ABSTRACT

Title of Thesis:	EXAMINING THE RELATIONSHIP BETWEEN JUVENILE CO-OFFENDING EXPERIENCE AND ADULT CRIMINAL BEHAVIOR
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Criminologists have long known that the majority of criminal behavior is committed by young offenders and that the bulk of these offenses are committed with accomplices. Prior work has focused on how the timing of onset is related to distinct criminal trajectories, but minimal research has considered how committing crimes with accomplices during adolescence may be associated with divergent criminal pathways. To address this research void, the current study uses Shannon's (1982) Racine birth cohort data to test the relationship between juvenile co-offending experience and later criminal engagement. Some theories suggest that the relationship may be negative, while others suggest that the relationship may be positive. Results indicate that the proportion of juvenile co-offenses is not related to later criminal engagement, but having a higher number of co-offenses in adolescence predicts more adult offending. Implications, limitations, and directions for future research are discussed.

EXAMINING THE RELATIONSHIP BETWEEN JUVENILE CO-OFFENDING
EXPERIENCE AND ADULT CRIMINAL BEHAVIOR

By

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Chapter 1: Introduction and Literature Review

For nearly a century, criminologists have known that criminal behavior is disproportionately committed by young offenders and that the majority of these offenses are committed with accomplices. In fact, the most frequently documented feature of juvenile delinquency is its group nature (McGloin & Nguyen, 2012; McGloin & Stickle, 2011; Reiss & Farrington, 1991; Warr, 2002). Unfortunately, empirical research on this issue remains scarce and underdeveloped (McGloin & Stickle, 2011). One of the most troubling features of the extant literature is the tendency for scholars to treat co-offending as merely a descriptive attribute of the criminal event, rather than recognizing that it may carry a unique meaning in and of itself. Given the prevalence of group offending among young offenders, the paucity of research examining juvenile co-offending patterns, processes, and consequences is problematic because there are several reasons to suspect that committing crimes with accomplices may be related to criminal pathways (McGloin & Nguyen, 2014).

One particularly important gap in the literature is analyzing the relationship between juvenile co-offending experiences and later criminal involvement. Prior work has investigated how an individual's age of onset is related to criminal trajectories, but few studies have specifically analyzed how committing crimes with accomplices during adolescence might reflect divergent criminal pathways. Indeed, several theories suggest that the tendency for young offenders to commit crimes with others may serve as a marker or an indication of the likelihood of future criminal involvement during adulthood. This void in the literature impedes criminologists' understanding of how participating in group crime during adolescence may impact one's embeddedness in a criminal lifestyle.

Therefore, examining juvenile co-offending experiences is an important domain of criminological inquiry because it could provide insight into the continuation of (or desistance from) subsequent criminal engagement. Given it is known that group crime is primarily characteristic of juvenile delinquency, addressing this particular research gap may advance the development of theory, general empirical knowledge, and intervention strategies for young offenders.

Drawing from theoretical discussions about group crime and criminal trajectories, the current study seeks to investigate how juvenile co-offending experiences may be related to later criminal involvement. It is plausible for one to hypothesize that juveniles who offend with accomplices may have different criminal trajectories than juveniles who offend alone. Specifically, this study proposes the following hypotheses:

1. Juvenile co-offending will be negatively related to later criminal engagement.

2. Juvenile co-offending will be positively related to later criminal engagement.

3. Gender will condition the relationship between juvenile co-offending experiences and later criminal engagement.

This thesis uses official police contact data from Shannon's (1982) Racine birth cohort study, which report offending behaviors for individuals during adolescent and adult years, including information on how many people were involved in the criminal event. The goal of the current research is to provide additional insight into how engaging in group crime during adolescence may reflect divergent criminal trajectories.

Theories of Co-offending

Criminologists have long known that crime is often not a lone enterprise (Weerman, 2003). In fact, several studies demonstrate that most offenders work with others at some point in their careers (Conway & McCord, 2002; McCarthy, Hagan, & Cohen, 1998; Reiss & Farrington, 1991; Weerman, 2003). When at least two people commit a crime together, it is called a co-offense (Felson, 2009). Several scholars have offered some reasons that people co-offend.

Why Individuals Co-offend

There are at least two situational perspectives that explain why an individual may commit crimes with accomplices during adolescence due to the social nature of a group setting. For instance, Osgood, Wilson, O'Malley, Bachman, and Johnston (1996) theorize that during adolescence, spending unstructured, unsupervised time with peers promotes criminogenic behavior for a few reasons. First, when no authority figure is present, people feel freer to test out deviant behaviors. Second, without an agenda, there is nothing to keep people focused on any type of particular behaviors. Third, when adolescents are in a group setting, there is something naturally rewarding about engaging in deviance or being a part of a group behavior. Osgood et al. (1996) argue that even if everyone in the group is prosocial, the situation can lend itself to delinquency because in the presence of peers, deviant acts will be easier and more rewarding. Though this is not explicitly a co-offending theory, it does suggest that due to the unstructured, unsupervised nature of the situation, spending time with peers during adolescence may often result in delinquency (i.e., group offending).

In addition, Granovetter's (1978) threshold model suggests that an individual's decision to partake in a given collective behavior is conditional on the actions of the people around them. He argues that people have different thresholds, which he describes as the proportion of people who must partake in the behavior before they decide to join in. Granovetter suggests that when in a group setting, an individual's threshold serves as a tipping point (the point at which they believe that participating in the action will maximize their utility) in decision making. McGloin and Rowan (2015) take Granovetter's (1978) threshold model of collective behavior and apply it to collective criminal behavior. Specifically, they look at how individual and situational level factors shape a person's decision to engage in group crime. McGloin and Rowan's (2015) threshold model suggests that when people make decisions about whether or not to engage in group crime, they take into account the behavior of other people. They argue that one of the most salient factors of this decision making process is the absolute number of people involved. For instance, they suggest that if a situation prompts individuals to identify as part of an in-group that shares a social identity, this may prime them to behave in a manner consistent with the goals or shared interests of the group (including group deviance). Essentially, they argue that in group settings, some individuals will decide to partake in a collective criminal event if they see enough other people doing it.

Alternatively, some scholars suggest that people commit crimes with accomplices because it provides them with gains that committing crimes alone cannot. For example, McCarthy, Hagan, and Cohen (1998) suggest that "criminal cooperation" is a process in which individuals willingly pool their resources in the pursuit of shared illegal goals. They argue that co-offending poses potential benefits such as criminal accomplices providing

additional information, skills, and resources that can amplify opportunities and rewards of crime. McCarthy and colleagues (1998) suggest that for some offenders, recognizing the potential value of criminal cooperation may provide them with the motivation and willingness to trust other criminals, and to co-offend. Similarly, Weerman (2003) suggests that co-offending is a form of social exchange. He argues that people may offend with others because they can obtain material goods (such as sharing the "catch" and payment) or immaterial goods (such as social approval and acceptance) from their accomplices. Accordingly, Weerman (2003) argues that people may co-offend because this potential exchange of goods can satisfy an array of physical, economic, social, and psychological desires that offending alone simply cannot.

Characteristics of Co-offending

Throughout the past few decades, scholars have noted several characteristics of co-offending. One characteristic of co-offending is that it appears to be negatively related with age. Although several studies demonstrate that adult offenders often break the law in the company of others (Reiss & Farrington, 1991), it has been long known by criminologists that co-offending is more characteristic of juvenile delinquency than of adult criminality (Carrington, 2009; Reiss, 1988; Stolzenberg & D'Alessio, 2008). In fact, Warr (1996) contends that the group nature of delinquency is an essential, rather than an incidental, feature of offending.

A second characteristic of co-offending is that it is very prevalent. Shaw and McKay (1942) reported that the vast majority, approximately eighty percent, of the juveniles seen in the Cook County Juvenile Court were suspected of crimes that were co-

offenses. Gold (1970) reported that in Flint, Michigan, seventy-five percent of offenses were committed with at least one accomplice. Erickson (1971) reported that eighty-five percent of offenses were group-based, after reviewing eleven different studies. Reiss and Farrington (1991) reported that fifty-seven percent of crimes committed by young offenders in London were co-offenses. All of these studies provide support for the assertion that co-offending occurs rather frequently, especially among juvenile offenders.

A third characteristic of co-offending is that the duration of co-offending relationships (an offender's likelihood to co-offend with the same accomplices) tends to be rather short. Reiss and Farrington (1991) suggest that most co-offenses committed by delinquents are generally done so by two or three individuals who are only loosely associated with each other. Using the Cambridge Study in Delinquent Development dataset, they found that among individuals with at least ten crime convictions, less than three percent identified an accomplice with whom they co-offended more than one time. Similarly, Sarnecki (2001) found that the majority of co-offending relationships last for only a single event, based on official crime data in Sweden. McGloin, Sullivan, Piquero, and Bacon (2008) investigated the stability of co-offending, and found that in general, juvenile offenders do not typically "reuse" co-offenders, although those who offended more frequently demonstrated a greater tendency to do so. To be clear, suggesting that most co-offending relationships are short-lived is not to imply that these relationships are inconsequential. Indeed, some scholars suggest that having criminal social connections is associated with more criminal involvement and criminal success, and that even committing just one crime with an accomplice can impact the likelihood of subsequent offending (Conway & McCord, 2002).

A fourth characteristic of co-offending is that it is related to patterns of subsequent offending (Carrington, 2009). Existing literature acknowledges that peers "matter" in terms of the development of criminal careers (McGloin & Stickle, 2011). However, the literature typically focuses on deviant peer normative influence, rather than recognizing that committing crimes *with* others is an important phenomenon as well. It is not surprising then that Warr (2002) argues that in order to fully understand the concept of 'companions in crime,' scholars should discuss both peer influence and offending with accomplices. Indeed, some studies have looked at the impact that co-offending has on an offender's criminal pathway. For example, Conway and McCord (2002) suggest that co-offending increases the likelihood of persistent criminality, especially when coupled with early onset. In addition, they found that co-offenders commit more crimes than solo offenders. Based on these results, they concluded that co-offending is a "key ingredient" to high rates of criminality, and that having even just one co-offense is impactful on an offender's criminal career. This is one of several studies which illustrate the need to further investigate the diverse social processes that foster cooperative criminal relations if we hope to establish a comprehensive understanding of co-offending patterns and their relationship with future criminal trajectories.

Although extant literature suggests that co-offending is simply a "fact" of crime (McGloin et al., 2008; Weerman, 2003), there are still several research gaps. One particularly important unanswered question is whether or not there is potential meaning or value in understanding the relationship between juvenile co-offending experiences and later criminal involvement. If it is known that co-offending is very prevalent, is a distinguishing feature of juvenile delinquency, and may be impactful on one's criminal

career, then it is unfortunate that this particular research void remains unfilled. Though prior juvenile delinquency research has investigated how the timing of onset is related to distinct criminal trajectories, it is certainly problematic that minimal research has focused on whether these offenses are being committed alone or with other people, and how this might influence subsequent offending behaviors. The following sections will discuss why it is plausible to predict that juveniles who offend with accomplices may have different criminal trajectories than juveniles who offend alone.

Juvenile Co-offending Experiences and Divergent Criminal Pathways

Several scholars suggest that an individual's juvenile offending behaviors can be used to predict their adult offending behaviors (Shannon, 1982; Siegel & Welsh, 2016; Warr, 2002; Weis, Crutchfield, & Bridges, 2001). For nearly a century, criminologists have known that crime is disproportionately committed by young offenders and that the majority of these offenses are committed with accomplices (Anderson & Felson, 2010; McGloin & Nguyen, 2012; McGloin & Stickle, 2011; Reiss & Farrington, 1991; Warr, 2002). Accordingly, this thesis argues that instead of treating co-offending as a mere characteristic of the criminal event, this phenomenon warrants closer investigation. Specifically, I suggest that co-offending during adolescent years may carry a unique and valuable meaning in and of itself, and it might be a useful factor for predicting criminal engagement as an adult.

As previously stated, there are reasons to expect differences in patterns of later offending (i.e., divergent criminal pathways) for juveniles who offend with accomplices in comparison to juveniles who offend alone. This study has two competing hypotheses which

suggest there are at least two potential directions of this relationship. First, committing crimes with accomplices during adolescence might be associated with a reduction of criminal engagement during adulthood. Conversely, committing crimes with accomplices during adolescence might be associated with an increase of criminal engagement during adulthood. The following two subsections will draw from theoretical discussions of co-offending, adolescence, and criminal pathways to provide justifications for both possible relationships.

Negative Relationship Between Adolescent Co-offending and Adult Criminality

There are at least two theoretical reasons to expect a negative relationship between co-offending during adolescence and later criminal engagement. First, this section will use Moffitt's (1993) dual taxonomy to argue that offending with others during adolescence may suggest that these individuals need the comfort of others to engage in criminal behaviors. Then, McGloin and Rowan's (2015) threshold model will be used to argue that co-offending with others during adolescence may suggest that due to the group nature of the event, these individuals perceive reduced responsibility, which leads them to participate in criminal behavior that they would not have otherwise done in if they were alone. Both of these theories provide reasons to expect that individuals with juvenile offending experiences that consist of group crime may engage is less adult criminality than individuals with juvenile offending experiences that do not.

Moffitt's (1993) dual taxonomy suggests that juvenile delinquency conceals two distinct categories of individuals, and that there appear be noteworthy individual differences in the stability of antisocial behavior of each. She argues that the timing of

onset and the duration of antisocial involvement are the defining features of these two distinct categories of offenders. According to Moffitt (1993), life-course persistent offenders, which make up a relatively small proportion of the population, develop out of a combination of neuropsychological deficits and an evocative interaction with poor parenting. She argues that because the delinquent behaviors of the juveniles in this category arise from bio-psychological and pathological origins, these individuals are predisposed to criminality and are autonomously motivated. Hence, peers have no influence on the timing of onset or the duration of engagement in delinquency. Consequently, individuals in this category are more likely to begin offending earlier than their peers, and continue offending chronically throughout their adult years.

The second category of offenders in Moffitt's (1993) dual taxonomy is adolescence-limited offenders, which make up a majority of the population. She argues that for these offenders, the development of delinquent behavior begins with the maturity gap, which she describes as the gap between physical and social maturity. According to her theory, most individuals begin maturing around the age of thirteen, but because they are treated as children, it creates frustration and causes them to rebel by engaging in social mimicry of antisocial behavior of their peers (Moffitt, 1993). Instead of being autonomously motivated like life-course persistent offenders, adolescent-limited offenders commit crimes mainly or exclusively under the influence of or imitation of their life-course persistent peers. Essentially, these individuals need peer processes such as learning mechanisms and peer pressure to prompt or promote their engagement in delinquency.

Moffitt (1993) suggests that these adolescence-limited offenders' delinquent behaviors are provoked by the perceived rewards from their peers, such as separation from

intrusive adults and rejection of roles assigned to them as immature adolescents (McCord & Conway, 2002; Moffitt, 1993). In the most general and basic sense, the idea is that adolescent-limited offenders are much more likely to offend with their peers because they need the comfort of others. However, once their physical and social maturity match, the individuals in this category no longer have the drive or the motivation to rebel, and they desist from engaging in delinquent behavior. Thus, adolescent-limited offenders have a later onset and a shorter duration of engagement in delinquent behaviors than life-course persistent offenders. Individuals in this category fill out the age-crime curve, as their antisocial behavior is temporary, situational, and confined to development that occurs during adolescent years when the prominence of peer influence is at its climax.

Moffit's (1993) dual taxonomy gives reason to believe that juveniles who co-offend may engage in less criminal involvement later on because it suggests that they are not autonomously motivated to engage in delinquent behavior, but rather, they need the comfort of others. In other words, juveniles who co-offend may do so because they are just trying to fit in, they want to look cool in front of their friends, or they are simply engaging in these behaviors as a form of rebellion during their maturity gap. However, once they mature, they will no longer feel the need to conform, to look cool in front of their friends, or to rebel. Accordingly, this study expects these individuals to co-offend during adolescence, but to engage in less criminal activity during adulthood.

McGloin and Rowan's (2015) threshold model also provides reason to expect that co-offending experience as a juvenile might be associated with less offending later on. As previously discussed, their threshold model looks at how individual and situational level factors shape a person's decision to engage in group crime. McGloin and Rowan (2015)

suggest that when people make decisions about whether or not to engage in group crime, they take into account the behavior of other people. They argue that when adolescents are in a group setting, one of the most salient factors of this decision making process is the absolute number of people involved. McGloin and Rowan (2015) define an individual's threshold as the point at which they are willing to change their mind about joining in a delinquent activity, based on the behaviors of the people around them. They suggest that thresholds vary from person to person, ranging anywhere from not needing anyone else to do the behavior first to needing everyone else to do it first before deciding to join in. Even so, some people may see everyone else around them doing it, and may still decide not to partake in the delinquent act.

McGloin and Rowan's (2015) threshold model suggests that when in a group setting, the presence of others can fundamentally change an individual's decision to engage in delinquency. For example, in group settings, it may be easier for one to fall victim to temptation. If the situation prompts the individuals to identify as part of an in-group that shares a social identity, then this may prime them to behave in a manner consistent with the goals or shared interests of the group, even if it includes delinquency. In such situations, individuals may perceive less responsibility for their actions because they are doing it with other people. In other words, due to the group nature of the event, these individuals may perceive reduced responsibility, which may lead them to participate in criminal behavior that they would not have otherwise done if they were alone. Therefore, this suggests that co-offending with others during adolescence may reflect people who are only willing to commit crimes within a group setting, but not by themselves. If these are people who perceive less responsibility for their actions when in a group setting, and are people who

would not normally commit crimes when alone, one would expect them to engage in less criminal activity later on because it reflects behaviors that they are only willing to do with others in certain social contexts. If people are more likely to spend time with peers and socialize in group settings during adolescence, then they might not find themselves in situations that tempt them to engage in criminal activities as an adult because they are not spending as much of their time in group settings.

Indeed, several studies demonstrate how the presence of others can impact perceptions of costs, risk, rewards, and benefits. McGloin and Thomas (2016) completed an analysis using data from two separate experiments, both conducted at large, public state universities. The experiments used hypothetical vignettes to assess how the size of the group involved in deviant behavior affects perceived risks and rewards. They found that in conditions with higher numbers of people involved in deviant acts, the perceived risk of arrest was lower, perceived sense of responsibility was lower, perceived disappointment was lower, feeling of belonging was higher, thrill and excitement was higher. This provides evidence that the size of the group involved in deviant acts has the ability to alter an individual's anticipated value of risks, costs, rewards. Therefore, the presence of others may be a key situational element that might entice a juvenile who would not normally participate in crime to do so.

Other criminologists also suggest that the presence of peers may affect one's perception of costs, risks, rewards, and benefits. For example, Gardner and Steinberg (2005) competed a study of 306 people, who were divided into three age groups: adolescents (13–16), youths (18–22), and adults (24 and above). The subjects participated in two questionnaires that measured risk preference and decision making in addition to one

behavioral task that measured risk taking. Within each age group, subjects were randomly assigned to one of two conditions: completing the tasks alone, or completing them among other peers in their age group. Their results showed two important things. First, participants took more risks, focused more on the benefits than the costs of risky behavior, and made riskier decisions when in peer groups (in comparison to being alone). Second, peer effects on risk taking and risky decision making were stronger among adolescents and youths than adults. This is further evidence that supports the notion that the presence of peers plays an important fundamental role in decision making among adolescents.

McGloin and Rowan's (2015) threshold model suggests that juveniles whose offending experiences consists of co-offenses may be associated with less criminal involvement later on because it may be that for some people, offending is something that they are willing to do because other people are present, so they feel less responsible for their actions. We know that criminal behavior is disproportionately committed by young offenders and that the majority of their offenses are committed with other accomplices. If people are more likely to spend time with peers and socialize in group settings during adolescence, and group settings can lend themselves to group crime, then it is reasonable to expect that when individuals reach adulthood and stop spending so much time in group settings, they might not participate in criminal activities. Conversely, individuals who do commit crimes on their own during adolescence may continue to commit crimes during adulthood.

Both Moffit's (1993) dual taxonomy and McGloin and Rowan's (2015) threshold model provide reasons to expect that individuals with juvenile offending experiences that consist of group crime may engage is less adult criminality than individuals with juvenile

offending experiences that consist of solo crime. Moffit's (1993) dual taxonomy suggests that juveniles who co-offend need to be prompted by others in order to engage in the act, or that they need the comfort of others. In other words, juveniles who co-offend may do so because they are just trying to fit in, they want to look cool in front of their friends, or they are simply engaging in these behaviors as a form of rebellion during their maturity gap. However, once they mature, they will no longer feel the need to conform, to look cool in front of their friends, or to rebel. McGloin and Rowan's (2015) threshold model suggests that juveniles who co-offend may reflect people who would not normally commit crimes alone. However, due to the situational group nature of the event, they perceive less responsibility, less risks, and more rewards, and thus participate in the delinquent behavior. It is plausible to hypothesize that once these individuals reach adulthood and stop hanging out in group settings, they will no longer fall victim to such temptation. Therefore, one could expect that these individuals will offend less frequently (or not at all) as adults. Based on these two theories, then, this study hypothesizes that: There will be a negative relationship between juvenile co-offending experiences and later criminal engagement (H1).

Positive Relationship Between Adolescent Co-offending and Adult Criminality

There are also theoretical justifications to believe that a juvenile's offending experience that consists of co-offenses might be positively related with their offending frequency as an adult. This section focuses on criminal social connections, specifically using McCarthy and Hagan's (2001) concept of criminal capital, to make the argument that offending with others may cultivate more offending later on because it may provide

individuals with an opportunity to gain skills and other resources from their accomplices, which may further embed them in a criminal lifestyle, and ultimately make crime more attractive for them. This theoretical justification suggests that juveniles who co-offend may offend more frequently as an adult in comparison to juveniles who offend alone because it could lead to more criminal capital and thus, a more lucrative criminal career.

Warr (2002) suggests that criminal conduct is predominantly social behavior, and that most offenders are imbedded in a network of friends who also break the law. Indeed, much of the research in criminology considers the single strongest predictor of criminal behavior to be the number of delinquent friends an individual has (Warr, 2002). Taking this a step further, this thesis argues that one potential reason to suspect that committing crimes with accomplices could have a positive relationship with later criminal involvement stems from the idea that co-offending can offer an avenue towards greater criminal success.

The concepts of human and social capital are centered on the idea that individuals invest in certain institutions and resources (such as schools, job trainings, and social networking) because they can provide advantages in the legal economic market, and ultimately lead to more dividends (Coleman, 1988). The idea is that whenever someone comes in contact with a person in their social network, they gain things such as attitudes, skills, opportunity awareness, awareness spaces, and norms. In the economic sector, social and human capital can provide an individual with advantages in the workforce and for legitimate earnings. Ultimately, this human and social capital translates into greater economic success. For example, in general, people who invest in schooling or job training tend to do better in the legal economic market because they can attain jobs with higher salaries than those who do not make those investments. In addition, collaborating with

others in the workplace can foster the mastery of complex tasks, expand one's knowledge and skill set, which will translate into the potential for higher material rewards (Rowan et al., 2016). Hence, having social connections and investing in certain institutions in the legal sector are crucial in terms of achieving more success in the workforce.

McCarthy and Hagan (2001) applied these concepts of human and social capital to the criminal domain to describe what they refer to as "criminal capital." They contend that success in the illegal market is associated with the attainment of "specialized knowledge and skills suited to offending" and having connections to offenders who can provide access to information and training. Because no 'crime schools' exists for people to attend to teach individuals how to be successful in the criminal sector, having social criminal connections are crucial because they allow offenders to earn criminal capital that can then translate into higher illegal earnings. Essentially, the argument is that having social criminal connections is crucial for achieving criminal success and for keeping individuals invested in illegal enterprises.

Several studies demonstrate that having even one criminal accomplice or criminal social connection can provide someone with ample benefits such as learning criminal skills, expanding their knowledge of criminal opportunities, and expanding their criminal network (Rowan et al., 2016). For example, McCarthy and Hagan (2001) examined variations in criminal success (measured by criminal earnings) among a sample of homeless delinquent juveniles, and found that their willingness to collaborate with other offenders resulted in increased criminal success. Evidently, having criminal connections can increase criminal knowledge, enhancement of criminal skills, and tactics for recognizing opportunities to engage in crime. This demonstrates that in the criminal

sanction, social relationships and connections are important because they provide offenders with more criminal capital, which in turn makes them more likely to achieve criminal success.

Criminologists have argued that this notion of criminal capital is important, and that criminal associations matter. Indeed, several different kinds of criminal connections have been investigated. Wright and Decker (1994) studied a sample of burglars, who reported perceiving group offending to be safer and more successful than solo offending because the presence of accomplices could help them during criminal acts that would be more difficult for someone to complete alone, in addition to accomplices having the ability to offer special skills that could lead for larger gains. Furthermore, a study by Tremblay and Morselli (2000) demonstrated that offenders who were acquainted with other successful offenders (specifically, those who were successful in terms of avoiding incarceration) were more likely than other offenders to achieve higher earnings from criminal activities. Morselli and Tremblay (2004) completed a study on criminal networks of prisoners, using a survey of volunteer inmates in southern Quebec. The results of their analyses suggest that the correlation between offenders with less redundant criminal networks (which indicate more efficient access to skills and opportunities) and higher criminal earnings is indeed positive.

Morselli, Tremblay, and McCarthy (2006) looked at criminal mentorship, using data collected from 268 male inmates from five federal prisons in Quebec. They argue that criminal mentorship is an asset because they address an offender's need for security, provide guidance for criminal activities, and serve as connections to other criminal networks. They found that, on average, offenders who said they did have a criminal mentor

reported having substantially higher illegal earnings ($105,000) than offenders who said that they did not have a criminal mentor ($12,000). Furthermore, they found mentored offenders see a reduced risk of incapacitation, whereas non-mentored offenders see an increased risk of incapacitation.

Criminologists have clearly demonstrated that criminal associations are important, especially in relation to gaining more criminal capital. It is surprising then, given the prevalence of the group-nature of crime, that the empirical investigation of criminal capital in the context of co-offending is so scarce. Andresen and Felson (2012) suggest co-offending can lead to sharing new methods of committing crime, identification of potential targets, information about police activities and opportunities to be part of a specific criminal enterprise. However, they do not provide empirical support for their claim. One of the few studies that does investigate criminal capital and the co-offending associate is Rowan et al. (2016). They investigate whether co-offending offers advantages that translate into higher illegal earnings, using longitudinal data from the Pathways to Desistance project. Rowan and colleagues (2016) found that co-offending experience in a given year is associated with a forty-one percent increase in the likelihood of earning illegal money. Furthermore, they found that this positive association endures even when considering previous co-offenses, which indicates that the benefits gained from this particular criminal association does persist over time. This provides evidence that co-offending can lead to advantages that may enable on offender to have a more lucrative criminal career.

To be clear, from a criminal capital perspective, an individual can obtain gains from criminal events and/or criminal associates. A person can gain criminal capital through repeated engagement in certain crime types (i.e., criminal events), but they can also gain

criminal capital by offending with an accomplice, and getting skills from the other person. In other words, both the criminal event and the criminal accomplice matter from a criminal capital perspective. However, when looking at criminal capital specifically from a co-offending standpoint, the literature suggests that the parting skill comes from the accomplice, not the crime. So, although it is possible to gain criminal capital from specialized experience, when it comes to deriving capital from criminal associations or ties, the focus is on the criminal relationship. Accordingly, because this study is particularly interested in the relationship between co-offending and later criminal engagement, the focus is on the gains that are derived from the criminal accomplice, rather than the criminal event. Indeed, the co-offending literature suggests that a person can gain criminal capital from an accomplice, even in a single event. As previously stated, Conway and McCord (2002) state that co-offending is a "key ingredient" to high rates of criminality, and that having even just one co-offense is impactful for an offender's criminal career because it increases the likelihood of persistent criminality, especially when coupled with early offending experience.

If we know that even a single co-offending experience can be impactful on an individual's criminal career because it may provide them with criminal capital, then each co-offense would potentially provide them with the opportunity to get even more gains. So, with each co-offense, these individuals may become further embedded in a criminal lifestyle, which might translate into more criminal involvement later on. Having criminal accomplices may provide people with the opportunity to gain criminal knowledge, enhancement of criminal skills, and supply them with additional resources that can amplify both the opportunities and the rewards of crime. Co-offending can lead to sharing new

methods of committing crime, identification of potential targets, information about police activities, and opportunities to be part of specific criminal enterprises. Furthermore, the broadening of criminal opportunities and the reduction of criminal effort provided by accomplices might help further embed them in a criminal lifestyle, and make crimes more attractive to them.

McCarthy and Hagan's (2001) concept of criminal capital provides reason to expect that juveniles who rely more on co-offending may offend more frequently as an adult in comparison to juveniles who rely more on solo offending because it could lead to more criminal capital and thus, a more lucrative criminal career. It can be argued that each time they co-offend, they have the opportunity to gain skills and other resources from their accomplices, which may further embed them in a criminal lifestyle, and ultimately make crime more attractive for them. Therefore, I also hypothesize that: There will be a positive relationship between juvenile co-offending experience and later criminal engagement (H2).

Although from a co-offending perspective, the criminal capital argument is that individuals get gains from their criminal social connection rather than from the criminal event itself, the current research predicts that we should be able to observe this skill transmission through the individual's subsequent offending behaviors. In other words, even though people are *getting* criminal capital from their accomplices, they are *using* these skills for later criminal events. Accordingly, this study predicts that if someone is acquiring criminal capital, then they may engage in more in crimes that actually require some sort of specialized skill, such as knowing where opportunities for crime are, or crimes that potentially provide them with financial gains later on. For the purposes of this study, such crimes are referred to as instrumental offenses. Following this logic, one would expect to

see a positive association between co-offending during adolescence in later criminal activity as an adult. Specifically, this study poses that the relationship between co-offending experience as a juvenile and offending may be particularly strong for instrumental crimes. For the current study, instrumental crimes include robbery, armed robbery, burglary, breaking and entering, larceny, theft, auto theft, forgery, counterfeiting, fraud, embezzlement, extortion, or any official contact with Racine police for multiple offenses that included one of the aforementioned crimes. This study argues that for individuals who are invested in securing criminal capital, the skills acquired from criminal ties is going to be what makes them more successful, more willing, and more likely to engage in crime more frequently.

Co-offending and Gender

There are no co-offending theories that speak directly to differences between males and females, nor are there empirical studies that specifically investigate this. However, there are reasons to suspect that gender may condition the relationship between co-offending as a juvenile and later criminal engagement, although the direction of this moderating effect is open to debate. This section discusses several qualitative and ethnographical studies which suggest that males and females may co-offend for different reasons, have different availabilities to criminal opportunities, and that they may have different co-offending experiences.

First, it may be the case that gender conditions the relationship such that males derive more benefits from co-offending than females. Some scholars suggest that females may co-offend for more social reasons, whereas men may co-offend in an effort to gain

more criminal capital in pursuit of acquiring a more lucrative criminal career. For example, Haynie, Giordano, Manning, and Longmore (2005) assert that romantic partners are social associates which exert an influence above and beyond other peers, such as friends. Accordingly, ethnographical work by Becker and McCorkel (2011) suggests that females are oftentimes drawn into deviance by their male partners. Perry and Pauletti (2011) suggest that when it comes to romantic partners, females are often more concerned about securing their intense need for closeness and avoiding possible rejection.

Arguably, since social relationships are particularly important to females, it might be the case that females who co-offend with males do so because they are invested in maintaining or strengthening their relationship, as opposed to acquiring skill (i.e., criminal capital). For example, Mullins and Wright (2003) interviewed females who were involved in burglaries, and many of the females reported that they were unknowingly used as an accomplice or were coerced into participating in the crime by their boyfriend, but went along with it anyway. Accordingly, a study by Morash (1986) reveals that adolescent females are more likely to play minor roles when committing crimes with males. Indeed, ethnographical research also supports the notion that oftentimes, when females are co-offending with males, they typically have secondary (as opposed to leadership) roles (Becker & McCorkel, 2011). For instance, if a couple is involved in selling illegal drugs, the male would most likely be the one to get the product, package it, organize the drug deal, and deliver it, while the female holds the money or keeps lookout.

Steffensmeier (1983) suggests that in the criminal sphere, this male power on female recruitment and the disparity in the roles they play are, at least in part, due to peer acceptance. Essentially, the argument is that females co-offend with their male partners

because they have a desire to prove that they "have heart" and are perceived as loyal to their significant other. Hence, these are reasons to suspect that males and females may simply not invest in co-offending for the same reasons. Since females are more likely to co-offend with their romantic partners for social reasons, they may not take advantage of the criminal capital because they are more invested in securing their relationship, as opposed to acquiring skill. In contrast, males may be invested in gaining criminal capital and acquiring skills because they are interested in securing a more lucrative criminal career.

If females who co-offend primarily do so with their male romantic partners (Becker & McCorkel, 2011) and are not really interested in committing the crime (Perry & Pauletti, 2011), I suspect that they are doing so because they have the need to feel accepted, and are focusing on securing their relationship or satisfying their social needs. In essence, in terms of their motivation to co-offend, securing their *relationship* is the buy in for the females, whereas the buy in for the males is securing a lucrative criminal career. Consequentially, I suspect that gender may condition the effects of co-offending on later criminal engagement. If females who co-offend with their romantic partners do so, at least in part, in effort to maintain their relationship with their significant other, or they feel pressured to prove their loyalty to their significant other by playing a supportive role in the criminal behavior, then it suggests that they may offend less frequently later on because once they have proven their loyalty to their romantic partner, or feel secure enough in their relationship, they may stop feeling a need to prove to their male counterpart that they 'have heart.' This would suggest that females may not be as strongly affected by co-offending experience as are males.

Second, on the other hand, it may be the case that gender conditions the relationship such that females may be more strongly affected by co-offending experience than males because it serves as a rare opportunity for them to gain criminal capital. Steffensmeier (1983) states that the criminal social networks of females are typically smaller and more restricted than those of their male counterparts. Males are more likely to have many ties and to move in wider circles. Prior work has suggested that men may be more apt to offending with people who are not within their normal network, meaning that they have more opportunities to gain skills, whereas women may be more limited in terms of who they offend with. If females have a smaller pool of potential co-offenders, this may offer more support as to why females would be less invested in acquiring skill – there are social constraints that limit their access to wider networks consisting of people from whom they could potentially gain criminal capital from.

Some ethnographical work suggests that males predominate in comparatively higher status, higher power, and higher paying forms of illicit activity, whereas females are confined to low status, high risk, and low reward criminal opportunities. Steffensmeier (1983) suggests that since the criminal sphere is controlled by males, illicit activities reflect men's interests and concerns, and restrict females' access to traditionally male-dominated criminal activities. For instance, Maher's (1997) work suggests that women typically participate in the crack cocaine market as either "sexual media" (using sexuality as a resource for criminal gain) or "cover roles" (using females to camouflage other criminal activities being carried out by males or concealing goods). Because males predominate in criminal networks and these networks often operate to exclude or minimize females' participation in crime, gender serves as a resource for co-offending for males and obstructs

criminal opportunities for females (Becker & McCorkel, 2011). Ultimately, then, this would indicate that co-offending with a male accomplice may be a female's only vehicle to criminal capital. This suggests that females may actually benefit more from having male criminal relationships because it serves as a rare opportunity for them to gain criminal capital.

To summarize, there are reasons to suspect that gender may condition the relationship between juvenile co-offending experience and later criminal engagement. However, this is exploratory because the direction of this potential relationship is not clear. On one hand, it is possible that females may derive less criminal capital from co-offending with their male romantic partners because they are more invested in securing their relationship, as opposed to acquiring skill. This would suggest that females may not be as strongly affected by co-offending experience as are males. Therefore, juvenile co-offending experience may be negatively associated with later offending for females. On the other hand, it is possible that co-offending with a male accomplice may serve as a rare opportunity for females to gain criminal capital that they otherwise would have been excluded from. This would suggest that females may be more strongly affected by co-offending experience than males.

Chapter 2: Data and Methods

The current study examines the relationship between juvenile co-offending experiences and later criminal involvement. To do so, it investigates the association between committing crimes with accomplices during adolescence (i.e., co-offending) and the frequency of offending as well as the frequency of committing instrumental crimes during adulthood (i.e., later offending). This effort moves beyond the current co-offending literature because extant research has primarily relied on cross-sectional research designs that only involve young offender populations. Few studies have followed individuals throughout adolescence into adulthood, tracking their criminal patterns and behaviors. Of those that do, co-offending is typically only considered to be a descriptive attribute of the offense, rather than as an important characteristic that holds meaning or value. Therefore, this impedes criminologists' understanding of co-offending processes with respect to divergent criminal pathways. Because co-offending is more characteristic of juvenile delinquency than of adult criminality, it is crucial to begin an investigation with a focus on adolescent years. Accordingly, the current study relies on a unique dataset that tracts offending behavior from adolescence and adulthood in a sample of young offenders from Racine, Wisconsin.

Data

Because this paper argues that co-offending experience during adolescence might predict later criminal involvement, it uses a dataset that contains information on offending behavior for both adolescent and adult years. The current research uses longitudinal data collected from Lyle Shannon's (1982) Racine, Wisconsin birth cohort study. Based on the

premise that delinquency and crime are products of the ongoing social life of the community, Shannon investigated how the changing ecological structure of the city of Racine had an impact on juvenile delinquency and adult crime. In an attempt to understand the development of delinquency and its limited continuity into criminal careers, Shannon collected offending data on a total of 6,127 males and females in three birth cohorts. In hopes of illustrating how juvenile misbehavior (specifically, its continuation or discontinuation) is related to geographical locations with a history of social and economic disadvantages, Shannon collected official police contact, age-by-age, and interview data throughout the course of the study.[1]

The current study uses the official police contact data, which report offending behaviors for each subject. The data report offense characteristics, including the number of people involved and the type of offense committed. In addition, the data report the subject's demographic characteristics such as their age at the time of each offense, race, socioeconomic status, and gender. The 1942 birth cohort has offending information for 1,352 subjects from age 6 through age 32. The 1949 birth cohort has offending information for 2,099 subjects from age 6 through age 25. The 1955 birth cohort has offending information for 2,676 subjects from age 6 through age 22. Because the current study specifically hypothesizes about *juvenile* co-offending experiences and divergent criminal pathways (not between offenders and non-offenders), the sample was limited to those

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[1] Shannon's (1982) Racine birth cohort study has interview data for each birth cohort. However, these data cannot be used for the current study for two primary reasons. First, the interview data only report offending characteristics for the first five crimes in which the subjects were caught by police in addition to five sorts of behaviors in which the subjects were not caught by police. Therefore, the structure of the data would make the current study's operationalizations of juvenile co-offending experience inaccurate because it is unclear whether the data are reporting information on specific instances of offending, or if they are about the subject's behaviors in general. Second, only 25% of each birth cohort was interviewed, which would substantially reduce the sample size and result in a massive data loss.

subjects who had at least one official contact with Racine police before the age of 18.[2] This resulted in a final sample size of 2,489 individuals.

Measures

Dependent Variables:

Frequency of offending as an adult. The first operationalization of later offending is the amount of offending that each subject commits as an adult. This is measured as a count. Specifically, it is the number of official police contacts that an individual has with Racine police for committing an offense after the age of 18, up until the end of the study. For the current sample, the average number of offenses committed after the age of 18 is 2.93 (SD 5.71) with a range of 0 to 64.

Frequency of instrumental offending as an adult. The second operationalization of later offending is the amount of instrumental crimes that each subject commits as an adult. Instrumental crimes are those in which perpetrators use illegitimate means in an effort to obtain monetary gains (Baron, 2011; Baumer & Gustafon, 2007; Dennison, 2016). As a reminder, from a co-offending perspective, this study argues that individuals gain criminal capital from their criminal social connections, and use these skills for subsequent offending. For individuals who are invested in securing criminal capital, the skill acquired from their criminal ties is going to be what makes them more successful, more willing, and more likely to engage in crime more frequently. Accordingly, I suggest that we should be able to observe this skill transmission through the individual's subsequent engagement crimes that require some sort of specialized skill (such as knowing where opportunities for

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[2] The final sample consists of 468 individuals belonging to the 1942 birth cohort, 923 individuals belonging to the 1949 birth cohort, and 1,096 individuals belonging to the 1955 birth cohort.

crime are) or crimes that potentially provide offenders with financial gains. For this reason, the frequency of instrumental offending is used as an outcome of interest.

For the current study, instrumental crimes include robbery, burglary, theft, auto theft, forgery, and fraud, or any official contact with Racine police for multiple offenses that included one of the aforementioned crimes.[3] For example, if a subject comes into contact with police for committing burglary (an instrumental crime) and destruction of property (a non-instrumental crime), the criminal event is coded as an instrumental offense. This is measure captures the number of times that a subject comes into contact with Racine police for committing an instrumental offense after the age of 18, up until the end of the study. For the current sample, the average number of instrumental offenses committed after the age of 18 is .26 (SD .98) with a range of 0 to 13.

Independent Variables:

Ratio of juvenile co-offenses to total juvenile offenses. Because the current study is interested in the relationship between a juvenile offender's tendency to commit crimes with accomplices (or alone) and divergent criminal pathways, one measure of interest is the

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[3] According to the Racine data collection procedures, offenses coded as robberies included robbery (felony), armed robbery (felony), robbery and assault (felony), and other robbery (felony). Offenses coded as burglaries included burglary (felony), breaking and entering (felony), and entering a locked vehicle (misdemeanor). Over $100 is considered a felony, and under $100 is considered a misdemeanor. Offenses coded as theft included theft (except auto), larceny and theft (except auto), tampering with bike, auto, or machine, larceny of money by use of slugs, larceny from cars or trucks, purse snatching, petty theft, bike larceny, stolen property: receiving, selling, buying, or possession, shoplifting, tampering with U.S. mail, theft of mail, looting, take junk, or attempted theft. Offenses coded as auto theft included auto theft, joyride, operating a motor vehicle without the owner's consent (car, plane, motorcycle, tractor, or boat) or accomplice to such an act. Offenses coded as forgery included forgery (felony), uttering forged instrument (felony), forgery and altering checks (felony), counterfeiting (felony), or false ID card (misdemeanor). Offenses coded as fraud included fraud (felony), embezzlement (felony), extortion (felony), perjury (felony), obtaining money under false pretense (felony), or writer of threatening letter (felony), issuing worthless checks (misdemeanor), defrauding an inkeeper or restauranter (misdemeanor), or soliciting illegal funds (misdemeanor).

proportion of juvenile offenses that involved accomplices. The official police contact data reports the number of people involved in each criminal event. If only one person is involved in the criminal event, it is recoded it as 0, indicating that it is a solo offense. If two or more people were involved, it is recoded as 1, indicating that it is a co-offense. For each subject, I add up the number of criminal events coded as 1 that occur before the age of 18. Then, for each subject, this number is divided by the total number of offenses that the subject has up until the age of 18. This ratio ranges from 0 to 1, and illustrates the extent to which a subject's juvenile offending experience involves accomplices. Of the 2,489 juvenile offenders in the current sample, the average ratio of co-offenses before the age of 18 is .494 (SD .396).

Frequency of co-offending as a juvenile. The second operationalization of juvenile co-offending experience is the number of offenses that each subject commits with others during adolescence. This is measured as a count. Specifically, it is the number of official police contacts that an individual has with Racine police for committing an offense before the age of 18 that involved at least one other person. For the current sample, the average number of co-offenses committed before the age of 18 is 2.20 (SD 3.95) with a range of 0 to 46.

Control Variables:

Birth cohort. Each birth cohort has a different period of exposure. As previously stated, the 1942 birth cohort has offending information for subjects from age 6 through age 32, the 1949 birth cohort has offending information for subjects from age 6 through age 25, and the 1955 birth cohort has offending information for subjects from age 6 through

age 22. Accordingly, the current analyses account for the birth cohort that each subject belongs to. Specifically, each model in the first set of analyses (in which data from all three birth cohorts is combined) contain two dummy variables: one for the 1942 birth cohort and one for the 1949 birth cohort (1= the subject is a member of this cohort, 0= the subject is not a member of this birth cohort). For the current study, the reference category for this measure is the 1955 birth cohort. For the current sample, approximately 19% of subjects belong to the 1942 birth cohort, 37% of subjects belong to the 1949 birth cohort, and 44% of subjects belong to the 1955 birth cohort.

Age of official onset. Age is a correlate of crime. Specifically, early onset is associated with an increased likelihood of future criminal engagement. Moffitt's (1993) Dual Taxonomy and McGloin & Rowan's (2015) threshold model suggest that age is negatively related to co-offending as well. Accordingly, the current analyses account for each subject's age of official onset in an effort to ensure that I am not capturing an age effect, as opposed to a co-offending effect. The Racine official police contact data report the subject's age for each offense. Therefore, I use the subject's age during their first official police contact to operationalize this measure. The average age of official onset for the current sample is 13.64 (SD 2.94) within a range of 6 to 17.

Race. Race is a second correlate of crime. Therefore, the current analyses account for each subject's race. According to the Racine data collection procedures, each cohort member was identified as White, Black, or Chicano (Shannon, 1982). Each model contains a dummy variable for race (1= White, 0= Non-White). The current sample is approximately 85% White and 15% Non-White.

Socioeconomic status. Socioeconomic status is a third correlate of crime. Accordingly, the current analyses account for each subject's socioeconomic status. According to the Racine data collection procedures, each subject was given a socioeconomic status ranking between 1 and 26 based on geometric scores that reflect each block's characteristics.[4] These characteristics included the average dollar value of owner-occupied housing, the average contract rent, the percent lacking some or all plumbing, the percent of units renter-occupied, and the percent of units overcrowded. These block characteristics were taken from the U.S. Census of Housing. A rank of 1 represents a low socioeconomic status, and a rank of 26 represents a high socioeconomic status (Shannon, 1982). For the current sample, the average socioeconomic status ranking is 10.08 (SD 6.77) with a range of 1 to 26.

Frequency of solo offending as a juvenile. For all analyses that operationalize juvenile co-offending experience as the frequency of co-offending as the independent variable, there is an added control variable: the frequency of solo offending during adolescence. This additional control variable is necessary because the count of co-offenses as a juvenile could be serving as a proxy for overall offending as a juvenile. Accordingly, this study controls for the count of juvenile solo offenses in an effort to see if co-offending or solo offending (or both) is uniquely related to the outcome of interest in the model. For the current sample, the average number of solo offenses committed before the age of 18 is 1.81 (SD 2.89) with a range of 0 to 28.

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[4] According to the Racine data collection procedures, subjects who lived in more than one area throughout the course of the study were given a socioeconomic status ranking that combines each of the different areas. Specifically, according to appendix 3 of the codebook, Shannon (1982) assigned these individuals an average rank score. Therefore, cohort members who lived in multiple areas between the ages of 6 and 18 were assigned a socioeconomic status rank between 1 and 26 which reflects the average rank of the areas they lived in. For the current study, these average socioeconomic status rankings were used for these subjects who lived in more than one area during their adolescent years.

Moderating Variable:

Gender. Although empirical co-offending research does not specifically speak to differences between males and females, one of the most robust findings in criminology is the correlation between gender and criminal involvement. The current study includes gender as a moderator variable. Gender is coded as a dummy variable (1= male, 0= female). The current sample is approximately 69% male and 31% female. This study hypothesizes that gender may condition the relationship between juvenile co-offending experiences and later criminal engagement. Accordingly, the analyses include an interaction term. For the models that operationalize juvenile co-offending experience as a proportion, I include an interaction between the subject's gender and their ratio of co-offenses to total offenses during adolescence. For the models that operationalize juvenile co-offending experience as a count, I include an interaction between the subject's gender and their frequency of co-offending during adolescence.

Table 1 provides descriptive statistics for the variables used in the analyses, using the combined data from all three birth cohorts. The next three tables provide descriptive statistics for the variables used in the analyses when the models are run by individual birth cohort. Table 2 shows the descriptive statistics for the 1942 birth cohort. Table 3 shows the descriptive statistics for the 1949 birth cohort. Table 4 shows the descriptive statistics for the 1955 birth cohort.

Table 1. Descriptive Statistics for Variables Used in the Analyses
All Three Birth Cohorts (n = 2,489)

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Number of Adult Offenses	2,489	2.938	5.709	0	64
Number of Adult Instrumental Offenses	2,489	0.262	0.981	0	13
Juvenile Co-Offending Ratio	2,489	0.494	0.396	0	1
Number of Juvenile Co-Offenses	2,489	2.206	3.954	0	46
Number of Juvenile Solo Offenses	2,489	1.818	2.894	0	28
Number of Juvenile Offenses	2,489	4.025	6.284	1	65
Age of Official Onset	2,489	13.646	2.942	6	17
Male	2,489	0.689	0.462	0	1
Female	2,489	0.311	0.462	0	1
White	2,489	0.845	0.361	0	1
Non-White	2,489	0.155	0.361	0	1
Socioeconomic Status	2,210	10.088	6.778	1	26

Table 2. Descriptive Statistics for Variables Used in the Analyses
1942 Birth Cohort (n = 469)

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Number of Adult Offenses	469	4.149	7.203	0	63
Number of Adult Instrumental Offenses	469	0.241	0.854	0	9
Juvenile Co-Offending Ratio	469	0.394	0.391	0	1
Number of Juvenile Co-Offenses	469	1.392	2.067	0	15
Number of Juvenile Solo Offenses	469	1.621	1.677	0	9
Number of Juvenile Offenses	469	3.012	3.205	1	23
Age of Official Onset	469	14.836	2.114	6	17
Male	469	0.744	0.436	0	1
Female	469	0.256	0.436	0	1
White	469	0.940	0.237	0	1
Non-White	469	0.060	0.237	0	1
Socioeconomic Status	423	9.728	6.554	1	26

Table 3. Descriptive Statistics for Variables Used in the Analyses
1949 Birth Cohort (n = 923)

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Number of Adult Offenses	923	3.327	6.456	0	64
Number of Adult Instrumental Offenses	923	0.189	0.753	0	9
Juvenile Co-Offending Ratio	923	0.409	0.387	0	1
Number of Juvenile Co-Offenses	923	1.714	2.902	0	26
Number of Juvenile Solo Offenses	923	2.047	2.968	0	31
Number of Juvenile Offenses	923	3.761	5.409	1	46
Age of Official Onset	923	13.782	2.808	6	17
Male	923	0.702	0.457	0	1
Female	923	0.298	0.457	0	1
White	923	0.869	0.337	0	1
Non-White	923	0.131	0.337	0	1
Socioeconomic Status	822	10.445	6.937	1	26

Table 4. Descriptive Statistics for Variables Used in the Analyses
1955 Birth Cohort (n = 1,097)

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Number of Adult Offenses	1,097	2.093	3.913	0	40
Number of Adult Instrumental Offenses	1,097	0.333	1.177	0	13
Juvenile Co-Offending Ratio	1,097	0.572	0.389	0	1
Number of Juvenile Co-Offenses	1,097	2.811	4.945	0	46
Number of Juvenile Solo Offenses	1,097	1.868	3.426	0	28
Number of Juvenile Offenses	1,097	4.680	7.728	1	65
Age of Official Onset	1,097	13.023	3.179	6	17
Male	1,097	0.655	0.475	0	1
Female	1,097	0.345	0.475	0	1
White	1,097	0.785	0.411	0	1
Non-White	1,097	0.215	0.411	0	1
Socioeconomic Status	965	9.942	6.730	1	26

Missing Data

One advantages of using the Racine birth cohort data is that there is not a lot of missing data. The only measure of interest in the current study that has missing data is the subject's socioeconomic status. According to the Racine data collection procedures, the only individuals who have missing values for this measure are those who lived outside of Racine for a part of the study, but whose offending behaviors were still trackable (Shannon,

1982, appendix 3). Of the 2,489 juvenile offenders in the current sample, a total of 279 individuals (approximately 11%) had missing socioeconomic status rankings.

To address this issue, the analyses are run in two separate ways. First, I run the analyses with the missing socioeconomic status rankings (n = 2,210). Second, as a form of sensitivity analysis, each model is run using the mean imputation method for socioeconomic status ranking. Several scholars suggests that the mean imputation method is one of the simplest procedures for dealing with missing data, affirm that it properly accounts for the uncertainty of missing data, and insist that it produces consistent and valid estimators (Nielsen, 2001; Vink, Frank, Pannekoek, & van Buuren, 2014; Wang, 2004). Although only the findings for the first analysis are reported in the results section, I do allude to the differences found when the models are run using the mean imputation method.

Analytic Technique

This study tests the relationship between juvenile co-offending experience and criminal engagement as an adult. The two dependent variables of interests used in this study are count variables that depict the number of adult offenses and the number of adult instrumental offenses committed by each subject. Because the outcomes of interest in this study are count variables that measure crime (a rare event), relying on an Ordinary Least Squares (OLS) regression model, which assumes that the dependent variable is normally distributed, can result in biased and inefficient estimates (Moksony & Hegedus, 2014). In the Poisson regression model, the probability of a count dependent variable is determined by a Poisson distribution, where the mean of the distribution is a function of the independent variables. One important characteristic of the Poisson distribution is that the

conditional mean of the outcome is equal to the conditional variance (hence, it assumes equidispersion). By looking at the descriptive statistics (see Table 1), a comparison of the means and the standard deviations of both outcomes of interest reveals that this is not the case for the current data. Rather, the standard deviations are higher than the means, which indicates that there is overdispersion (specifically, that the outcomes have right skewed distributions). Therefore, the count nature of the dependent variables and the overdispersion present in the data renders the Poisson regression model inappropriate because it would run the risk of generating inflated z-scores and would result in inefficient, inconsistent, and biased parameter estimates (Winkelmann, 2008).

The negative binomial regression model (a variant of the Poisson regression model) is less sensitive to overdispersion because allows the variance to exceed the mean (Osgood, 2000). To formally test for overdispersion, a negative binomial regression is run to examine the likelihood ratio test with the null hypothesis that alpha is equivalent to zero. The chi-square statistic is 120.96. Therefore, the null hypothesis is rejected, concluding that there is overdispersion, and that negative binomial regression is the appropriate model to use. Therefore, based on the nature of the dependent variables of this study, each model in this study relies on a negative binomial regression, a statistical approach well-suited for overdispersed count data (Osgood, 2000).

The analyses are run in two separate ways, which serves as a test of robustness. The first consists of all three birth cohorts, while controlling for the subject's birth cohort. All of the data are combined, and there are three dummy variables (one for each birth cohort). Each model contains two dummy variables (one for the 1942 birth cohort and one for the 1949 birth cohort), while the 1955 birth cohort serves as the reference category. This

method allows us to absorb whatever differential exposure exists between the subjects. Second, three separate analyses are run by each individual cohort. This method allows us to observe whether or not the effects differ by cohort. The findings for the analyses run by individual birth cohort are alluded to in the results section, and are reported in Appendix A.

Each analysis consists of four pairs of models. The first pair of models uses the subject's ratio of juvenile co-offenses as the independent variable, and the subject's number of adult offenses as the dependent variable. The second pair of models uses the subject's ratio of juvenile co-offenses as the independent variable, and the subject's number of adult instrumental offenses as the dependent variable. The third pair of models uses the subject's number of juvenile co-offenses as the independent variable, and the subject's number of adult offenses as the dependent variable. The fourth pair of models uses the subject's number of juvenile co-offenses as the independent variable, and the subject's number of adult instrumental offenses as the dependent variable. Within each pair, the first model excludes the interaction term between gender and the respective co-offending measure, while the second model includes the interaction term to see if the relationship between the dependent and independent variable is conditioned on gender.

Chapter 3: Results

As a reminder, this study uses two alternative operationalizations of both the dependent and independent variables. Later offending (the dependent variable) is first measured as a count of overall adult offenses, and then as a count of adult instrumental offenses. Juvenile co-offending experience (the independent variable) is first measured as a ratio, and then as a count. I will begin by presenting all of the results for the ratio measure, and then present all of the results for the count measure.

Table 5. Negative Binomial Regressions of Number of Adult Offenses on Ratio of Juvenile Co-Offenses
All Three Birth Cohorts (n = 2,210)

Model 1a				Model 1b			
Number of Adult Offenses				Number of Adult Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Juvenile Co-Offending Ratio	0.086	0.095	1.090	Juvenile Co-Offending Ratio	0.071	0.115	1.074
Age of Official Onset	-0.084	0.012	0.918***	Age of Official Onset	-0.084	0.120	0.918***
Female	-0.819	0.073	0.440***	Female	-0.840	0.120	0.431***
White	-0.558	0.089	0.572***	White	-0.558	0.089	0.572***
Socioeconomic Status	-0.031	0.005	0.969***	Socioeconomic Status	-0.031	0.005	0.969***
1942 Birth Cohort	0.853	0.090	2.348***	1942 Birth Cohort	0.853	0.853	2.347***
1949 Birth Cohort	0.548	0.072	1.730***	1949 Birth Cohort	0.548	0.548	1.730***
Female*Juvenile Co-Offending Ratio				Female*Juvenile Co-Offending Ratio	0.042	0.196	1.043
Constant	1.818	0.193		Constant	1.806	0.200	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 5 shows the results for the first set of main models, which include data from all three birth cohorts. Model 1a presents the negative binomial regression of the number of adult offenses on the ratio of juvenile co-offenses. Although several of the other variables in this model are statistically significant, the coefficient for the ratio of co-offenses as a juvenile is not, suggesting that there is no relationship between this operationalization of juvenile co-offending experience and the expected count of adult offenses. Model 1b includes the interaction term between gender and juvenile co-offending experience, which is not statistically significant. This indicates that gender does not condition the relationship between the ratio of juvenile co-offenses and adult offending.

Looking at Table 5, there are some control variables worth noting. There is a statistically significant negative relationship between the age of official onset and the later offending. In particular, the incidence rate ratio suggests that for each one unit increase in age of official onset, the expected count of adult offenses decreased by a factor of 0.918 (a 8% decrease), net of statistical controls. The incidence rate ratio for White suggests that the expected count of adult offenses is lower by a factor of 0.572 (a 42.8% decrease) for Whites than for non-Whites, net of statistical controls. The incidence rate ratio for socioeconomic status suggests that a one unit increase in socioeconomic status ranking decreases the expected count of adult offenses by a factor of 0.969 (a 3.1% decrease), net of statistical controls. The incidence rate ratio for females suggests that that the expected count of adult offenses is lower by a factor of 0.440 for females than for males, net of statistical controls.

Table 6. Negative Binomial Regressions of Number of Adult Instrumental Offenses on Ratio of Juvenile Co-Offenses
All Three Birth Cohorts (n = 2,210)

Model 2a				Model 2b			
Number of Adult Instrumental Offenses				Number of Adult Instrumental Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Juvenile Co-Offending Ratio	0.022	0.224	1.022	Juvenile Co-Offending Ratio	0.148	0.264	1.160
Age of Official Onset	-0.148	0.026	0.862***	Age of Official Onset	-0.147	0.026	0.863***
Female	-1.043	0.187	0.352***	Female	-0.820	0.306	0.440**
White	-0.915	0.190	0.400***	White	-0.921	0.190	0.397***
Socioeconomic Status	-0.051	0.013	0.949***	Socioeconomic Status	-0.052	0.013	0.949***
1942 Birth Cohort	0.037	0.210	1.038	1942 Birth Cohort	0.036	0.210	1.036
1949 Birth Cohort	-0.318	0.167	0.726	1949 Birth Cohort	-0.317	0.167	0.727
Female*Juvenile Co-Offending Ratio				Female*Juvenile Co-Offending Ratio	-0.451	0.494	0.636
Constant	0.875	0.418		Constant	1.018	0.446	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 6 shows the results for the second set of main models, which include data from all three birth cohorts. Model 2a presents the negative binomial regression of the number of adult instrumental offenses on the ratio of juvenile co-offenses. Once again, the co-efficient for the ratio of co-offenses as a juvenile is not statistically significant, suggesting that there is no relationship between this operationalization of juvenile co-

offending experience and the expected count of adult instrumental offenses. Model 2b shows that the coefficient for the interaction term is not statistically significant, indicating that gender does not condition the relationship between the ratio of juvenile co-offenses and adult instrumental offending. The same pattern emerged for the control variables as with the first set of models.[5] Age of official onset, socioeconomic status, and being White are negatively related to the expected number of adult instrumental offenses. Being a male is positively related to the expected number of adult instrumental offenses.[6]

Tables 7 through 12 (see Appendix A) show the results for the same parallel investigation described above, but the analyses are run by individual birth cohort instead of using the combined dataset. For all three birth cohorts, as with the overall sample, the ratio of juvenile co-offenses is not a statistically significant predictor of the expected count of overall adult offenses nor the expected count of adult instrumental offenses. In addition, none of the interaction terms are statistically significant across any of the models. In terms

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[5] In terms of control variables, there are occasional differences across birth cohorts, but they are not patterned in any systematic way. Unlike the other two birth cohorts, for the 1942 birth cohort, the age of official onset is not a statistically significant predictor of the expected count of adult instrumental offenses (see Table 8). Unlike the other two birth cohorts, for the 1949 birth cohort, socioeconomic status is not a statistically significant predictor of the expected count of adult instrumental offenses (see Table 10). Other than these two differences, the results were the same across all three birth cohorts, just as the results from the overall sample.

[6] For the proportion independent variable, a parallel analysis was completed that included the number of overall juvenile offenses as an added control variable for each model. For the most part, all of the results were substantively the same, but there were two exceptions. First, when the analyses were run using the combined dataset, the ratio of juvenile co-offenses was a statistically significant predictor ($p \leq .05$) of the expected count of overall adult offenses for model 1a. Second, when the analyses were run by individual birth cohort with, for the 1942 birth cohort, in model 1b, gender did condition the relationship ($p \leq .05$) between the ratio of juvenile co-offenses and the expected count of overall adult offenses. Other than these two differences, for all other models (including the combined dataset and the individual birth cohort analyses), the ratio of juvenile co-offenses was not a statistically significant predictor of the expected count of overall adult offenses nor the expected count of adult instrumental offenses. In addition, none of the interaction terms were statistically significant across any of the models.

of the control variables, the same general patterns emerged as with the overall sample, with

the exception of a couple instances.[7]

Now, we consider the results for the analyses where the primary independent

variable is the number of juvenile co-offenses instead of the proportion of all juvenile

offenses committed with accomplices. As a reminder, in an effort to isolate the unique

effect of co-offending, these models include the count of juvenile solo offenses as an added

control.

Table 13. Negative Binomial Regressions of Number of Adult Offenses on Number of Juvenile Co-Offenses
All Three Birth Cohorts (n = 2,210)

	Model 3a				Model 3b		
	Number of Adult Offenses				Number of Adult Offenses		
	Coef.	SE	IRR		Coef.	SE	IRR
Number of Juvenile Co-Offenses	0.080	0.011	1.084***	Number of Juvenile Co-Offenses	0.065	0.010	1.067***
Number of Juvenile Solo Offenses	0.107	0.012	1.112***	Number of Juvenile Solo Offenses	0.101	0.012	1.106***
Age of Official Onset	0.009	0.011	1.009	Age of Official Onset	0.011	0.011	1.011
Female	-0.703	0.068	0.494***	Female	-1.034	0.086	0.355***
White	-0.560	0.083	0.571***	White	-0.578	0.083	0.560***
Socioeconomic Status	-0.018	0.004	0.981***	Socioeconomic Status	-0.016	0.004	0.983***
1942 Birth Cohort	0.931	0.082	2.538***	1942 Birth Cohort	0.947	0.081	2.562***
1949 Birth Cohort	0.546	0.067	1.727***	1949 Birth Cohort	0.559	0.066	1.749***
Female*Number of Juvenile Co-Offenses				Female*Number of Juvenile Co-Offenses	0.190	0.033	1.209***
Constant	0.019	0.187		Constant	-0.298	0.193	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Tables 13 shows the results when using the count of juvenile co-offenses as the

primary independent variable, consisting of data from all three birth cohorts. Model 3a

presents the negative binomial regressions of the number of adult offenses on the number

of juvenile co-offenses. Model 3a suggests that the number of co-offenses a juvenile

engages in is significantly related to their expected number of adult offenses. In particular,

for every additional juvenile co-offense, the expected count of adult offenses increases by

8.4%, net of statistical controls. That being said, the number of solo offenses is also related

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[7] As a form of sensitivity analysis, I ran the models using the mean imputation method for socioeconomic status. The results were the same as those for the overall analyses. For all models (including the analyses run using the combined dataset and the individual birth cohort analyses), the proportion of juvenile co-offenses was not a statistically significant predictor of overall adult offending nor adult instrumental offending. None of the interaction terms for gender and juvenile co-offending experience were statistically significant.

to the expected count of adult offenses. The incidence rate ratio suggests that for every additional juvenile solo offense, the expected count of adult offenses increases by 11.2%, net of statistical controls. Model 3b shows that the interaction term between gender and juvenile co-offending experience is statistically significant. The incidence rate ratio for the interaction term is 1.209 (p≤.001). This suggests that gender conditions the relationship between the number of juvenile co-offenses and the expected number of adult offenses. Specifically, gender moderates this relationship such that females are more strongly affected by co-offending experience than are males.

Looking at Table 13, there are some control variables worth noting. The incidence rate ratio for White suggests that the expected count of adult offenses is lower by a factor of 0.571 (a 42.9% decrease) for Whites than for non-Whites, net of statistical controls. The incidence rate ratio for socioeconomic status suggests that a one unit increase in socioeconomic status ranking decreases the expected count of adult offenses by a factor of 0.981 (a 1.9% decrease), net of statistical controls. The incidence rate ratio for females suggests that that the expected count of adult offenses is lower by a factor of 0.494 for females than for males. There is not a statistically significant relationship between the age of official onset and the expected number of adult offenses.

Table 14. Negative Binomial Regressions of Number of Adult Instrumental Offenses on Number of Juvenile Co-Offenses
All Three Birth Cohorts (n = 2,210)

Model 4a				Model 4b			
Number of Adult Instrumental Offenses				Number of Adult Instrumental Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Number of Juvenile Co-Offenses	0.100	0.023	1.105***	Number of Juvenile Co-Offenses	0.096	0.023	1.101***
Number of Juvenile Solo Offenses	0.118	0.026	1.125***	Number of Juvenile Solo Offenses	0.116	0.026	1.123***
Age of Official Onset	-0.037	0.026	0.963	Age of Official Onset	-0.036	0.026	0.963
Female	-0.688	0.180	0.502***	Female	-0.818	0.230	0.441***
White	-0.917	0.184	0.399***	White	-0.921	0.184	0.397***
Socioeconomic Status	-0.036	0.013	0.963**	Socioeconomic Status	-0.036	0.013	0.964**
1942 Birth Cohort	0.230	0.196	1.258	1942 Birth Cohort	0.231	0.196	1.260
1949 Birth Cohort	-0.247	0.162	0.780	1949 Birth Cohort	-0.249	0.162	0.779
Female*Number of Juvenile Co-Offenses				Female*Number of Juvenile Co-Offenses	0.065	0.072	1.067
Constant	-1.198	0.410		Constant	-1.315	0.429	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

In Table 14, model 4a presents the negative binomial regressions of the number of adult instrumental offenses on the number of juvenile co-offenses. The incidence rate ratio in model 4a suggests that the number of co-offenses a juvenile engages in is significantly related to the expected number of adult instrumental offenses. In particular, for every additional co-offense, the expected count of adult instrumental offenses increases by 10.5% (p≤.001), net of statistical controls. That being said, the number of solo offenses is also related to the expected count of adult offenses. The incidence rate ratio suggests that for every additional juvenile solo offense, the expected count of adult offenses increases by 12.5%, net of statistical controls. Model 4b suggests that gender does not condition the relationship between the count of juvenile co-offenses and the expected number of adult instrumental offenses.

Looking at Table 14, there are some control variables worth noting. The incidence rate ratio for White suggests that the expected count of adult instrumental offenses is lower by a factor of 0.399 (a 60.1% decrease) for Whites than for non-Whites, net of statistical controls. The incidence rate ratio for socioeconomic status suggests that a one unit increase in socioeconomic status ranking decreases the expected count of adult instrumental offenses by a factor of 0.963 (a 3.7% decrease), net of statistical controls. The incidence rate ratio for females suggests that that the expected count of adult instrumental offenses is lower by a factor of 0.502 for females than for males, net of statistical controls. There is not a relationship between the age of official onset and the expected number of adult instrumental offenses.

Tables 15 through 20 (see Appendix A) show the results for the same parallel investigation described above, but the analyses are run by individual birth cohort instead

of using the combined dataset. For all three birth cohorts, as with the overall sample, the number of juvenile co-offenses is a statistically significant predictor of the expected count of overall adult offenses and the expected count of adult instrumental offenses. However, the interaction between gender and juvenile co-offending experience is only significant in the models that predict overall adult offending. Across all of the cohorts, gender does not condition the relationship between juvenile co-offending experience and later offending.

In terms of control variables, there are occasional differences across birth cohorts, but they do not appear to be patterned in any systematic way. Unlike the other two birth cohorts, for the 1942 birth cohort, being a male is not a statistically significant predictor of the expected count of adult instrumental offenses (see Table 16). For the 1949 birth cohort, socioeconomic status is not a statistically significant predictor of the expected count of overall adult offenses (see Table 17) or the expected count of adult instrumental offenses (see Table 18). For the 1955 birth cohort, socioeconomic status is not a statistically significant predictor of the expected count of adult instrumental offenses (see Table 20). Other than these few differences, the results were the same across all three birth cohorts, just as the results from the overall sample.[8]

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[8] As a form of sensitivity analysis, I ran the models using the mean imputation method for socioeconomic status. For all models (including the analyses run using the combined dataset and the individual birth cohort analyses), the results were substantively the same as for the overall sample, with one exception. When the analyses were run for individual birth cohorts, in model 3b, gender did not condition the relationship between the number of juvenile co-offenses and the expected count of overall adult offenses. Other than this difference, across all other models, just as with the overall sample, the number of juvenile co-offenses was a statistically significant predictor of the expected count of overall adult offenses and the expected count of adult instrumental offenses. In addition, similar to the overall sample, none of the interactions between gender and juvenile co-offending experience were statistically significant for the adult instrumental offending models.

Chapter 4: Discussion

Criminologists have long known that criminal behavior is disproportionately committed by young offenders. The most frequently documented feature of juvenile delinquency is its group nature (McGloin & Nguyen, 2012; McGloin & Stickle, 2011; Reiss & Farrington, 1991; Warr, 2002). Unfortunately, much of the extant literature tends to treat co-offending as merely a descriptive attribute of the criminal event, rather than considering that it may carry consequences for the criminal career. Prior work has investigated how an individual's age of onset is related to criminal trajectories, but few studies have specifically analyzed how committing crimes with accomplices during adolescence might reflect divergent criminal pathways. In an effort to address this research void, the current study tests the relationship between juvenile co-offending experience and later criminal engagement. It was hypothesized that this direction could be either negative or positive. Overall, this study found mixed results for the relationship between juvenile co-offending experiences and criminal engagement as an adult.

First, the results suggest that when measured as a proportion of juvenile co-offenses to total juvenile offenses, there is no relationship between juvenile co-offending experience and later offending. In contrast, the results suggest that when measured as the number of juvenile co-offenses, juvenile co-offending experience is a statistically significant predictor of both the expected number of overall adult offenses and the expected number of adult instrumental crimes. There could be several different reasons for these findings. It is possible that the important factor is really the amount of experience, rather than whether or not an individual favors co-offending over solo offending. Recall that one characteristic of co-offending is that people tend not to reuse the same accomplices (Farrington, 1991;

McGloin et al., 2008; Sarnecki, 2001). With that in mind, people who have higher numbers of juvenile co-offenses are probably engaging in delinquent acts with different (hence, more) people, which means they are getting more criminal ties. So, with more co-offending events, individuals are potentially being exposed to more criminal ties, and gaining more criminal capital, which might make them more likely to engage in subsequent offending. Since this idea of "more" co-offending experience is better captured by the count measure than the proportion measure, this might explain the difference in the ability for each operationalization to predict later offending. On the other hand, it might just be that juvenile offending experience (overall) is what predicts later criminality, instead of it being something unique about juvenile co-offending. The results showed that both the number of co-offenses *and* solo offenses were statistically significant predictors for the models that used the count measure as the independent variable. So, it could just be that more offending as a juvenile is associated with more offending as an adult.

Second, the results suggest that there is a gender interaction between juvenile co-offending experience and later criminality, but it is nuanced. The gender interaction only emerges when the independent variable is measured as a count, and it only emerges in regard to overall adult offending (but not with adult instrumental offending). If an individual were deriving criminal capital from co-offending relationships, then we should arguably observe an increase in instrumental offenses in particular. However, the results indicate that when females co-offend, it appears to put them at greater risk of offending later on, but only with overall offending, rather than instrumental offending. One possibility for this could be that females may not be obtaining criminal capital from their relationships. Prior work has suggested that females may co-offend because of relationship

ties (Becker & McCorkel, 2011; Perry & Pauletti, 2011). But, if females are not engaging in more instrumental crimes, then maybe it is because they are not deriving criminal capital from these relationships. So, this may just reflect females who are getting caught up in bad relationships that promote more criminality in general, but not in specialized offenses. On the other hand, some scholars have argued that females do not have the same criminal opportunities as their male counterparts (Becker & McCorkel, 2011; Steffensmeier, 1983). With that in mind, it could be that females are gaining criminal capital from these relationships, but because their opportunities to engage in crimes that require specialized skills are still blocked, then they are not able to convert their criminal capital gains into instrumental offending. So, perhaps co-offending with males does serve as a rare opportunity for females to gain criminal capital, but due to the fact that males predominate in criminal networks which oftentimes operate to exclude or minimize female's participation in high status, high power roles, females are not actually able to utilize the skills (Maher, 1997). This might explain why we observe that gender conditions the relationship between juvenile co-offending experience and overall adult offending, but not between juvenile co-offending experience and adult instrumental offending.

Third, the results suggests that there are occasional differences across individual birth cohorts, but they do not appear to be patterned in any systematic way. This additional analysis was undertaken in an effort to absorb differences due to the amount of time exposure and whether or not there are different effects for each cohort. These results suggest that the effects of co-offending on later criminal engagement do not differ by individual birth cohort. For nearly a century, several scholars have suggested that co-offending is important, and that group crime is the dominate form of juvenile delinquency

(McGloin & Nguyen, 2012; McGloin & Stickle, 2011; Reiss & Farrington, 1991; Shaw & McKay, 1942; Warr, 2002). Perhaps then, it is not shocking that there are not differences in the patterns of co-offending across the three birth cohorts. This finding offers support for the notion that co-offending occurs rather frequently, especially among juvenile offenders, and that it is related to the continuation of (or desistance from) subsequent criminal engagement, even across different time periods.

Limitations

Despite the advantages that this longitudinal dataset provides, there are drawbacks worth noting. First, Shannon (1982) specifically sought to investigate how much delinquency and crime are generated in selected neighborhoods with a history of structured disadvantage in Racine, Wisconsin. Because the original study used a prospective birth cohort design to provide information on crime rates for both offenders and non-offenders growing up in a similar time period and physical location, the results may not be generalizable to all individuals across the United States.

Second, the police contact data provided a wealth of important information such as whether offenses were committed individually or with others, in addition to the subject's age at the time of each offense. But, it only provides official records of offending, as opposed to capturing the subjects' complete offending behaviors. Therefore, I may not be capturing everyone's complete juvenile offending experience or their frequency of offending as an adult. It is well known that many offenses go uncaught by or unreported to police (Cole, Smith, & DeJong, 2016). This also potentially limits my ability to fully investigate my argument for the idea of criminal capital leading to more crime. If it is the

case that offending with an accomplice leads to more criminal capital, and offenders are becoming more skilled, it could be possible that they are indeed committing more crimes, but are not being caught by police. If they have learned how to get away with committing crimes, then I may be missing an important part of the story by only looking at official police data. It is certainly possible that the data are not capturing crimes in which members of these cohorts have committed, but the police were not able to figure out who the perpetrator was. Future research may want to include both official and self-report measures to further investigate this issue.

A third limitation of the police contact data is its lack of available control variables that are specific to co-offending. Ideally, the control variables to use for co-offending analyses are things such as the subjects' entire offending history (as opposed to only the offenses they have been caught by the police), their accomplices' complete offending histories (which would allow us to demonstrate if they gain more criminal capital from people who have backgrounds in certain types of crimes), the subjects' motivation for participating in the criminal event, and the accomplices' motivation for participating in the criminal event. All of these variables would better equip us to understand the mechanisms behind the occurring phenomena. Unfortunately, the police contact data does not provide such information.

A final limitation of the current study is its inability to provide insight into co-offending mechanisms. Even if the results of the analysis suggest provide support for the notion that the propensity to commit crimes with accomplices during adolescence is associated with an increase (or a decrease) in frequency of offending as an adult it does not provide concrete evidence as to *why* this phenomenon occurs. Although I have provided

several theoretical justifications that offer suggestions as to how early experiences with co-offending might be related to an individual's criminal trajectory, the study is more exploratory than explanatory. Future research should seek to uncover the mechanisms behind why and how investigate how co-offending as an onset to crime impacts future criminal behavior. This may include self-reported information or narrative data that asks subjects "how did the presence of others during your first offense impact your criminal experience?" so that we can better understand the working mechanisms behind this frequent phenomenon.

Future Research

In addition to addressing the aforementioned limitations, there are also some general steps for future research to improve our knowledge of co-offending. First, future research should incorporate mixed methodologies. For the current study, official police contact data was used. Consequentially, there are instances in which I had to make assumptions about certain variables. For example, the official police contact data for the current sample tells us how many people were involved in the criminal event. However, it does not provide any insight into the specific social context. If I had true interview data that provided information on key factors such as whether everyone shared an equal role in the criminal event, whether everyone participated willingly, how strong these criminal relationships were (whether they are they best friends, lose associates, or strangers), what each person's motivation for participating in the event was, and so forth, it could have really enhanced the quality of my analysis by providing additional insight into process and mechanisms. I recommend that future research incorporates official data and self-report

measures in an effort to filling in those contextual gaps may help tease out the processes and mechanisms behind the phenomena that we are unable to capture from employing just one methodology.

Second, future research would benefit from expanding the scope of their focus. The majority of extant co-offending research focuses on delinquency and crime. It would be really interesting for future research to expand to crime types, particularly with status offenses. Given that female juveniles are more likely to come in contact with the law for status offenses, it would be useful for future research to investigate whether there are differences in juvenile co-offenses and solo offenses for males and females, and then see if this is related to divergent criminal pathways. It might be the case that the differences between offense types for gender plays a role in distinguishing who continues offending later on, and who does not. Considering that I did found evidence that in some instances, gender does condition the relationship between co-offending and later criminality, it would be wise for future research to delve further into this phenomenon.

In the end, this thesis has contributed to our understanding of how committing crimes with accomplices during adolescence can impact an individual's offending behaviors during adulthood. Results suggests that the proportion of all juvenile offenses that are committed with accomplices is not related to later offending. However, the number of juvenile co-offenses is a statistically significant predictor of both overall offenses and specifically instrumental offenses committed as an adult. Second, the results suggest that there is a gender interaction between juvenile co-offending experience and later criminality, but it only emerges for overall adult offending (but not with adult instrumental offending). Third, the results suggests that there not large systematic differences in co-

offending patterns across the three birth cohorts. Ultimately, this study provides support for the notion that examining juvenile co-offending experiences is an important domain of criminological inquiry.

Appendix A

Table 1. Descriptive Statistics for Variables Used in the Analyses
All Three Birth Cohorts (n = 2,489)

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Number of Adult Offenses	2,489	2.938	5.709	0	64
Number of Adult Instrumental Offenses	2,489	0.262	0.981	0	13
Juvenile Co-Offending Ratio	2,489	0.494	0.396	0	1
Number of Juvenile Co-Offenses	2,489	2.206	3.954	0	46
Number of Juvenile Solo Offenses	2,489	1.818	2.894	0	28
Number of Juvenile Offenses	2,489	4.025	6.284	1	65
Age of Official Onset	2,489	13.646	2.942	6	17
Male	2,489	0.689	0.462	0	1
Female	2,489	0.311	0.462	0	1
White	2,489	0.845	0.361	0	1
Non-White	2,489	0.155	0.361	0	1
Socioeconomic Status	2,210	10.088	6.778	1	26

Table 2. Descriptive Statistics for Variables Used in the Analyses
1942 Birth Cohort (n = 469)

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Number of Adult Offenses	469	4.149	7.203	0	63
Number of Adult Instrumental Offenses	469	0.241	0.854	0	9
Juvenile Co-Offending Ratio	469	0.394	0.391	0	1
Number of Juvenile Co-Offenses	469	1.392	2.067	0	15
Number of Juvenile Solo Offenses	469	1.621	1.677	0	9
Number of Juvenile Offenses	469	3.012	3.205	1	23
Age of Official Onset	469	14.836	2.114	6	17
Male	469	0.744	0.436	0	1
Female	469	0.256	0.436	0	1
White	469	0.940	0.237	0	1
Non-White	469	0.060	0.237	0	1
Socioeconomic Status	423	9.728	6.554	1	26

Table 3. Descriptive Statistics for Variables Used in the Analyses
1949 Birth Cohort (n = 923)

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Number of Adult Offenses	923	3.327	6.456	0	64
Number of Adult Instrumental Offenses	923	0.189	0.753	0	9
Juvenile Co-Offending Ratio	923	0.409	0.387	0	1
Number of Juvenile Co-Offenses	923	1.714	2.902	0	26
Number of Juvenile Solo Offenses	923	2.047	2.968	0	31
Number of Juvenile Offenses	923	3.761	5.409	1	46
Age of Official Onset	923	13.782	2.808	6	17
Male	923	0.702	0.457	0	1
Female	923	0.298	0.457	0	1
White	923	0.869	0.337	0	1
Non-White	923	0.131	0.337	0	1
Socioeconomic Status	822	10.445	6.937	1	26

Table 4. Descriptive Statistics for Variables Used in the Analyses
1955 Birth Cohort (n = 1,097)

Variable	Number of Observations	Mean	Standard Deviation	Minimum	Maximum
Number of Adult Offenses	1,097	2.093	3.913	0	40
Number of Adult Instrumental Offenses	1,097	0.333	1.177	0	13
Juvenile Co-Offending Ratio	1,097	0.572	0.389	0	1
Number of Juvenile Co-Offenses	1,097	2.811	4.945	0	46
Number of Juvenile Solo Offenses	1,097	1.868	3.426	0	28
Number of Juvenile Offenses	1,097	4.680	7.728	1	65
Age of Official Onset	1,097	13.023	3.179	6	17
Male	1,097	0.655	0.475	0	1
Female	1,097	0.345	0.475	0	1
White	1,097	0.785	0.411	0	1
Non-White	1,097	0.215	0.411	0	1
Socioeconomic Status	965	9.942	6.730	1	26

Table 5. Negative Binomial Regressions of Number of Adult Offenses on Ratio of Juvenile Co-Offenses
All Three Birth Cohorts (n = 2,210)

Model 1a				Model 1b			
Number of Adult Offenses				Number of Adult Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Juvenile Co-Offending Ratio	0.086	0.095	1.090	Juvenile Co-Offending Ratio	0.071	0.115	1.074
Age of Official Onset	-0.084	0.012	0.918***	Age of Official Onset	-0.084	0.120	0.918***
Female	-0.819	0.073	0.440***	Female	-0.840	0.120	0.431***
White	-0.558	0.089	0.572***	White	-0.558	0.089	0.572***
Socioeconomic Status	-0.031	0.005	0.969***	Socioeconomic Status	-0.031	0.005	0.969***
1942 Birth Cohort	0.853	0.090	2.348***	1942 Birth Cohort	0.853	0.853	2.347***
1949 Birth Cohort	0.548	0.072	1.730***	1949 Birth Cohort	0.548	0.548	1.730***
Female*Juvenile Co-Offending Ratio				Female*Juvenile Co-Offending Ratio	0.042	0.196	1.043
Constant	1.818	0.193		Constant	1.806	0.200	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 6. Negative Binomial Regressions of Number of Adult Instrumental Offenses on Ratio of Juvenile Co-Offenses
All Three Birth Cohorts (n = 2,210)

Model 2a				Model 2b			
Number of Adult Instrumental Offenses				Number of Adult Instrumental Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Juvenile Co-Offending Ratio	0.022	0.224	1.022	Juvenile Co-Offending Ratio	0.148	0.264	1.160
Age of Official Onset	-0.148	0.026	0.862***	Age of Official Onset	-0.147	0.026	0.863***
Female	-1.043	0.187	0.352***	Female	-0.820	0.306	0.440**
White	-0.915	0.190	0.400***	White	-0.921	0.190	0.397***
Socioeconomic Status	-0.051	0.013	0.949***	Socioeconomic Status	-0.052	0.013	0.949***
1942 Birth Cohort	0.037	0.210	1.038	1942 Birth Cohort	0.036	0.210	1.036
1949 Birth Cohort	-0.318	0.167	0.726	1949 Birth Cohort	-0.317	0.167	0.727
Female*Juvenile Co-Offending Ratio				Female*Juvenile Co-Offending Ratio	-0.451	0.494	0.636
Constant	0.875	0.418		Constant	1.018	0.446	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 7. Negative Binomial Regressions of Number of Adult Offenses on Ratio of Juvenile Co-Offenses
1942 Birth Cohort (n = 423)

Model 1a				Model 1b			
Number of Adult Offenses				Number of Adult Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Juvenile Co-Offending Ratio	0.185	0.187	1.204	Juvenile Co-Offending Ratio	-0.017	0.218	0.982
Age of Official Onset	-0.094	0.033	0.909**	Age of Official Onset	-0.099	0.033	0.905**
Female	-1.190	0.163	0.304***	Female	-1.468	0.226	0.230***
White	-1.018	0.265	0.360***	White	-1.018	0.265	0.361***
Socioeconomic Status	-0.033	0.010	0.966**	Socioeconomic Status	-0.034	0.010	0.966**
Female*Juvenile Co-Offending Ratio				Female*Juvenile Co-Offending Ratio	0.717	0.408	2.048
Constant	2.923	0.590		Constant	2.803	0.591	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 8. Negative Binomial Regressions of Number of Adult Instrumental Offenses on Ratio of Juvenile Co-Offenses
1942 Birth Cohort (n = 423)

Model 2a				Model 2b			
Number of Adult Instrumental Offenses				Number of Adult Instrumental Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Juvenile Co-Offending Ratio	0.441	0.433	1.554	Juvenile Co-Offending Ratio	0.317	0.479	1.373
Age of Official Onset	-0.122	0.068	0.884	Age of Official Onset	-0.123	0.068	0.883
Female	-1.003	0.468	0.366*	Female	-1.294	0.696	0.273
White	-1.647	0.449	0.192***	White	-1.632	0.449	0.195***
Socioeconomic Status	-0.065	0.028	0.936*	Socioeconomic Status	-0.066	0.028	0.935*
Female*Juvenile Co-Offending Ratio				Female*Juvenile Co-Offending Ratio	0.654	1.099	1.924
Constant	1.106	1.200		Constant	0.886	1.265	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 9. Negative Binomial Regressions of Number of Adult Offenses on Ratio of Juvenile Co-Offenses
1949 Birth Cohort (n = 822)

Model 1a				Model 1b			
Number of Adult Offenses				Number of Adult Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Juvenile Co-Offending Ratio	0.031	0.154	1.031	Juvenile Co-Offending Ratio	-0.103	0.185	0.901
Age of Official Onset	-0.103	0.019	0.901***	Age of Official Onset	-0.104	0.019	0.900***
Female	-0.668	0.117	0.512***	Female	-0.837	0.176	0.432***
White	-0.569	0.150	0.566***	White	-0.562	0.150	0.569***
Socioeconomic Status	-0.031	0.008	0.968***	Socioeconomic Status	-0.032	0.008	0.968***
Female*Juvenile Co-Offending Ratio				Female*Juvenile Co-Offending Ratio	0.416	0.326	1.516
Constant	2.771	0.321		Constant	2.677	0.328	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 10. Negative Binomial Regressions of Number of Adult Instrumental Offenses on Ratio of Juvenile Co-Offenses
1949 Birth Cohort (n = 822)

Model 2a				Model 2b			
Number of Adult Instrumental Offenses				Number of Adult Instrumental Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Juvenile Co-Offending Ratio	-0.024	0.415	0.976	Juvenile Co-Offending Ratio	-0.157	0.484	0.853
Age of Official Onset	-0.133	0.048	0.874**	Age of Official Onset	-0.134	0.048	0.873**
Female	-1.175	0.356	0.308***	Female	-1.389	0.544	0.249*
White	-0.898	0.377	0.407*	White	-0.896	0.375	0.408*
Socioeconomic Status	-0.038	0.023	0.961	Socioeconomic Status	-0.038	0.023	0.962
Female*Juvenile Co-Offending Ratio				Female*Juvenile Co-Offending Ratio	0.481	0.908	1.618
Constant	0.151	0.799		Constant	0.008	0.844	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 11. Negative Binomial Regressions of Number of Adult Offenses on Ratio of Juvenile Co-Offenses
1955 Birth Cohort (n = 965)

Model 1a				Model 1b			
Number of Adult Offenses				Number of Adult Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Juvenile Co-Offending Ratio	-0.042	0.159	0.958	Juvenile Co-Offending Ratio	0.151	0.202	1.163
Age of Official Onset	-0.073	0.017	0.929***	Age of Official Onset	-0.072	0.017	0.930***
Female	-0.811	0.114	0.444***	Female	-0.532	0.212	0.587*
White	-0.465	0.131	0.628***	White	-0.466	0.131	0.627***
Socioeconomic Status	-0.029	0.008	0.970***	Socioeconomic Status	-0.030	0.008	0.970***
Female*Juvenile Co-Offending Ratio				Female*Juvenile Co-Offending Ratio	-0.502	0.323	0.605
Constant	1.673	0.280		Constant	1.829	0.298	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 12. Negative Binomial Regressions of Number of Adult Instrumental Offenses on Ratio of Juvenile Co-Offenses
1955 Birth Cohort (n = 965)

Model 2a				Model 2b			
Number of Adult Instrumental Offenses				Number of Adult Instrumental Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Juvenile Co-Offending Ratio	-0.358	0.340	0.698	Juvenile Co-Offending Ratio	-0.035	0.415	0.965
Age of Official Onset	-0.167	0.035	0.845***	Age of Official Onset	-0.163	0.035	0.849***
Female	-0.960	0.252	0.382***	Female	-0.443	0.456	0.641
White	-0.770	0.257	0.462**	White	-0.775	0.257	0.460**
Socioeconomic Status	-0.056	0.020	0.944**	Socioeconomic Status	-0.059	0.020	0.942**
Female*Juvenile Co-Offending Ratio				Female*Juvenile Co-Offending Ratio	-0.980	0.727	0.375
Constant	1.336	0.574		Constant	1.632	0.619	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 13. Negative Binomial Regressions of Number of Adult Offenses on Number of Juvenile Co-Offenses
All Three Birth Cohorts (n = 2,210)

Model 3a				Model 3b			
Number of Adult Offenses				Number of Adult Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Number of Juvenile Co-Offenses	0.080	0.011	1.084***	Number of Juvenile Co-Offenses	0.065	0.010	1.067***
Number of Juvenile Solo Offenses	0.107	0.012	1.112***	Number of Juvenile Solo Offenses	0.101	0.012	1.106***
Age of Official Onset	0.009	0.011	1.009	Age of Official Onset	0.011	0.011	1.011
Female	-0.703	0.068	0.494***	Female	-1.034	0.086	0.355***
White	-0.560	0.083	0.571***	White	-0.578	0.083	0.560***
Socioeconomic Status	-0.018	0.004	0.981***	Socioeconomic Status	-0.016	0.004	0.983***
1942 Birth Cohort	0.931	0.082	2.538***	1942 Birth Cohort	0.947	0.081	2.562***
1949 Birth Cohort	0.546	0.067	1.727***	1949 Birth Cohort	0.559	0.066	1.749***
Female*Number of Juvenile Co-Offenses				Female*Number of Juvenile Co-Offenses	0.190	0.033	1.209***
Constant	0.019	0.187		Constant	-0.298	0.193	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 14. Negative Binomial Regressions of Number of Adult Instrumental Offenses on Number of Juvenile Co-Offenses
All Three Birth Cohorts (n = 2,210)

Model 4a				Model 4b			
Number of Adult Instrumental Offenses				Number of Adult Instrumental Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Number of Juvenile Co-Offenses	0.100	0.023	1.105***	Number of Juvenile Co-Offenses	0.096	0.023	1.101***
Number of Juvenile Solo Offenses	0.118	0.026	1.125***	Number of Juvenile Solo Offenses	0.116	0.026	1.123***
Age of Official Onset	-0.037	0.026	0.963	Age of Official Onset	-0.036	0.026	0.963
Female	-0.688	0.180	0.502***	Female	-0.818	0.230	0.441***
White	-0.917	0.184	0.399***	White	-0.921	0.184	0.397***
Socioeconomic Status	-0.036	0.013	0.963**	Socioeconomic Status	-0.036	0.013	0.964**
1942 Birth Cohort	0.230	0.196	1.258	1942 Birth Cohort	0.231	0.196	1.260
1949 Birth Cohort	-0.247	0.162	0.780	1949 Birth Cohort	-0.249	0.162	0.779
Female*Number of Juvenile Co-Offenses				Female*Number of Juvenile Co-Offenses	0.065	0.072	1.067
Constant	-1.198	0.410		Constant	-1.315	0.429	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 15. Negative Binomial Regressions of Number of Adult Offenses on Number of Juvenile Co-Offenses
1942 Birth Cohort (n = 423)

Model 3a				Model 3b			
Number of Adult Offenses				Number of Adult Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Number of Juvenile Co-Offenses	0.144	0.033	1.154***	Number of Juvenile Co-Offenses	0.118	0.034	1.126**
Number of Juvenile Solo Offenses	0.112	0.039	1.119**	Number of Juvenile Solo Offenses	0.114	0.039	1.121**
Age of Official Onset	0.000	0.032	1.000	Age of Official Onset	-0.003	0.032	0.996
Female	-1.056	0.159	0.347***	Female	-1.286	0.188	0.276***
White	-1.100	0.251	0.332***	White	-1.106	0.249	0.330***
Socioeconomic Status	-0.028	0.010	0.971**	Socioeconomic Status	-0.028	0.010	0.972**
Female*Number of Juvenile Co-Offenses				Female*Number of Juvenile Co-Offenses	0.241	0.117	1.273*
Constant	1.255	0.571		Constant	1.117	0.573	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 16. Negative Binomial Regressions of Number of Adult Instrumental Offenses on Number of Juvenile Co-Offenses
1942 Birth Cohort (n = 423)

Model 4a				Model 4b			
Number of Adult Instrumental Offenses				Number of Adult Instrumental Offenses			
	Coef.	SE	IRR		Coef.	SE	IRR
Number of Juvenile Co-Offenses	0.240	0.068	1.271***	Number of Juvenile Co-Offenses	0.217	0.069	1.242**
Number of Juvenile Solo Offenses	0.150	0.069	1.162*	Number of Juvenile Solo Offenses	0.154	0.069	1.167*
Age of Official Onset	0.046	0.079	1.048	Age of Official Onset	0.042	0.078	1.043
Female	-0.759	0.465	0.468	Female	-1.154	0.594	0.315
White	-1.891	0.413	0.150***	White	-1.878	0.410	0.152***
Socioeconomic Status	-0.058	0.027	0.943*	Socioeconomic Status	-0.058	0.027	0.943*
Female*Number of Juvenile Co-Offenses				Female*Number of Juvenile Co-Offenses	0.275	0.231	1.317
Constant	-1.650	1.335		Constant	-1.944	1.326	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 17. Negative Binomial Regressions of Number of Adult Offenses on Number of Juvenile Co-Offenses
1949 Birth Cohort (n = 822)

	Model 3a				Model 3b		
	Number of Adult Offenses				Number of Adult Offenses		
	Coef.	SE	IRR		Coef.	SE	IRR
Number of Juvenile Co-Offenses	0.089	0.023	1.093***	Number of Juvenile Co-Offenses	0.067	0.022	1.070***
Number of Juvenile Solo Offenses	0.131	0.019	1.140***	Number of Juvenile Solo Offenses	0.127	0.018	1.135***
Age of Official Onset	0.006	0.018	1.006	Age of Official Onset	0.008	0.018	1.008
Female	-0.561	0.106	0.570***	Female	-0.894	0.134	0.408***
White	-0.700	0.135	0.496***	White	-0.698	0.133	0.497***
Socioeconomic Status	-0.012	0.007	0.987	Socioeconomic Status	-0.009	0.007	0.990
Female*Number of Juvenile Co-Offenses				Female*Number of Juvenile Co-Offenses	0.243	0.065	1.275***
Constant	0.677	0.302		Constant	0.357	0.310	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 18. Negative Binomial Regressions of Number of Adult Instrumental Offenses on Number of Juvenile Co-Offenses
1949 Birth Cohort (n = 822)

	Model 4a				Model 4b		
	Number of Adult Instrumental Offenses				Number of Adult Instrumental Offenses		
	Coef.	SE	IRR		Coef.	SE	IRR
Number of Juvenile Co-Offenses	0.099	0.052	1.104	Number of Juvenile Co-Offenses	0.084	0.052	1.088
Number of Juvenile Solo Offenses	0.163	0.050	1.177***	Number of Juvenile Solo Offenses	0.159	0.049	1.173***
Age of Official Onset	-0.030	0.047	0.969	Age of Official Onset	-0.032	0.046	0.968
Female	-0.801	0.349	0.448*	Female	-1.110	0.455	0.329
White	-1.090	0.360	0.336**	White	-1.097	0.356	0.333**
Socioeconomic Status	-0.018	0.023	0.981	Socioeconomic Status	-0.017	0.023	0.983
Female*Number of Juvenile Co-Offenses				Female*Number of Juvenile Co-Offenses	0.159	0.148	1.172
Constant	-1.797	0.745		Constant	-2.039	0.779	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 19. Negative Binomial Regressions of Number of Adult Offenses on Number of Juvenile Co-Offenses
1955 Birth Cohort (n = 965)

	Model 3a				Model 3b		
	Number of Adult Offenses				Number of Adult Offenses		
	Coef.	SE	IRR		Coef.	SE	IRR
Number of Juvenile Co-Offenses	0.065	0.014	1.067***	Number of Juvenile Co-Offenses	0.054	0.013	1.056***
Number of Juvenile Solo Offenses	0.094	0.017	1.099***	Number of Juvenile Solo Offenses	0.089	0.017	1.093***
Age of Official Onset	0.014	0.017	1.014	Age of Official Onset	0.020	0.017	1.020
Female	-0.663	0.104	0.515***	Female	-1.026	0.137	0.358***
White	-0.367	0.123	0.692**	White	-0.410	0.123	0.663***
Socioeconomic Status	-0.017	0.008	0.982*	Socioeconomic Status	-0.013	0.008	0.986
Female*Number of Juvenile Co-Offenses				Female*Number of Juvenile Co-Offenses	0.164	0.043	1.178***
Constant	-0.095	0.264		Constant	-0.473	0.279	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

Table 20. Negative Binomial Regressions of Number of Adult Instrumental Offenses on Number of Juvenile Co-Offenses
1955 Birth Cohort (n = 965)

	Model 4a				Model 4b		
	Number of Adult Instrumental Offenses				Number of Adult Instrumental Offenses		
	Coef.	SE	IRR		Coef.	SE	IRR
Number of Juvenile Co-Offenses	0.067	0.026	1.070**	Number of Juvenile Co-Offenses	0.068	0.026	1.070**
Number of Juvenile Solo Offenses	0.117	0.032	1.124***	Number of Juvenile Solo Offenses	0.177	0.032	1.124***
Age of Official Onset	-0.057	0.035	0.944	Age of Official Onset	-0.057	0.035	0.944
Female	-0.563	0.237	0.569*	Female	-0.541	0.304	0.581
White	-0.644	0.249	0.524*	White	-0.643	0.249	0.525**
Socioeconomic Status	-0.038	0.019	0.962	Socioeconomic Status	-0.038	0.019	0.962
Female*Number of Juvenile Co-Offenses				Female*Number of Juvenile Co-Offenses	-0.010	0.089	0.990
Constant	-0.899	0.540		Constant	-0.877	0.577	

Note: SE = standard error; IRR = incidence rate ratio
*p≤.05, **p≤.01, ***p≤.001

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