial construct of academics designed to better understand and explain a complex and multifaceted construction of personal identity (Leverso & Matsueda, 2019; Pyrooz & Densley, 2016). In reality, these distinctions exist on a spectrum, as illustrated by imperfections in the model.

Another outcome from this study was the utility of groupings based on aggregate variables when compared to individual signaling types. When exploring communication patterns on a variable level, there was excessive variation between individual use of communication types, limiting the ability to identify a usable pattern in the participants. Categories of communication patterns have been shown in current research to be aligned with individual personality and interest patterns (Correa et al., 2010; Gosling et al., 2011; Hodas & Butner, 2016; Stoughton et al., 2013). However, when accounting for the relative weight and cost of these signals, the similarities between these two individuals become more apparent, suggesting the importance of observing overall communication patterns over individual signal types.

This study provides evidence that raises further concern regarding the false dichotomy when classifying gang vs nongang that is commonly used in policing. Many “gang members” are likely, at most, only tangentially criminally involved. Rather, gang membership itself is a fluid and ill-defined identity. Therefore, labeling individuals as “gang members” may more likely reflect the biases of those whose experiences center mainly around those Black and Latinx youth with criminal backgrounds involved in the criminal justice system. The findings of this study suggest that Black and Latinx youth without criminal backgrounds but nonetheless acting in ways in which they seem to be on a trajectory leading to criminal behavior because of their tangential involvement with a “gang” can be identified by their communication patterns. Mental

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health providers, educators, community organizers, and other community stakeholders, can learn to interpret the language youth use to communicate their level of affiliation with each other and with a gang. This information could be used judiciously to better support individuals by targeting interventions directly to their level of affiliation. However, it is important to note that the hyperlocal and everchanging language of gang affiliation poses challenges to those seeking to encourage dissidence and prevention. The overarching implications of this study are that our current criminal justice system grossly over criminalizes Black and Latinx youth. Mandatory sentencing guidelines and enhancements based on gang membership should be reevaluated and hopefully eliminated. These biased labels are likely contributing factors to the well-documented overcriminalization and aggressive policing of Black and Hispanic youth.

Gang/Nongang is a False Dichotomy. There has long been a distinction between the academic and criminal justice definition of gang membership (Center, 2015b; "Criminal street gang related crimes act," 2018; Curry et al., 1994; Perrin, 2018; Sánchez-Jankowski, 2018). This study further supports the need for a theoretical shift from the dichotomous view of gang versus nongang to an understanding that gang membership existing on a spectrum. Though all members included in the study met the minimum requirements to be considered gang members in New York State, the communication patterns of individuals suggested that their level of embeddedness was vastly different. The majority of youth presented only as unaffiliated or peripherally affiliated. If that is the case, treating these youth in the same manner as heavily involved gang members is a highly ineffective way to reduce gang-related crime. This again supports recent calls to defund the police and replace much of the current retributive and punishment-based policies with social services and community based interventions.

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Gang Identification Subject to Biases. When making identifications, such as gang affiliation, that both rely on observer interpretation and impact the lives of the identified, using multi-factor identification methods that take into account observer interpretation are even more important. This study illustrates the presence of a great number of individuals who initially met criteria as “gang involved” but, upon further exploration, presented with very few gang signifiers. The greater size of low-affiliation groupings when clustering using only self-generated signals further reinforces this as it demonstrates that often youth appear to be more heavily involved than they actually are due to their peer associations.

It is a fact repeatedly illustrated by research, that individual interpretations of gang affiliation and criminal identity are easily skewed by an observer’s conscious or unconscious biases (Barvosa, 2014; Bass, 2001; Woods, 2011). Determining gang status is often directly tied to the race and social economic status of the individual (Crutchfield et al., 2012; Tapia, 2011). Additionally, identification by local police precincts as “gang affiliated” has been shown to increase police attention and harsher conduct from police when interacting in the community (Novich & Hunt, 2017; Tapia, 2011). This is a contributing factor to the well documented disproportionate arrest rate for Black and Hispanic males (Lytle, 2014; Spencer et al., 2016) and contributes directly to the more aggressive, punitive, and violent treatment by police and the criminal justice system (Morrow & Shjarback, 2019; Novich, 2018). Given the move to gang databases that record and share gang identified individuals across jurisdictional boundaries, an erroneous or overzealous identification can have lasting impacts on an individual even if it never leads to an arrest (D. U. Patton et al., 2017). This record of racial biases is especially salient in this study as the New York gang database directly uses online social media content to construct gang databases for use in arrest and trial (Díaz, 2019). The irony is that this pattern of

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criminalization also directly undercuts effective gang dissidence efforts by funneling all suspected gang-affiliated youth into the criminal justice system.

Are all individuals identified as gang members actually involved in criminal and deviant gang activity or is their involvement more indicative of neighborhood and cultural patterns? Is incarceration always the appropriate solution? In most cases youth involved in the study might naturally move away from their gang affiliation over time; however, by syphoning youth into the criminal justice system, we are having the opposite effect and pushing them further out of the mainstream and more deeply into their lives as gang members (Carson & Vecchio, 2015; Decker, Pyrooz, & Moule, 2014; O'Neal et al., 2016; Weerman et al., 2015).

The majority of the signals observed were low-cost indicators. This means that, though individuals were verbally endorsing gang affiliation and criminal acts, they most commonly did not show actual physical evidence of these explicit acts and beliefs. The presence of these statements is informative as it indicates the type of personal presentation the youth seek to cultivate in their social circle. However, these interpretations are inferential. No explicit connection was made between an individual's stated affiliations and any actual offline criminal connections or gang engagement. This means that, though these groupings can provide information regarding a person's likely state of mind and can be inferred to relate to their offline activities, they should not be used to make definitive judgements regarding the activities of youth in the real world. This distinction is important. Criminal justice agencies regularly use suspected gang members' social media profiles as a component of criminal prosecution (Behrman, 2015; D. U. Patton et al., 2017). The data from this study should not be used to further that agenda.

Targeting Interventions.

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This study demonstrated the potential for utilizing historical Facebook data for studying social interactions that are often invisible to outsiders. Observing authentic interpersonal interactions is especially challenging when attempting to understand subcultures as an outside observer. The availability of such a wealth of authentic interpersonal communication is an important resource for researchers. The utility of this methodology opens up the possibility of a great number of research opportunities at a lower cost and time investment than traditional in-person methods though at the cost of direct person-to-person interaction. In particular, one could design a longitudinal study using historical Facebook data to explore the ways in which gang signaling changes over time in a way similar to how this study collected historical data from a single timeframe. Using Facebook accounts to identify patterns in signaling between incarcerated youth could potentially identify salient indicators to target interventions prior to criminal justice involvement or identifying youth who are particularly at risk for serious injury or death.

This study further supports the inaccuracies of current gang law. Instead, the ability to make inferences regarding an individual's level of gang affiliation through observational data can be used to more effectively implement proactive gang dissidence interventions. Providing training and financing to community organizations already embedded in the community to more effectively identify an individual's level of commitment to their gang would enable individuals to more effectively target interventions to that individual's level of need. It would be tempting to think of an online tool that could screen social media profiles for specific patterns of communication as were identified in this study. However, this is not necessarily something that could be easily implemented. The hyperlocal and ever fluid nature of gangs and their associated signaling makes broader implementation of a gang activity screener for online usage very challenging (Aspholm, 2016; Patton et al., 2019). Though many of the signals used in this study

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are broadly applicable to North American gangs today, an equal number are regionally and temporally specific. The checklist designed for this study is not necessarily applicable to gang affiliated youth living outside Brownsville in 2017.

Research shows that youth with lower levels of affiliation respond more positively to psychosocial and community based interventions. Understanding and identifying individuals' varying levels of gang affiliation would enable concrete improvements in gang dissidence and prevention efforts. Across a wide range of studies, gang prevention interventions have shown only modest success. In particular, interventions targeting reduction in delinquency through active engagement on a community level show greater successes in decreasing gang involvement and at a significantly lower price suppression efforts (Arbreton & McClanahan, 2002; Esbensen, 2004; Howell, 2010; Wong et al., 2016). In addition, gang prevention strategies that rely on police suppression are especially ineffective (Stinchcomb, 2002; Thornberry et al., 2018).

In contrast, school and community-based approaches that target specific small-scale local populations have a higher rate of effectiveness (Sellers et al., 1998; Stinchcomb, 2002; Thurman et al., 1996). Current research indicates that the most effective gang-preventions are targeted at the individual's level of affiliation (Alleyne & Wood, 2010; Carson & Vecchio, 2015; Lenzi et al., 2015; Roman et al., 2017; Varano et al., 2011). This is especially true in long-involved core gang members (Berger et al., 2017). Additionally, individuals actively contemplating disengagement will respond differently to interventions than those who continue to define their identity through their affiliation (Densley & Pyrooz, 2017).

Therefore, to prevent negative individual and community outcomes, appropriate psychosocial and community interventions should be implemented to divert increased affiliation of these low-affiliated individuals. These discrepant outcomes combined with the overreliance of

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the criminal justice system on ineffective and inhumane punitive consequences over effective and humane rehabilitative and psychosocial measures strongly support current calls to transfer these funds from the police to effective mental health and community organizations.

Additionally, funding is needed for increasing alternative activities for youth in the most underserved communities. Providing funding to create nongang opportunities for career development, social interaction, leadership opportunities, and social support will help provide alternatives for youth who might otherwise fulfil these unmet needs through gang membership.

Understanding the ways youth communicate levels of gang affiliation is especially salient for school psychologists. School psychologists are on the front line for individual and systemic interventions targeting youth at all levels of gang involvement. Understanding and interpreting gang-specific signals would help school psychologists working with school communities to educate, inform, and implement school based interventions and programs targeted at individual need. For unaffiliated and peripheral youth in highly gang-affiliated areas, psychologists can provide supports to help navigate their relationships with other, potentially gang-involved peers and family. Providing afterschool programs with alternatives for gang membership can help divert wannabe youth before they become fully enmeshed in the gang. More intensive therapeutic interventions can then be used to target youth actively engaged in gang activities and provide support for those who seek to disengage once already involved. In addition, explicit teacher training can help provide support and education for staff that work closest with the greatest number of students. Training can help them both to understand the differences between youth who appear gang involved and are actively criminal and to provide additional ways to identify youth most at risk who might benefit from the most intensive interventions.

Limitations

A major limitation of this study is the difficulty of directly confirming the relation between level of embeddedness, criminality, and public social media communication patterns. This study instead explores the degree to which online patterns of signaling mirror or diverge from what prior research has shown to take place offline. Individuals' level of embeddedness can be inferred from the individuals' rate of publicly presented online signals. Higher levels of group-specific signals were interpreted to indicate increased commitment to the gang with high-cost signals indicating the greatest level of gang affiliation. As direct confirmation of this association would not be possible without additional offline data, these interpretations can only be inferential for this study.

This current study was unable to control for age effects in the participants, primarily due to the incomplete and inaccurate age data presented by individuals online. Current research suggests that there may be a link between the age of the participant and how the individuals interact online (Whittaker et al., 2020). Specifically, younger gang affiliated youth may present a more public profile online with older members keeping a lower profile across social media platforms (Whittaker et al., 2020). However, inability to control for age-based social media usage patterns could have contributed an uncontrolled variable that distorted the resultant groupings.

Additionally, the current study was limited by the sample size of 300 individuals. Though this was sufficient to demonstrate patterns using aggregate signals, the breakdown of individual categories was too ambitious given the relative infrequency of certain types of high-cost indicators. The limitations of this sample size were most evidenced in studying the patterns of low-incidence subgroupings. In particular, the supposition that the unanticipated outlier cases

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were indicative of core gang members and individuals contemplating dissidence is tentative.

Increasing the sample size would allow for more definitive patterns in these individuals to emerge or their online behaviors to more clearly stand out as divergent. This likewise impacted the ability to identify patterns in communication using individual variable types. Were more data to be available, it is possible that important patterns would emerge.

Likewise, what is missing from this study is feedback from gang members themselves. Though observational data gives an important look into the lives and experiences of gang affiliated youth, their personal experience and understanding of their own gang affiliation is an important factor that is not well understood. What personal meaning gang signals have in their own lives and social interactions is an important factor both in understanding the roles that gangs play in their lives and identities as well as understanding potential prosocial alternatives, community resources and alternative social supports that would fill those roles.

An additional limitation of the current study is in the limited population studied. Contemporary research has shown that differences in the structural hierarchy, individual level interactions, recruitment practices and day-to-day functioning of gangs are often related to ethnic and racial composition of the group (Esbensen & Winfree, 1998; Grund & Densley, 2012, 2014). As this study only explored the gangs within the Brownsville area of Brooklyn, NY, the study was limited to the African American and Afro Caribbean ethnic and racial composition of gangs in that area (Bureau, 2018). The true breadth and diversity of gang composition was not explored. Therefore, the applicability of this study might not be directly translatable to gangs in other ethnic/racial makeups or from other geographic areas. Likewise, as this study explored online interactions during the 2017 calendar year on the Facebook platform, the codebook used is likely no longer an effective tool. This is both due to the ever-changing language gang

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members use, as well as changes in the social media ecosystem making observing historic activity more difficult. Social media trends are moving away from the Facebook style of content engagement centered on long-term documentation towards more transitory models of self-expression with abbreviated 24-hour time-limited posts in the style of Snapchat, such as time-limited Instagram stories and Facebook stories (Anderson & Jiang, 2018; Perrin & Anderson, 2019).

The role of sexual orientation was not explored. This has been an understudied area across gang research – especially the experiences of LGBTQ+ individuals within this space. (Panfil, 2020). There has historically been a homophobic culture around gang membership (Bray & Davis, 2019). This has been shown to impact the way that gay, lesbian, bisexual, and pansexual individuals engage with, and express, their gang affiliation (Bray & Davis, 2019). This was not explored and is important.

Women are in gangs. As are transgender individuals. An active attempt to include non-cisgender male participants was made but these individuals were more difficult to find that met criteria for inclusion in the study. Only one openly transgender individual was found for inclusion in the study, though other transgender individuals may have been included without direct knowledge of their transition. Cisgender female participants were likewise challenging to identify and include in the study. Of note, this is due in part to the fact that female candidates often did not meet criteria for inclusion. There is a body of research that explores the ways in which female gang members interact differently with their affiliation which would likely directly impact signal patterns (Belknap & Bowers, 2016; Bjerregaard & Smith, 1993; Deuchar et al., 2020; O’Neal et al., 2016).

Recommendations and Implications

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Future research is needed to target both individuals at their varying levels of need and identification, as well as increasing awareness of these distinctions in the organizations and agencies that work most closely with gang affiliated youth. This includes school personnel, social workers, and individuals involved in the criminal justice system. Additionally, this research supports the need for broader systemic changes that adjust the manner in which we as a society conceptualize gang affiliated youth. Not every human with gang affiliations is a hardened unrepentant criminal and it does a disservice to the communities that gangs exist in to treat them as such. These findings should likewise be used to inform the practice of psychologists working with youth in these communities, both to better inform their clinical work and to better support the teachers, administrators, doctors and community members that work with youth who have gang affiliations.

Conclusions

Gang affiliation has typically been viewed through a criminal justice lens, identifying individuals as gang or nongang - a methodology that has led to the classification of youth with even low-levels of gang connections as criminal gang members. This false dichotomy has direct implications for the type and quality of services to which youth in gang-impacted neighborhoods have access. Instead of clinically validated psychosocial and community lead interventions, youth are instead funneled into the criminal justice system. This serves both to strip communities of their human resources whilst increasing the criminality of youth with tangential gang involvement (Gushue & Wong, 2018; Hazlehurst, 2018; Winfree Jr et al., 1992). The current study built on previous research into the ways in which youth use group-specific signals to communicate varying levels of commitment to the gang through the use of online social media profiles. The findings support current academic understanding that there are varied but consistent

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patterns in ways youth communicate their affiliation and suggests that the majority of youth identified under criminal statutes as gang-involved are likely only loosely affiliated to actual criminal organizations. These findings suggest that the current dichotomous gang/nongang definition utilized in policing and criminal justice erroneously over criminalizes the vast majority of youth accused of gang offenses.

However, a reliance on these broader patterns can overlook some important signals with lower frequency of usage. In particular, loss signaling and visible brands and tattoos, both were important indicators of an individual's identification with the gang and commitment to continued membership that were not observable as relevant in the contexts of this study due to their lower incidence.

References

- (NYPD), P. D. (2019a). *NYPD Shooting Incident Data (Historic)*
- (NYPD), P. D. (2019b). *NYPD Shooting Incident Data (Year To Date)*
- Alhabash, S., & Ma, M. (2017). A tale of four platforms: Motivations and uses of Facebook, Twitter, Instagram, and Snapchat among college students? *Social Media+ Society*, 3(1), 2056305117691544.
- Allen, W. (2010, 2010-11-24). The Color of Success: African-American College Student Outcomes at Predominantly White and Historically Black Public Colleges and Universities [research-article]. <http://dx.doi.org/10.17763/haer.62.1.wv5627665007v701>. <https://doi.org/WV5627665007V701>
- Alleyne, E., & Wood, J. L. (2010). Gang involvement: Psychological and behavioral characteristics of gang members, peripheral youth, and nongang youth. *Aggressive behavior*, 36(6), 423-436.
- Alleyne, E., & Wood, J. L. (2012). Gang membership: The psychological evidence. In *Youth gangs in international perspective* (pp. 151-168). Springer.
- Alonso, A. (1998). Urban graffiti on the city landscape. *San Diego State University*.
- Anderson, M., & Jiang, J. (2018). Teens, social media & technology 2018. *Pew Research Center*, 31, 2018.
- Arbreton, A. J., & McClanahan, W. S. (2002). Targeted Outreach: Boys & Girls Clubs of America's Approach to Gang Prevention and Intervention.
- Aristeidou, M., Scanlon, E., & Sharples, M. (2017). Profiles of engagement in online communities of citizen science participation. *Computers in Human Behavior*, 74, 246-256.
- Aspholm, R. R. (2016). " *This Ain't the Nineties*": *Chicago's Black Street Gangs in the Twenty-First Century* University of Illinois at Chicago].
- Barbot, B. (2018). *Cluster Analysis [Power Point Lecture]*.
- Barvosa, E. (2014). Unconscious bias in the suppressive policing of Black and Latino men and boys: neuroscience, Borderlands theory, and the policymaking quest for just policing. *Politics, Groups, and Identities*, 2(2), 260-283.

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

Bass, S. (2001). Policing space, policing race: Social control imperatives and police discretionary decisions. *Social Justice*, 28(1 (83), 156-176.

Battenfield, F. L. (2013). The culture of communication in athletics. *Routledge handbook of sport communication*, 441-449.

Bazarova, N. N. (2012). Public intimacy: Disclosure interpretation and social judgments on Facebook. *Journal of Communication*, 62(5), 815-832.

Bazarova, N. N. (2015). Online disclosure. *The International Encyclopedia of Interpersonal Communication*, 1-10.

Bazarova, N. N., & Choi, Y. H. (2014). Self-disclosure in social media: Extending the functional approach to disclosure motivations and characteristics on social network sites. *Journal of Communication*, 64(4), 635-657.

Behrman, M. (2015). When gangs go viral: Using social media and surveillance cameras to enhance gang databases. *Harv. JL & Tech.*, 29, 315.

Belknap, J., & Bowers, M. (2016). Girls and Women in Gangs. *The Wiley Handbook on the Psychology of Violence*, 211-225.

Bergen-Cico, D. K., Haygood-El, A., Jennings-Bey, T. N., & Lane, S. D. (2014). Street addiction: A proposed theoretical model for understanding the draw of street life and gang activity. *Addiction Research & Theory*, 22(1), 15-26.

Berger, R., Abu-Raiya, H., Heineberg, Y., & Zimbardo, P. (2017). The process of desistance among core ex-gang members. *American Journal of Orthopsychiatry*, 87(4), 487.

Bjerregaard, B., & Smith, C. (1993). Gender differences in gang participation, delinquency, and substance use. *Journal of Quantitative Criminology*, 9(4), 329-355.

Boxer, P., Veysey, B., Ostermann, M., & Kubik, J. (2015). Measuring gang involvement in a justice-referred sample of youth in treatment. *Youth violence and juvenile justice*, 13(1), 41-59.

Braga, A. A., Welsh, B. C., & Schnell, C. (2015). Can policing disorder reduce crime? A systematic review and meta-analysis. *Journal of Research in Crime and Delinquency*, 52(4), 567-588.

[Record #767 is using a reference type undefined in this output style.]

Brown, D. (2010). The limited benefit of prison in controlling crime. *Current Issues in Criminal Justice*, 22(1), 137-148.

[Record #1106 is using a reference type undefined in this output style.]

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

Callais, M. A. (2005). Helping fraternity and sorority members understand ritual. *Oracle: The Research of Journal of the Association of Fraternity Advisors*, 1(1), 32-37.

Carson, D. C., & Esbensen, F.-A. (2019). Gangs in school: exploring the experiences of gang-involved youth. *Youth violence and juvenile justice*, 17(1), 3-23.

Carson, D. C., & Vecchio, J. M. (2015). Leaving the Gang. *The handbook of gangs*, 257.

[Record #282 is using a reference type undefined in this output style.]

[Record #305 is using a reference type undefined in this output style.]

Correa, T., Hinsley, A. W., & De Zuniga, H. G. (2010). Who interacts on the Web?: The intersection of users' personality and social media use. *Computers in Human Behavior*, 26(2), 247-253.

Criminal street gang related crimes act, A05141, New York State Assembly (2018).
https://assembly.state.ny.us/leg/?default_fld=&bn=A05141&term=2017&Summary=Y&Actions=Y&Text=Y&Committee%26nbspVotes=Y&Floor%26nbspVotes=Y

Crutchfield, R. D., Skinner, M. L., Haggerty, K. P., McGlynn, A., & Catalano, R. F. (2012). Racial disparity in police contacts. *Race and Justice*, 2(3), 179-202.

Ctr, N. G., & America, U. S. o. (2015). Parents' Guide to Gangs.

Curry, G. D. (2000). Self - reported gang involvement and officially recorded delinquency. *Criminology*, 38(4), 1253-1274.

Curry, G. D., Ball, R. A., & Fox, R. J. (1994). *Gang crime and law enforcement recordkeeping*. US Department of Justice, Office of Justice Programs, National Institute of Justice.

Curry, G. D., Decker, S. H., & Egley Jr, A. (2002). Gang involvement and delinquency in a middle school population. *Justice Quarterly*, 19(2), 275-292.

Décary-Hétu, D., & Morselli, C. (2011). Gang Presence in Social Network Sites. *International Journal of Cyber Criminology*, 5(2).

Decker, S. H., & Pyrooz, D. C. (2015). *The handbook of gangs*. John Wiley & Sons.

Decker, S. H., Pyrooz, D. C., & Moule, R. K. (2014). Disengagement from gangs as role transitions. *Journal of Research on Adolescence*, 24(2), 268-283.

Decker, S. H., Pyrooz, D. C., Sweeten, G., & Moule Jr, R. K. (2014). Validating self-nomination in gang research: Assessing differences in gang embeddedness across non-, current, and former gang members. *Journal of Quantitative Criminology*, 30(4), 577-598.

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

- Densley, J. A. (2012). Street gang recruitment: Signaling, screening, and selection. *Social Problems*, 59(3), 301-321.
- Densley, J. A., Cai, T., & Hilal, S. (2014). Social dominance orientation and trust propensity in street gangs. *Group Processes & Intergroup Relations*, 17(6), 763-779.
- Densley, J. A., & Pyrooz, D. C. (2017). A signaling perspective on disengagement from gangs. *Justice Quarterly*, 1-28.
- Deuchar, R., Harding, S., McLean, R., & Densley, J. A. (2020). Deficit or credit? A comparative, qualitative study of gender agency and female gang membership in Los Angeles and Glasgow. *Crime & Delinquency*, 66(8), 1087-1114.
- Dias, D., & Sá, M. J. (2014). Initiation rituals in university as lever for group cohesion. *Journal of Further and Higher Education*, 38(4), 447-464.
- Díaz, Á. (2019). New York City Police Department Surveillance Technology. *Brennan Center for Justice October 4th*.
- Dierkhising, C. B., Lane, A., & Natsuaki, M. N. (2014). Victims behind bars: A preliminary study of abuse during juvenile incarceration and post-release social and emotional functioning. *Psychology, Public Policy, and Law*, 20(2), 181.
- Drout, C. E., & Corsoro, C. L. (2003). Attitudes toward fraternity hazing among fraternity members, sorority members, and non-Greek students. *Social Behavior and Personality: an international journal*, 31(6), 535-543.
- Esbensen, F.-A. (2004). *Evaluating GREAT: A school-based gang prevention program*. US Department of Justice, Office of Justice Programs, National Institute of
- Esbensen, F.-A., Deschenes, E. P., & Winfree, L. T. (1999). Differences between gang girls and gang boys results from a multisite survey. *Youth & Society*, 31(1), 27-53.
- Esbensen, F.-A., Huizinga, D., & Weiher, A. W. (1993). Gang and non-gang youth: Differences in explanatory factors. *Journal of Contemporary Criminal Justice*, 9(2), 94-116.
- [Record #279 is using a reference type undefined in this output style.]
- Esbensen, F.-A., Winfree, L. T., He, N., & Taylor, T. J. (2001). Youth gangs and definitional issues: When is a gang a gang, and why does it matter? *Crime & Delinquency*, 47(1), 105-130.
- Estrada, J., Huerta, A. H., Hernandez, E., Hernandez, R., & Kim, S. (2018). Socio-ecological risk and protective factors for youth gang involvement. *The handbook of violence in education: Forms, factors, and preventions*, 185-202.

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

- Estrada Jr, J. N., Gilreath, T. D., Astor, R. A., & Benbenishty, R. (2016). A statewide study of gang membership in California secondary schools. *Youth & Society*, 48(5), 720-736.
- Fessler, D. M., Holbrook, C., & Dashoff, D. (2016). Dressed to kill? Visible markers of coalitional affiliation enhance conceptualized formidability. *Aggressive behavior*, 42(3), 299-309.
- Fleisher, M. S., & Krienert, J. L. (2004). Life - course events, social networks, and the emergence of violence among female gang members. *Journal of community psychology*, 32(5), 607-622.
- Forber-Pratt, A. J., & Espelage, D. L. (2018). A Qualitative Investigation of Gang Presence and Sexual Harassment in a Middle School. *Journal of Child and Family Studies*, 27(6), 1929-1939.
- Forsyth, D. R. (2009). *Group dynamics*. Cengage Learning.
- Garot, R. (2007). "Where You From!" Gang Identity as Performance. *Journal of Contemporary Ethnography*, 36(1), 50-84.
- Gilman, A. B., Hill, K. G., & Hawkins, J. D. (2014). Long-term consequences of adolescent gang membership for adult functioning. *American journal of public health*, 104(5), 938-945.
- Goldman, L., Giles, H., & Hogg, M. A. (2014). Going to extremes: Social identity and communication processes associated with gang membership. *Group Processes & Intergroup Relations*, 17(6), 813-832.
- Gosling, S. D., Augustine, A. A., Vazire, S., Holtzman, N., & Gaddis, S. (2011). Manifestations of personality in online social networks: Self-reported Facebook-related behaviors and observable profile information. *Cyberpsychology, Behavior, and Social Networking*, 14(9), 483-488.
- Gravel, J., Wong, J. S., & Simpson, R. (2018). Getting in people's faces: On the symbiotic relationship between the media and police gang units. *Deviant Behavior*, 39(2), 257-273.
- Grund, T. U., & Densley, J. A. (2012). Ethnic heterogeneity in the activity and structure of a Black street gang. *European Journal of Criminology*, 9(4), 388-406.
- Grund, T. U., & Densley, J. A. (2014). Ethnic Homophily and Triad Closure: Mapping Internal Gang Structure Using Exponential Random Graph Models. *Journal of Contemporary Criminal Justice*, 1043986214553377.

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

- Gushue, K., & Wong, J. S. (2018). "When You Choose to be a Gangbanger, You Deserve Everything You Get": Victim Dichotomization, Fear, and the Problem Frame. *Journal of Contemporary Criminal Justice*, 34(4), 364-382.
- Hagan, J., & Dinovitzer, R. (1999). Collateral consequences of imprisonment for children, communities, and prisoners. *Crime and justice*, 26, 121-162.
- Hall, D. L., Cohen, A. B., Meyer, K. K., Varley, A. H., & Brewer, G. A. (2015). Costly signaling increases trust, even across religious affiliations. *Psychological Science*, 26(9), 1368-1376.
- Hansen, L. L., & Freitag, M. E. (2016). "Come on Now, I Want to See Blood!": Choreographed Violence in Gang Initiation Rites. In *Global Perspectives on Youth Gang Behavior, Violence, and Weapons Use* (pp. 1-18). IGI Global.
- Hayward, R. A., & Honegger, L. (2014). Gender Differences in Juvenile Gang Members: An Exploratory Study. *Journal of Evidence-Based Social Work*, 11(4), 373-382 310p.
<https://doi.org/10.1080/10911359.2014.897110>
- Hazlehurst, K. (2018). Media Depictions and Public Discourses on Juvenile 'Gangs' in Melbourne, 1989-1991. In *Gangs and Youth Subcultures* (pp. 221-244). Routledge.
- Heer, J., & Boyd, D. (2005). Vizster: Visualizing online social networks. IEEE Symposium on Information Visualization, 2005. INFOVIS 2005.,
- Hethorn, J. (1994). Gang identity or self-expression? Researchers look beyond the surface of "gang clothing" and appearance. *California Agriculture*, 48(7), 44-48.
- Hodas, N. O., & Butner, R. (2016). How a user's personality influences content engagement in social media. International Conference on Social Informatics,
- Hodkinson, P., & Deicke, W. (2007). *Youth cultures: scenes, subcultures and tribes* (Vol. 10). Routledge.
- Holman, M., Johnson, J., & Holman, M. (2004). A search for a theoretical understanding of hazing practices in athletics. *Making the team: Inside the world of sport initiations and hazing*, 50-60.
- Howell, J. C. (2010). Gang Prevention: An Overview of Research and Programs. *Juvenile Justice Bulletin. Office of Juvenile Justice and Delinquency Prevention*.
- Howell, J. C., & Egley Jr, A. (2005). Moving risk factors into developmental theories of gang membership. *Youth violence and juvenile justice*, 3(4), 334-354.
- Huff, C. R., & Barrows, J. (2015). Documenting gang activity: Intelligence databases. *The handbook of gangs*, 59-77.

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

- Jensen, E., Swaner, R., Picard-Fritsche, S., & Hynynen, S. (2016). The Brownsville Anti-Violence Project. *Center for Court Innovation*.
- Johnson, A. L., Crawford, M. T., Sherman, S. J., Rutchick, A. M., Hamilton, D. L., Ferreira, M. B., & Petrocelli, J. V. (2006). A functional perspective on group memberships: Differential need fulfillment in a group typology. *Journal of Experimental Social Psychology*, 42(6), 707-719.
- Johnston, H. (2013). Resource Brief: Gangs. Inquiry Response. *Principals' Partnership*.
- Kiesling, S. F. (1998). Men's identities and sociolinguistic variation: The case of fraternity men. *Journal of Sociolinguistics*, 2(1), 69-99.
- King L, H. K., Dragan KL, Driver CR, Harris TG, Gwynn RC, Linos N, Barbot O, Bassett MT. (2015). Community Health Profiles 2015, Brooklyn Community District 16: Brownsville. 40(59), 1-16.
- Krims, A. (2007). *Music and urban geography*. Taylor & Francis.
- Krohn, M. D., Ward, J. T., Thornberry, T. P., Lizotte, A. J., & Chu, R. (2011). The cascading effects of adolescent gang involvement across the life course. *Criminology*, 49(4), 991-1028.
- Lauger, T. R., & Densley, J. A. (2018). Broadcasting badness: Violence, identity, and performance in the online gang rap scene. *Justice Quarterly*, 35(5), 816-841.
- Lenzi, M., Sharkey, J., Vieno, A., Mayworm, A., Dougherty, D., & Nylund - Gibson, K. (2015). Adolescent gang involvement: The role of individual, family, peer, and school factors in a multilevel perspective. *Aggressive behavior*, 41(4), 386-397.
- Leverso, J., & Matsueda, R. L. (2019). Gang Organization and Gang Identity: An Investigation of Enduring Gang Membership. *Journal of Quantitative Criminology*, 1-33.
- Ley, D., & Cybriwsky, R. (1974). Urban graffiti as territorial markers. *Annals of the association of American geographers*, 64(4), 491-505.
- Lozon, J., & Bensimon, M. (2017). A systematic review on the functions of rap among gangs. *International Journal of Offender Therapy and comparative criminology*, 61(11), 1243-1261.
- Lytle, D. J. (2014). The effects of suspect characteristics on arrest: A meta-analysis. *Journal of Criminal Justice*, 42(6), 589-597.
- Meehan, A. J. (2000). The organizational career of gang statistics: The politics of policing gangs. *The Sociological Quarterly*, 41(3), 337-370.

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

[Record #1064 is using a reference type undefined in this output style.]

Melde, C., & Esbensen, F. A. (2011). Gang membership as a turning point in the life course. *Criminology*, 49(2), 513-552.

Miller, W. B. (1958). Lower class culture as a generating milieu of gang delinquency. *Journal of social issues*, 14(3), 5-19.

Milligan, G. W., & Cooper, M. C. (1987). Methodology review: Clustering methods. *Applied psychological measurement*, 11(4), 329-354.

Morrow, W. J., & Shjarback, J. A. (2019). Police worldviews, unconscious bias, and their potential to contribute to racial and ethnic disparities in New York Police Department (NYPD) stops for reason of “furtive movement”. *Journal of ethnicity in criminal justice*, 17(3), 269-298.

Morselli, C., & Décary-Héту, D. (2013). Crime facilitation purposes of social networking sites: A review and analysis of the ‘cyberbanging’ phenomenon. *Small Wars & Insurgencies*, 24(1), 152-170.

Neely, D. E. (1997). The social reality of African American street gangs. *Journal of Gang Research*, 4(2), 37-46.

Newman, P. R., & Newman, B. M. (1976). Early adolescence and its conflict: Group identity versus alienation. *Adolescence*, 11(42), 261-274.

Novich, M. (2018). Policing American Gangs and Gang Members. In *Oxford Research Encyclopedia of Criminology and Criminal Justice*.

Novich, M., & Hunt, G. (2017). “Get off me”: Perceptions of disrespectful police behaviour among ethnic minority youth gang members. *Drugs: education, prevention and policy*, 24(3), 248-255.

Núñez-Eddy, E. (2020). *The Coalescence of Education and Criminal Justice in the United States: The School-Prison Nexus and the Prison-Industrial Complex in a Capitalist Society* Arizona State University].

O’Neal, E. N., Decker, S. H., Moule, R. K., & Pyrooz, D. C. (2016). Girls, Gangs, and Getting Out Gender Differences and Similarities in Leaving the Gang. *Youth Violence and Juvenile Justice*, 14(1), 43-60.

Ogle, M. R., & Turanovic, J. J. (2016). Is getting tough with low-risk kids a good idea? The effect of failure to appear detention stays on juvenile recidivism. *Criminal Justice Policy Review*, 0887403416682299.

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

- Panfil, V. R. (2020). "I was a homo thug, now I'm just homo": Gay gang members' desistance and persistence. *Criminology*, 58(2), 255-279.
- Patton, D., Patel, S., Hong, J. S., Ranney, M. L., Crandall, M., & Dungy, L. (2017). Tweets, gangs, and guns: a snapshot of gang communications in detroit. *Violence and victims*, 32(5), 919-934.
- Patton, D. U., Brunton, D.-W., Dixon, A., Miller, R. J., Leonard, P., & Hackman, R. (2017). Stop and frisk online: theorizing everyday racism in digital policing in the use of social media for identification of criminal conduct and associations. *Social Media+ Society*, 3(3), 2056305117733344.
- Patton, D. U., Eschmann, R. D., & Butler, D. A. (2013). Internet banging: New trends in social media, gang violence, masculinity and hip hop. *Computers in Human Behavior*, 29(5), A54-A59.
- Patton, D. U., Eschmann, R. D., Elsaesser, C., & Bocanegra, E. (2016). Sticks, stones and Facebook accounts: What violence outreach workers know about social media and urban-based gang violence in Chicago. *Computers in Human Behavior*, 65, 591-600.
- Patton, D. U., Hong, J. S., Ranney, M., Patel, S., Kelley, C., Eschmann, R., & Washington, T. (2014). Social media as a vector for youth violence: A review of the literature. *Computers in Human Behavior*, 35, 548-553.
- Patton, D. U., Pyrooz, D., Decker, S., Frey, W. R., & Leonard, P. (2019). When Twitter fingers turn to trigger fingers: A qualitative study of social media-related gang violence. *International Journal of Bullying Prevention*, 1(3), 205-217.
- [Record #1063 is using a reference type undefined in this output style.]
- Perrin, A., & Anderson, M. (2019). Share of US adults using social media, including Facebook, is mostly unchanged since 2018. *Pew Research Center*, 10.
- Phelan, M. P., & Hunt, S. A. (1998). Prison gang members' tattoos as identity work: The visual communication of moral careers. *Symbolic Interaction*, 21(3), 277-298.
- Phillips, S. A. (2016). Deconstructing gang graffiti. *Routledge handbook of graffiti and street art*, 104-121.
- Pitts, J. (2017). Whatever happened to the family? England's new gang strategy. *Safer Communities*, 16(1), 32-40.
- Poljac, B., & Burke, T. (2008). Erasing the past: Tattoo-removal programs for former gang members. *FBI L. Enforcement Bull.*, 77, 13.

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

- Pyrooz, D. C. (2014a). From colors and guns to caps and gowns? The effects of gang membership on educational attainment. *Journal of Research in Crime and Delinquency*, 51(1), 56-87.
- Pyrooz, D. C. (2014b). "From your first cigarette to your last dyin' day": The patterning of gang membership in the life-course. *Journal of Quantitative Criminology*, 30(2), 349-372.
- Pyrooz, D. C., Decker, S. H., & Moule Jr, R. K. (2015). Criminal and routine activities in online settings: Gangs, offenders, and the Internet. *Justice Quarterly*, 32(3), 471-499.
- Pyrooz, D. C., & Densley, J. A. (2016). Selection into Street Gangs: Signaling Theory, Gang Membership, and Criminal Offending. *Journal of Research in Crime and Delinquency*, 53(4), 447-481.
- Pyrooz, D. C., Sweeten, G., & Piquero, A. R. (2012). Continuity and change in gang membership and gang embeddedness. *Journal of Research in Crime and Delinquency*, 0022427811434830.
- Pyrooz, D. C., Turanovic, J. J., Decker, S. H., & Wu, J. (2016). Taking Stock of the Relationship Between Gang Membership and Offending A Meta-Analysis. *Criminal Justice and Behavior*, 43(3), 365-397.
- Richardson, B. L., Macon, T. A., Mustafaa, F. N., Bogan, E. D., Cole-Lewis, Y., & Chavous, T. M. (2015, June 2015). Associations of racial discrimination and parental discrimination coping messages with African American adolescent racial identity. *Journal Of Youth And Adolescence*, 44, 1301-1317. <https://doi.org/10.1007/s10964-014-0196-6>
- Roman, C. G., Decker, S. H., & Pyrooz, D. C. (2017). Leveraging the pushes and pulls of gang disengagement to improve gang intervention: findings from three multi-site studies and a review of relevant gang programs. *Journal of crime and justice*, 40(3), 316-336.
- Rozycki Lozano, A. T., Morgan, R. D., Murray, D. D., & Varghese, F. (2011). Prison tattoos as a reflection of the criminal lifestyle. *International Journal of Offender Therapy and comparative criminology*, 55(4), 509-529.
- Sanchez-Jankowski, M. (1991). *Islands in the street: Gangs and American urban society*. Univ of California Press.
- Sánchez-Jankowski, M. (2018). Gangs, Culture, and Society in the United States. *Outlaw Motorcycle Clubs and Street Gangs: Scheming Legality, Resisting Criminalization*, 25-43.
- Sellers, C. S., Taylor, T. J., & Esbensen, F.-A. (1998). Reality check: Evaluating a school-based gang prevention model. *Evaluation Review*, 22(5), 590-608.

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

- Seul, J. R. (1999). Ours is the way of god': Religion, identity, and intergroup conflict. *Journal of peace research*, 36(5), 553-569.
- Shelley, W. W., & Peterson, D. (2018). "Sticks and Stones May Break My Bones, But Bullying Will Get Me Bangin'": Bullying Involvement and Adolescent Gang Joining. *Youth violence and juvenile justice*, 1541204018809841.
- Sierra-Arevalo, M., & Papachristos, A. V. (2015). Social network analysis and gangs. *The handbook of gangs*, 157-177.
- Siibak, A. (2009). Constructing the self through the photo selection-visual impression management on social networking websites. *Cyberpsychology: Journal of psychosocial research on cyberspace*, 3(1).
- Snoek, J. A. (2014). Masonic Rituals of Initiation. *Brill Handbooks on Contemporary Religion*, 321.
- Sosis, R. (2004). The adaptive value of religious ritual: Rituals promote group cohesion by requiring members to engage in behavior that is too costly to fake. *American Scientist*, 92(2), 166-172.
- Sosis, R. (2006). Religious Behaviors, Badges, and Bans: Signaling Theory and the Evolution of Religion. In P. McNamara (Ed.) *Where God and science meet* (pp. 61-86). The Hebrew University of Jerusalem.
- Sosis, R., & Bressler, E. R. (2003). Cooperation and commune longevity: A test of the costly signaling theory of religion. *Cross-cultural research*, 37(2), 211-239.
- Spencer, K. B., Charbonneau, A. K., & Glaser, J. (2016). Implicit bias and policing. *Social and Personality Psychology Compass*, 10(1), 50-63.
- Spergel, I. A. (1990). Youth gangs: Continuity and change. *Crime and justice*, 12, 171-275.
- Sprinthall, N. A., & Collins, W. A. (1984). *Adolescent psychology: A developmental view*. Random House New York, NY.
- Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Annual review of psychology*, 52(1), 83-110.
- Stinchcomb, J. B. (2002). Promising (and not-so-promising) gang prevention and intervention strategies: A comprehensive literature review. *Journal of Gang Research*, 10(1), 27-46.
- Stoughton, J. W., Thompson, L. F., & Meade, A. W. (2013). Big five personality traits reflected in job applicants' social media postings. *Cyberpsychology, Behavior, and Social Networking*, 16(11), 800-805.

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

- Stretesky, P. B., & Pogrebin, M. R. (2007). Gang-related gun violence socialization, identity, and self. *Journal of Contemporary Ethnography*, 36(1), 85-114.
- Tapia, M. (2011). US juvenile arrests: Gang membership, social class, and labeling effects. *Youth & Society*, 43(4), 1407-1432.
- Tarrant, M. (2002). Adolescent peer groups and social identity. *Social Development*, 11(1), 110-123.
- Thornberry, T. P., Kearley, B., Gottfredson, D. C., Slothower, M. P., Devlin, D. N., & Fader, J. J. (2018). Reducing crime among youth at risk for gang involvement: A randomized trial. *Criminology & Public Policy*, 17(4), 953-989.
- Thornberry, T. P., Krohn, M. D., Lizotte, A. J., & Chard-Wierschem, D. (1993). The role of juvenile gangs in facilitating delinquent behavior. *Journal of Research in Crime and Delinquency*, 30(1), 55-87.
- Thurman, Q. C., Giacomazzi, A. L., Reisig, M. D., & Mueller, D. G. (1996). Community-based gang prevention and intervention: An evaluation of the neutral zone. *Crime & Delinquency*, 42(2), 279-295.
- Tolan, P. H., Gorman-Smith, D., & Henry, D. B. (2003, March 2003). The developmental ecology of urban males' youth violence. *Developmental Psychology*, 39, 274-291. <https://doi.org/10.1037/0012-1649.39.2.274>
- Valdemar, R. (2006). Murder Ink: If You Know How To Read Them, Gang Tattoos Can Tell You the History of a Suspect. *Police: The Law Enforcement Magazine*, 30(2), 30-32.
- Van Vugt, M., & Hart, C. M. (2004). Social identity as social glue: the origins of group loyalty. *Journal of Personality and Social Psychology*, 86(4), 585.
- Varano, S. P., Huebner, B. M., & Bynum, T. S. (2011). Correlates and consequences of pre-incarceration gang involvement among incarcerated youthful felons. *Journal of Criminal Justice*, 39(1), 30-38.
- Vigil, J. D. (1988). Group processes and street identity: Adolescent Chicano gang members. *Ethos*, 16(4), 421-445.
- Wakefield, S., Lee, H., & Wildeman, C. (2016). Tough on crime, tough on families? Criminal justice and family life in America. *The Annals of the American Academy of Political and Social Science*, 665(1), 8-21.
- Weerman, F. M., Lovegrove, P. J., & Thornberry, T. (2015). Gang membership transitions and its consequences: Exploring changes related to joining and leaving gangs in two countries. *European Journal of Criminology*, 12(1), 70-91.

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

- West, J. S. (2016). *The Gang that Plays Together, Stays Together: An Exploratory Analysis of Patterns of Association and Cohesion in Los Angeles Street Gangs* University of California, Irvine].
- Whittaker, A., Densley, J., & Moser, K. S. (2020). No two gangs are alike: The digital divide in street gangs' differential adaptations to social media. *Computers in Human Behavior*, 106403.
- Wijeratne, S., Balasuriya, L., Doran, D., & Sheth, A. (2016). Word embeddings to enhance twitter gang member profile identification. *arXiv preprint arXiv:1610.08597*.
- Wijeratne, S., Doran, D., Sheth, A., & Dustin, J. L. (2015). Analyzing the social media footprint of street gangs. *Intelligence and Security Informatics (ISI), 2015 IEEE International Conference on*,
- Winfrey Jr, L. T., Fuller, K., Vigil, T., & Mays, G. L. (1992). The definition and measurement of 'gang status': Policy implications for juvenile justice. *Juvenile and Family Court Journal*, 43(1), 29-37.
- Wingood, G. M., DiClemente, R. J., Crosby, R., Harrington, K., Davies, S. L., & Hook, E. W. (2002). Gang involvement and the health of African American female adolescents. *Pediatrics*, 110(5), e57.
- Wong, J. S., Gravel, J., Bouchard, M., Descormiers, K., & Morselli, C. (2016). Promises kept? A meta-analysis of gang membership prevention programs. *Journal of Criminological Research, Policy and Practice*, 2(2), 134-147.
- Woods, J. B. (2011). Systemic Racial Bias and RICO's Application to Criminal Street and Prison Gangs. *Mich. J. Race & L.*, 17, 303.
- Zackasee, T. R. (2004). *Prison Gang Tattoo Recogniton: A Correctional Officer's Survival Guide* Youngstown State University].
- Zhao, S., Grasmuck, S., & Martin, J. (2008). Identity construction on Facebook: Digital empowerment in anchored relationships. *Computers in Human Behavior*, 24(5), 1816-1836.

Tables and Figures

Table 1

Means and Standard Deviations of Self-Generated and Total (Self- and Other-Generated) Signal Type Use Frequencies and Rates
(Frequencies of Specific Signal Types Out of Total Posts)

	Self-generated Signals				Total Signals			
	Frequency		Rate		Frequency		Rate	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Low-cost								
Argot	25.81	67.23	7.44	14.15	37.02	83.27	11.36	20.55
Attire	1.43	4.96	1.43	7.70	2.61	8.79	2.05	9.44
Colors	1.84	5.43	2.37	10.40	3.27	10.10	2.97	11.51
Emoji	23.30	71.90	6.28	12.63	32.46	90.26	9.47	17.87
Gang names	11.21	35.20	5.84	16.96	15.13	46.32	7.36	20.97
Hand signs	12.60	27.65	13.07	29.05	22.17	44.08	19.78	41.64
Symbols	0.11	0.84	0.05	0.31	0.28	2.33	0.08	0.48
Stated CJ	10.45	24.14	3.91	12.39	13.61	29.36	4.86	13.35
Stated drugs	12.75	27.06	3.05	5.03	16.81	34.28	3.87	6.06
Total Low-Cost	99.49	196.17	11.05	21.80	143.35	266.97	15.93	29.66
High-cost								
Criminal justice involvement	4.10	9.56	5.21	42.75	4.82	10.82	5.53	42.83
Loss	3.22	9.04	1.30	4.40	3.91	11.09	1.54	5.23
Overt crime	0.74	3.57	0.46	3.61	1.32	5.58	0.74	5.62
Overt drug use	3.19	9.91	3.47	15.87	5.80	22.13	4.20	16.11
Risky Behavior	0.53	3.61	0.70	6.35	0.93	6.84	1.05	7.91
Tattoo	0.25	1.52	0.18	1.20	0.33	1.65	0.21	1.23
Total High-Cost	12.02	3.89	2.00	3.89	17.12	36.63	2.85	6.10

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

Table 2

Cohen's Kappa Testing Inter-rater Reliability by Variable

	Total			Self-Generated		
	K	P	Asymptotic Standard error	K	P	Asymptotic Standard Error
Argot	.583	<.001	.120	.644	<.001	.126
Attire	.629	<.001	.232	.778	<.001	.212
Colors	.237	.019	.194	.294	<.001	.226
Emoji	.583	<.001	.136	.524	<.001	.149
Gang Names	.580	<.001	.135	.643	<.001	.132
Hand Signs	.755	<.001	.103	.873	<.001	.082
Pejorative statements	-.029	.803	.020	-.029	.803	.020
Symbols	.333	.060	.289	.455	.013	.325
Stated CJ Involvement	.689	<.001	.152	.647	<.001	.166
Stated Drug Use	.756	<.001	.125	.836	<.001	.112
Sexualized content	.152	.101	.133	.189	.274	.169
Initial Low-cost	.621	<.001	.110	.518	<.001	.114
Low-cost Without Unsuitable Variables	.700	<.001	.110	.658	<.001	.112
Overt CJ involvement	.733	<.001	.137	.733	<.001	.137
Loss	.835	<.001	.160	.835	<.001	.160
Overt Crime	1.000	<.001	.000	1.000	<.001	.000
Overt Drug	.834	<.001	.100	.916	<.001	.078
Tattoo	.298	.067	.159	.487	.013	.013
High-cost	.804	<.001	.103	.805	<.001	.101
Initial Total Signals	.620	<.001	.111	.668	<.001	.112
Total Signals Without Unsuitable Variables	.700	<.001	.110	.705	<.001	.110

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

Table 3

Variance Explained According to Cluster Solution for Total Signal Model

<i>Total Signal rate</i>	<i>3 group</i>			<i>4 group</i>			<i>5 group</i>			<i>6 group</i>		
	η^2	<i>F</i>	<i>p</i>	η^2	<i>F</i>	<i>p</i>	η^2	<i>F</i>	<i>p</i>	η^2	<i>F</i>	<i>p</i>
<i>Low-cost</i>	.810	142.73	< .001	.834	100.48	< .001	.836	169.99	< .001	.946	130.48	< .001
<i>High-cost</i>	.583	493.87	< .001	.848	372.02	< .001	899	351.97	< .001	.892	327.32	< .001

Table 4

Group Means and Standard Deviations for Total Communication Model After Clustering at the Six-Group Level

	N	Low-Cost Signal Rate		High-Cost Signal Rate	
		Mean	Standard Deviation	Mean	Standard Deviation
Group 1 – Unaffiliated	154	19.73*	10	3.777*	7.01
Group 2 – Peripheral	108	64.61*	21.95	7.81*	8.29
Group 3- Wannabe	23	148.32*	36.68	39.18*	56.84
Group 4 – Active	11	279.19*	70.17	52.62*	51.53
Group 5- Core 1	2	894.12*	8.319	188.24*	16.638
Group 6- Core 2	1	500.00*	---	700.00*	---

* Between group difference significant at $p < .001$

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

Table 5

Variance Explained According to Cluster Solution for Self-Generated Signal Model

<i>Signal Types</i>	<i>3 group</i>			<i>4 group</i>			<i>5 group</i>			<i>6 group</i>		
	η^2	<i>F</i>	<i>p</i>	η^2	<i>F</i>	<i>p</i>	η^2	<i>F</i>	<i>p</i>	η^2	<i>F</i>	<i>p</i>
<i>Low-cost</i>	.813	252.03	< .001	.924	178.25	< .001	.910	174.47	< .001	.931	162.17	< .001
<i>High-cost</i>	.665	533.68	< .001	.834	646.29	< .001	.844	454.66	< .001	.931	487.74	< .001

Table 6

Group Means and Standard Deviations for Self-Generated Communication Model After Clustering at the Six-Group Level

	Total Group Membership	Mean	Low-cost Signal Rate		High-cost Signal Rate	
			Standard Deviation	Mean	Standard Deviation	Mean
Group 1 - Unaffiliated	166	12.87*	7.802	2.91*	6.104	
Group 2 - Peripheral	112	53.06*	22.263	8.48*	10.424	
Group 3 - Wannabe	10	215.45*	50.022	2.00*	6.325	
Group 4 - Active	8	156.67*	81.727	115.00*	50.990	
Group 5 - Core 1	3	509.80*	16.981	105.88*	100.518	
Group 6 – Core 2	1	500.0*	---	700.00*	----	

* Between group difference significant at $p < .001$

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

Table 7

Variance Explained According to Cluster Solution for Variable-Level Signal Model

Signal Types	2 Group		3 Group		4 Group		5 Group		6 Group		7 Group		8 Group		9 Group	
	η^2	F	η^2	F	η^2	F	η^2	F	η^2	F	η^2	F	η^2	F	η^2	F
Argot	.137*	47.145	.278*	57.298	.330*	48.606	.438*	57.524	.466*	51.391	.467*	42.861	.479*	38.406	.503*	36.787
Attire	.000	0.035	.056*	8.771	.058*	6.072	.560*	93.812	.564*	76.042	.607*	75.307	.607*	64.329	.615*	58.049
Colors	.000	0.052	.099*	16.339	.105*	11.632	.326*	35.69	.332*	29.201	.357*	27.171	.358*	23.217	.369*	21.27
Emoji	.001	0.248	.049*	7.731	.280*	38.296	.280*	28.625	.294*	24.525	.344*	25.553	.344*	21.828	.500*	36.418
Gang names	.103*	34.386	.323*	70.948	.627*	165.532	.629*	124.899	.705*	140.334	.707*	117.933	.710*	102.342	.730*	98.254
Hand signs	.139*	48.074	.597*	220.249	.692*	221.955	.712*	182.393	.714*	146.975	.858*	295.569	.870*	279.399	.887*	284.823
Stated cj involvement	.202*	75.374	.402*	99.887	.411*	68.866	.917*	57.548	.438*	45.889	.439*	38.174	.441*	32.85	.456*	30.462
Stated drug involvement	.001	0.369	.002	0.356	.022	2.242	.438*	1.676	.032**	1.929	.032	1.615	.032	1.379	.051**	1.959
Symbols	.000	0.023	.001	0.167	.001	0.111	.001	0.083	.001	0.066	.001	0.056	.001	0.048	.001	0.042
Overt cj involvement	.886*	2325.373	.894*	1254.514	.917*	1086.481	.022	812.108	.974*	2206.662	.976*	1986.204	.976*	1696.65	.977*	1523.391
Overt crime	.000	0.016	.035*	5.355	.133*	15.132	.000	11.311	.180*	12.928	.200*	12.175	.200*	10.4	.294*	15.154
Overt loss	.000	0.087	.004	0.637	.004	0.423	.867	0.316	.004	0.252	.049*	2.52	.049*	2.153	.049**	1.877
Overt drug use	.000	0.012	.070*	11.255	.336*	32.884	.000*	24.58	.650*	29.809	.655*	24.767	.904*	21.156	.904*	173.736
Tattoo	.000	0.022	.001	0.163	.001**	0.108	.988	0.081	.001	0.064	.006	0.304	.006	0.26	.006	0.227

* Between group difference significant at $p < .050$

** Between group difference significance at $p < .010$

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

Cluster Solution	10 Group	11 Group	12 Group	13 Group	14 Group	15 Group
	η^2 F	η^2 F	η^2 F	η^2 F	η^2 F	η^2 F
Argot	.550* 39.461	.640* 51.283	.640* 46.464	.811* 102.943	.812* 95.003	.812* 87.908
Attire	.615* 51.422	.639* 51.198	.843* 140.743	.844\$ 129.654	.845* 119.589	.845* 110.659
Colors	.379* 19.69	.414* 20.379	.578* 35.925	.579* 32.854	.579* 30.264	.585* 28.672
Emoji	.500* 32.261	.502* 29.103	.502* 26.366	.570* 31.679	.709* 53.522	.709* 49.525
Gang names	.734* 88.773	.792* 109.934	.793* 100.052	.802* 96.943	.818* 98.824	.827* 96.996
Hand signs	.908* 317.576	.911* 296.706	.935* 375.971	.935* 344.253	.935* 318.76	.935* 294.956
Stated cj involvement	.717* 81.74	.763* 92.976	.763* 84.257	.767* 78.769	.768* 72.856	.913* 214.549
Stated drug	.051** 1.735	.108* 3.513	.108* 3.184	.109* 2.914	.110* 2.707	.110* 2.505
Symbols	.001 0.037	.001 0.033	.002 0.043	.002 0.043	.002 0.046	.002 0.043
Overt cj involvement	.977* 1349.472	.979* 1328.266	.979* 1204.298	.979* 1103.377	.979* 1016.309	.979* 940.416
Overt crime	.294* 13.424	.578* 39.533	.656* 49.929	.656* 45.664	.656* 42.034	.656* 38.895
Overt loss	.049** 1.663	.049 1.492	.067* 1.869	.007* 2.003	.083* 1.983	.083* 1.835
Overt drug use	.904* 153.901	.905* 143.765	.907* 130.358	.907* 121.814	.908* 132.608	.908* 122.705
Tattoo	.006 0.201	.006 0.18	.009 0.233	.012 0.29	.014 0.303	.014 0.281

* Between group difference significant at $p < .050$

** Between group difference significance at $p < .010$

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

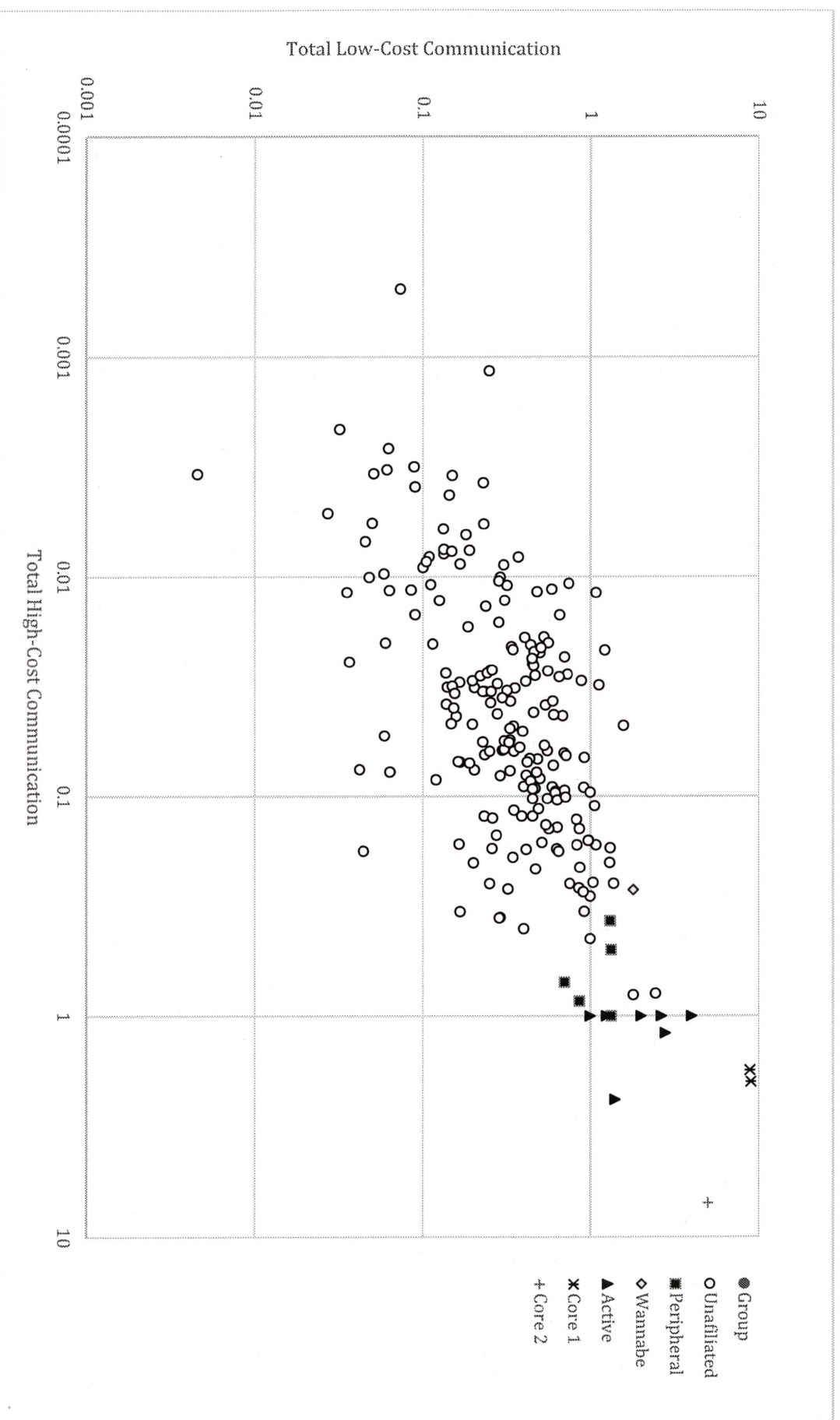
Table 8

Group Size According to Cluster Solution for Variable-Level Signal Model

<i>Cluster Solution</i>	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>Group Size</i>														
<i>1</i>	299	286	286	286	286	263	263	263	263	263	263	228	228	228
<i>2</i>	1	13	4	4	3	3	3	2	2	1	1	1	1	1
<i>3</i>	---	1	9	1	1	23	23	23	23	23	19	35	30	30
<i>4</i>	---	---	2	8	8	1	1	1	1	1	4	19	19	19
<i>5</i>	--	--	--	1	1	8	5	1	1	1	1	4	5	5
<i>6</i>	--	--	--	--	1	1	1	5	3	3	1	1	4	4
<i>7</i>	--	--	--	--	--	1	1	1	1	1	3	1	1	1
<i>8</i>	--	--	--	--	--	--	3	1	1	1	1	3	1	1
<i>9</i>	--	--	--	--	--	--	--	3	3	3	1	1	3	3
<i>10</i>	--	--	--	--	--	--	--	--	2	1	3	1	1	1
<i>11</i>	--	--	--	--	--	--	--	--	--	2	1	3	1	1
<i>12</i>	--	--	--	--	--	--	--	--	--	--	2	1	3	2
<i>13</i>	--	--	--	--	--	--	--	--	--	--	--	2	1	1
<i>14</i>	--	--	--	--	--	--	--	--	--	--	--	--	2	1
<i>15</i>	--	--	--	--	--	--	--	--	--	--	--	--	--	2

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

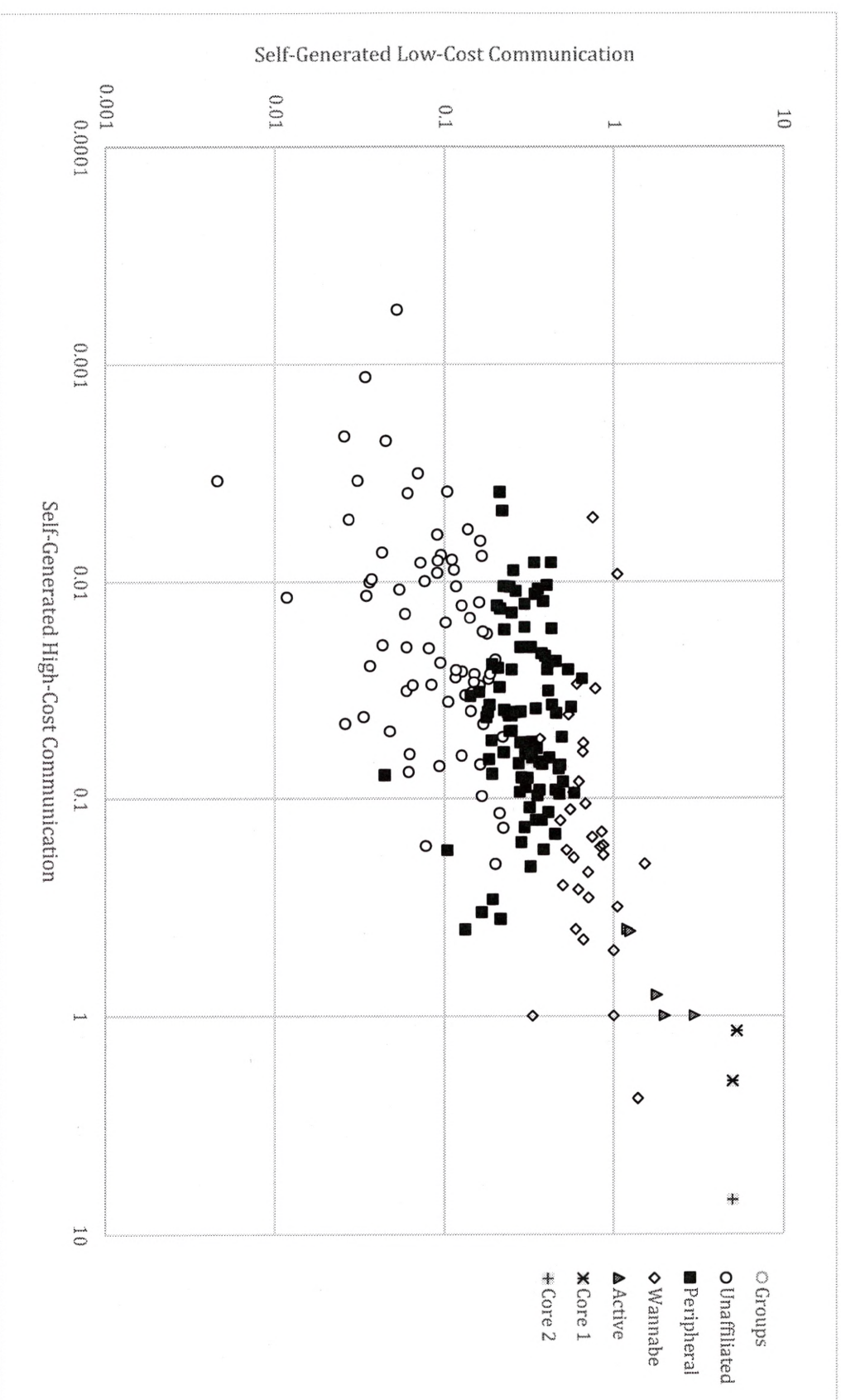
Figure 1: *Total Communication Model Group Distribution*



PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

Figure 2

Self-Generated Communication Model Group Distribution



PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

Appendices

Codebook

meaning	Signal	Meaning/notes	Symbol	Meaning	function of communication	
argot	fam		Yada	drug	status	folk
			2 meanings - 1. low-blood killer; 2. high-stating that a robbery is in progress		High Risk - bolded	
argot	Whooply	2:11				
argot	k/c substitution				Low Risk - nonbolded	Crip
argot	Poppin'				intergroup conflict - can be gang/gang or gang/outside	
argot	CKK	Crips and king kila				
	k instead of c					
argot	YG	young gangsters			expression of isolation and loss	
argot	ck				endorsement of group norms (criminality etc.)	
argot	crack				group cohesion	
argot	crackin				restatement of identity	
argot	Cuzz					
argot	folk					
argot	rack					
attire	left hand tattoos, piercings etc.	→ more on attire in differentiation criteria			notes:	
emoji	👊 (+ other	gang			"the island" - Rikers - code C1	
emoji	fuel pump)	gang			loud = weed - code stated drugs	
emoji	black flag	Gang – often but not always folk			v.i - visit incarcerated individual - code C1	
emoji	👊	(often blood related-not always)			shine day - birthday - argot	
emoji	👊					

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

emoji	👤		magic 8 ball	folk/crip alliance				
emoji	🔪							
emoji	👤							
emoji	🌀	twirlies						
emoji	👍							
emoji	👍👍	<-- the thumbs should be pointing towards each other						
emoji	💯							
emoji	👤							
gang name	183	1-8 trey gangstas						
gang name	Addicted to Cash (YG)							
gang name	five nine/ 59							
gang name	GKB	(gangsta killer blood)						
gang name	HoodStars							
gang name	HSB							
gang name	FOA	family over all - be careful b/c lowercase foa often means fuck outa here						
gang name	M.O.B.	nine trey gangstas						
gang name	NTG	nine trey gangstas						
gang name	OOC Gam							
gang name	prettyboy gangsta							

CFs = close friends NG

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

gang name	WHG5					
gang name	SMM	(scorpio gang?)	HGF - Hattian gorilla family			
gang name	823	eight deuce trey	K900?			
gang name	4GZ					
gang name	500 Blue Notes					
gang name	55 C					
gang name	BFG					
gang name	BG'Z					
gang name	BGD	black gangsta disciples	Dropping Rakes (Dipping Rakes, Slamming Rakes) is a diss aimed at the Gangster Disciples (GDs) gang.			
gang name	BGD 247	more black gangsta disciples				
gang name	GSC	G stone Crips				
gang name	NBC	new born crips				
gang name	Sakky Matthew					
gang name	Saratoga Playboys/gurls					
When coding – err down If unsure if high vs. low cost → code low If unsure if gang related → omit entirely						
DIFFERENTIATING CODING CATEGORIES						
Signal		If		then		
Colored bandana		Tied following gang conventions		Attire		
		Worn in standard form		Colors		
		Drawn/printed on clothing		symbol		
Known gang imagery		A component of a tattoo		tattoo		
		Direct evidence of gang association in post		Loss		
		No direct evidence in post but other direct evidence in surrounding posts		Loss		
Funeral reference/image		No evidence or unclear evidence		omit		
		Pictorial evidence (photos of cards, pictures from visits)		Overt CI		
		Use of hashtags related to		Stated CI		
Incarceration of an associate						

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

							incarceration #freepersonsname	
gang name	Smash crips						Direct evidence of direct contact – sharing phone numbers/passing messages	Overt CJ
gang name	UGC	united gangsta crips					Explicit time-linked references to court dates without pictures of attending	Stated CJ
gang name	Wave Gang						Explicit time-linked reference to own court dates with or without pictures	Overt CJ
gang name	ZAE						Posting from jail made by self (or through an associate on own timeline)	Overt CJ
gang name	861 crew						Non time-linked references to CJ involvement	Stated CJ
							To indicate overt vs stated – must be provable – it is provable if someone went to court at a date and time however, talking about an associate's specific court date is unclear the level of personal involvement therefore this is considered only stated	
argot	31st of month anniversary	initiation						
argot	blessed in	initiation						
argot	loc-ed	initiation						
loss	death	count things that are clockable i.e. - If a picture is attached or a specific profile is tagged - More abstract hashtags or reposts are counted in "stated crime"						

PREDICTING GANG EMBEDDEDNESS THROUGH PUBLIC SOCIAL MEDIA PRESENCE

loss	funeral	pictures of funerals - be sure they are gang related - some kids have grandparents etc. posted which would not count – when in doubt leave it out						
loss	jail	as with death/loss, only count this category if a specific individual is directly connected to the poster or the post is actionable (i.e. Visiting, talking to the person) also include mentions of their own court dates or arrests						
Symbol	5 blood sets			Any mentioned signs/emoji/visuals utilized in a pictorial context – can be apparel design, wall hangings, graffiti, jewelry				
Symbol	5 point crown							
Symbol	5 point star							
Symbol	bleeding heart							
Symbol	bulldog							
Symbol	razorblade			Any mentioned signs/emoji/visuals utilized in a pictorial context – can be apparel design, wall hangings, graffiti, jewelry				
Symbol	6 point star							
Symbol	BK	blood killer						
Symbol	Jewish star							
Symbol	pitchfork							
symbol	Pyrex	used for cooking crack - code in context ("stated drug")						
tattoo	3 burn mark							
tattoo	outlaw							
tattoo	thug life							

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