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Delinquent Peers: An Empirical Test of Competing Explanations

by

David James Pevalin

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ABSTRACT

The inclusion of delinquent peers as a predictor of crime has been theoretically and empirically problematic. This thesis tests competing explanations of what other factors may produce delinquent peers using the public release data from the first wave of the U.S. National Longitudinal Study of Adolescent Health (N = 6,072). Five hypotheses are derived from the contemporary literature that surmises that delinquent peers may be artifacts of self-reported delinquency, gender, age, group selection, or offender typology. The analyses find a wide range of heterogeneity in offenders and offenses for all levels of peer delinquency and evidence of an artifact of age. Together, these findings question the use of delinquent peers as a predictor of crime and the pursuit of general theories of crime.

ACKNOWLEDGEMENTS

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CHAPTER ONE: CONTEMPORARY THEORY AND RESEARCH

> Most delinquent acts are committed with companions; most delinquents have delinquent friends. The meaning of these simple facts is a matter of wide dispute.
> Travis Hirschi, <u>Causes of Delinquency</u>.

Introduction

The association between delinquency and delinquent peers has been a part of criminological theory that dates back at least to the 1940s and the work of Sutherland and the Glueck and Glueck (1950) study. Most theories of delinquency account for this association either explicitly or implicitly. Numerous studies have found that delinquent peers is a strong, if not the strongest, predictor of delinquency (e.g. Erickson and Jensen, 1977; Elliott, Huizinga, and Ageton, 1985; Sampson and Laub, 1993; and Paternoster and Brame, 1997). Yet, the inclusion of this association is far from unproblematic.

There are two sides in the debate concerning the use of delinquent peer association: are peers evidence of causal order and substantive causal process or are they a product of other behaviour. Sutherland's differential association theory as used by Elliott, Huizinga, and Ageton (1985: 34) posits that the delinquent peer group involvement is the main causal factor in delinquency because "...they observe and learn in group interactions and that some delinquent behaviors are encouraged and rewarded by the group...". Gottfredson and Hirschi's (1990) general theory reverses the causal ordering of differential association theory by advocating that people with low self-control are drawn to other people of similar dispositions and that the low self-control is a prior condition to joining the group. Taking this view leads to the conclusion that the "...individuals in such groups will therefore tend to be delinquent, as will the group itself..." (Gottfredson and Hirschi, 1990: 158). Gottfredson and Hirschi (1990: 157) explicitly state that including the delinquent peers association in a predictive equation is a mis-specification as it is probably confounded with the delinquency of the respondent or a suspect measure brought about by rumour. This perspective toward delinquent peers can be traced back to Glueck and Glueck's (1950: 164) conclusion that "birds of a feather flock together".

Other studies have suggested that delinquent peer association is confounded with, or is a product of other factors. Polk and Schafer (1972) suggest that delinquent peer association is another measure of failure at school as the dropout is more likely to spend time away from school with other dropouts. Research in the field of developmental psychology suggests that the nature of male networks and group dynamics may entail a high correlation between delinquent peer association and gender (Maccoby, 1986).

Agnew (1991a) characterizes most research into the delinquent peer association as too simplistic because it concentrates on the number of delinquent friends or the frequency of delinquent acts committed by friends. Agnew emphasizes that the duration, intensity, dynamics, and frequency of peer associations should be included in the research (cf. Sutherland, 1947). The amount of attachment youths have to their delinquent peers has been another area of dispute. Although the research results have been mixed, the balance is in favour of low levels of attachment between delinquent peers. On one hand, Giordano, Cernkovich, and Pugh (1986) found strong ties between serious delinquents and their groups. On the other are studies that found that chronic delinquents are weakly attached to their delinquent peers and that conforming group members are more popular than less conforming ones (Barlow and Ferdinand, 1992: 73). Agnew's (1991a) study found that high levels of attachment combined with high levels of peer delinquency correlated with high self-reported delinquency. At lower levels of attachment the effects were not present. Sampson and Laub (1993: 108) found that the relationship between delinquency and delinquent friends was so high that it may be a tautology but that was because of the particular research design. The delinquents in Hirschi's (1969) study were found to have little concern for each other. Taken together, all of the above counter-points lead to a substantial controversy over the use of delinquent peers as a predictor of delinquency.

This thesis aims to explore some of the competing explanations of the delinquent peer association by the analysis of data from the National Longitudinal Study of Adolescent Health (Udry, 1997). In the first chapter, contemporary criminological theories are discussed and examined for their treatment of delinquent peers. This is combined with a review of the recent empirical tests of the theories to illustrate the

operationalization of the delinquent peer association and samples used in the analyses. The second chapter deals with the details of the data, the measures constructed for analysis, and the methods employed. The results of the analyses are presented in the third chapter along with concluding remarks. Taking account of the theoretical polemic on this subject dating back at least fifty years, it seems pertinent to try to unravel this controversy in the light of new empirical evidence. It is hoped that these analyses will illuminate some of the peer interactions not previously examined.

Differential Association Theory

In 1947 Sutherland introduced an amended version of his 1939 theory of differential association with nine propositions. Taken together, the propositions constructed a theory of crime at two levels of explanation - group and individual - and on the assumption that crime is rooted in normative conflict (Matsueda, 1988). Normative conflict is also explained at both levels: based in the heterogeneity of modern industrial societies at the macro level; and in the observance or non-observance of particular laws by defining them favourably or unfavourably at the individual level.

The nine propositions of differential association theory were:

1. Criminal behavior is learned.

2. Criminal behavior is learned in interaction with other persons in a process of communication.

3. The principle part of the learning of criminal behavior occurs within intimate personal groups.

4. When criminal behavior is learned, the learning includes (a) techniques of committing crime, which are sometimes very complicated, sometimes very simple; (b) the specific direction of motives, drives, rationalizations, and attitudes.

5. The specific direction of motives and drives is learned from definitions of the legal codes as favorable or unfavorable.

6. A person becomes delinquent because of an excess of definitions favorable to violation of law over definitions unfavorable to violation of law.

7. Differential association may vary in frequency, duration, priority, and intensity.

8. The process of learning criminal behavior by association with criminal and anticriminal patterns involves all of the mechanisms that are involved in any other learning.

9. While criminal behavior is an expression of general needs and values, it is not explained by those general needs and values, since noncriminal behavior is an expression of the same needs and values (from Sutherland and Cressey, 1978: 80-82).

Over time, the theory has had its advocates and critics. Many of the criticisms have been answered in the various editions of Sutherland and Cressey's book, now in its eleventh edition, and articles such as Matsueda's (1988). The theory has also been examined at both the group and individual level of explanation. While acknowledging its application at the macro level - differential group affiliation (Sutherland and Cressey, 1978: 94) - the following discussion of its relevance to the study of delinquent peer associations will concentrate on the individual level of explanation.

The propositions have to be taken as a whole and relative to each other, but the most important ones to the role of delinquent peer associations are the third, sixth, seventh and eighth. Any effect of delinquent peers would not be the sole source of favourable or unfavourable definitions, nor of criminal or anticriminal patterns, but could be one of the more considerable sources, especially for adolescents. However, Matsueda (1988: 285) warns of such an approach:

> This strategy assumes that most delinquent behaviors are learned from one's peers, that delinquent peers are likely to transmit delinquency and non-delinquent peers nondelinquency, and therefore the concept of delinquent peers is highly correlated with the concept of associations with definitions favorable and unfavorable to delinquency. The problem with this strategy is that it fails to measure directly the crucial variable, learned definitions of law violation. It is conceivable that some definitions favoring law violation are learned from nondelinquents and some definitions favoring conformity are learned from delinquents.

Matsueda highlights one of the main problems with testing differential association theory: operationalizing the key variables. As Matsueda (1988: 286) points out in his own

work, he operationalizes learned definitions as a latent construct and, in doing so, admits that they cannot be measured directly. If this method of dealing with the theoretical constructs is followed, it is a matter of methodology and logic to determine which measurable variables best reflect the latent construct of learned definitions. In this vein, Orcutt (1987) found that marijuana use is explained by favourable definitions and the number of friends smoking marijuana. It follows then that it would be reasonable to assume that the behaviour of delinquent peers is accompanied by favourable definitions and rationalizations for such actions. Indeed, Warr and Stafford (1991: 856) in their test of differential association and social learning theory found that peer attitudes and behaviour were highly correlated. Also, while they found support for Sutherland's theory, the findings indicated that peer behaviour had a stronger effect on respondent's behaviour than peer attitudes. This led them to conclude that Sutherland's theory is "...ultimately incomplete" (Warr and Stafford, 1991: 862) as it concentrates on attitude transference as the main cause of delinquency while ignoring the effect of peer behaviour. The eighth proposition of differential association theory may allow for the inclusion of the main components of Akers' (1977) social learning theory - imitation and vicarious reinforcement: "...the notion of attitude transference on which differential association theory rests does not appear to be a sufficient explanation of peer influence" (Warr and Stafford, 1991: 862-863).

What, ultimately, is left unmeasured is the weight given these definitions and behaviours by those receiving them. These intangibles end up in the error terms of any analysis which may be unsatisfactory when taking a strict "Sutherland-esque" analytical induction approach to causality (Laub and Sampson, 1991), but is unavoidable when dealing with actual data and probabilistic models. According to Sutherland, the reaction of the receiver of these favourable or unfavourable definitions is based on his or her receptivity. The level of receptivity "...is determined by the person's current ratio of learned behaviors: Those who have learned an overabundance of anticriminal definitions will be receptive to additional anticriminal definitions and resistant to procriminal definitions, and vice versa" (Matsueda, 1988: 283). This is consistent with the overall thesis that a person's ratios of favourable and unfavourable definitions vary over time as

their social interactions change. The problem lies in an infinite regress as to what causes the ratio of definitions. Loosely interpreting the scope of social interactions may bring the focus ultimately back on to the family and childhood situations, a departure Sutherland would probably not have wanted to take (Laub and Sampson, 1991).

For all the debate over transmission of attitudes, the role of peer behaviour, and the possible infinite regress of receptivity, the theory and subsequent tests of it are clear over the hypothesized causal ordering; that the criminal definitions of others are transmitted to the individual who either accepts or rejects them and it is these individual definitions that may cause delinquency. This causal order could be illustrated as in figure 1.1.

Figure 1.1: Causal Ordering under Differential Association Theory
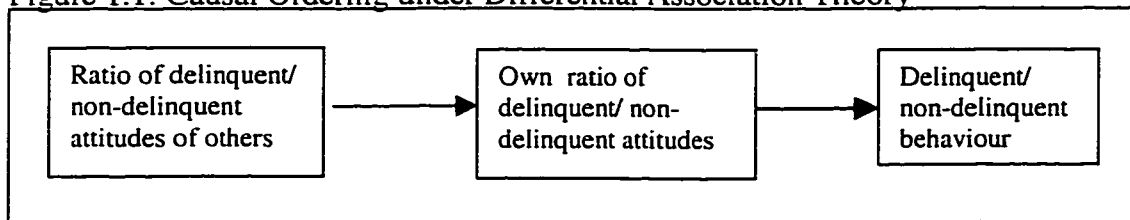
It is clear that, according to differential association theory, the delinquency of others is a substantive causal component in an individual's own delinquency. Indeed, it "...grants causal priority to associations with delinquent peers" (Thornberry, Lizotte, Krohn, Farnworth, and Jang, 1994: 49).

Much of the empirical testing of differential association theory occurred in the 1950s and 1960s (e.g. Short, 1957; Glaser, 1960; Short, 1960; and Liska, 1969) but it has remained in use in contemporary studies (e.g. Matsueda, 1982; Tittle, Burke, and Jackson, 1986; Matsueda and Heimer, 1987). And most of these studies claim to find support for the theory.

James Short Jr. (1960: 19) used a differential association perspective to study peer relationships "...expected to be delinquency inhibiting and neutral with respect to the production of delinquency...". The sample was taken from junior high school students, 184 boys and 118 girls, in a depressed area of a northwestern city in the US. James Short Jr. cross-tabulated self-reported delinquency by definitions expected to be delinquency

inhibiting, delinquency producing, and delinquency neutral relating to their best friends (Short, 1960: 20). While concluding that his findings supported the principle of differential association theory, Short acknowledged the liberties taken with the operationalization of some of the concepts. He concluded by commenting on the difficulties involved with testing differential association theory:

> Research on a theory such as differential association, the variables and functional relationships of which, though they are not without meaning, are so imprecisely defined, is necessarily a theoretically creative task (Short, 1960: 24)

In an analysis of the 1965 Richmond Youth Project data, Jensen (1972) explored the effects of parents in relation to delinquent peers and self-reported delinquency. Jensen (1972: 562) argued that the family is an important source of favourable or unfavourable definitions and should be included in any analysis conducted under the differential association perspective. He found general support for the theory but cast doubt on the role the family play as outlined by Sutherland. Jensen (1972: 574) maintained that

> ...what goes on in the family situation appears to have a significance of its own...The neutral or isolated child is more likely to be delinquent than the child who is loved by and attached to his parents even when delinquent patterns "outside the home" are scarce or absent.

Matsueda and Heimer (1987) also examined data from the Richmond Youth Project to test Matsueda's (1982) model of differential association across different racial groups. Matsueda and Heimer claim that the model also tests Hirschi's (1969) social control theory. Using latent variable structural equation modeling, they conclude that:

> For both black and nonblack samples, our models support differential association theory over social control theory. Contrary to Hirschi's (1969) postulate that each element of the social bond shows a unique and substantial effect on delinquency, we find that the effects of attachment to parents and peers operate indirectly through the process of learning an excess of definitions favorable to delinquency (Matsueda and Heimer, 1987: 835).

Matsueda's model did not include attitudes of friends or parents, areas crucial to differential association theory. The delinquency of peers was measured by the number of

close friends that were picked up by the police (Matsueda and Heimer, 1987: 837) which assumes that delinquent definitions come hand-in-hand with delinquent peer behaviour (cf. Matsueda, 1988). While this assumption is generally supported (cf. Warr and Stafford, 1991), Matsueda attempts to utilize both sides of this assumption in that he models the respondent's attitudes as a predictor of behaviour. Not surprisingly, it is the most significant and powerful predictor of delinquent behaviour, rendering all other predetermined variables non-significant. If, following Matsueda's lead on peer behaviour, one assumes that delinquent definitions and delinquent behaviour are substantively the same and only mediated by opportunity (also not modeled), then one must examine the model for its ability to predict delinquent behaviour while ignoring delinquent definitions. In this case, the model actually lends support to Hirschi's (1969) social bond theory with significant effects on delinquency from broken homes, supervision of parents, peer delinquency and peer attachment.

The association between peer delinquency and peer attachment in Matsueda and Heimer's findings is also of interest. In both racial samples, peer delinquency has a negative effect on peer attachment, a positive effect on delinquent definitions when attachment is controlled, and peer attachment has a negative effect on delinquent definitions. These findings indicate that attachments between delinquent friends are not strong while strong peer attachments are consistent with less delinquent definitions and, through them, delinquency. Together, they lend support to Gottfredson and Hirschi's (1990: 157) contention that "...individuals with low self-control do not tend to make good friends. They are unreliable, untrustworthy, selfish, and thoughtless. They may, however, be fun to be with; they are certainly more risk-taking, adventuresome, and reckless than their counterparts."

Tittle, Burke, and Jackson (1986: 405) developed a model that attempted to state and extend the theory of differential association. The sample was drawn from a 1972 survey conducted in Iowa, New Jersey, and Oregon (N=1,993). Using two-stage least squares methods, Tittle et al. estimated their model for six different crimes. The model yielded consistent results for five of the crimes with criminal definitions having no direct

effect on the probability of crime but an indirect effect through motive. Tittle et al. (1986: 425) conclude that their findings

> ...support the most popular interpretation of [Sutherland's] causal argument: the association with criminal definitions has an indirect effect on crime through learned symbolic elements rather than a direct effect via imitation (or the modern alternative of vicarious conditioning).

There are two concerns about the Tittle et al. model. First, definitions favourable to crime are measured by peer behaviour which uses the same assumption as Matsueda and Heimer (1987) that definitions come with behaviour. Also, that their measurement of motive – "...a relatively constant desire or persistent urge to do illegal things" (Tittle et al., 1986: 414) – appears to measure self-control (cf. Gottfredson and Hirschi, 1990) rather than "receptivity" as hypothesized by Sutherland.

Warr (1993b) partially used differential association theory to examine the relationships between parents, peers, and delinquency. Warr (1993b: 247) treated peers as "...potential instigators of delinquency...and parents as potential barriers to delinquency...". The causal ordering of the effect of delinquent peers followed differential association. Warr's analysis of data from the National Youth Survey addressed the question of whether or not parental influence is capable of negating the influence of delinquent peers. The findings indicated that the amount of time spent with parents, rather than attachment to parents (from the adolescent's point of view), was able to reduce or eliminate peer influence. The time spent with parents would appear to reduce the opportunity for delinquency as Warr (1993b: 259) suspects "...that the immediate pressure of peers on adolescents is so great that peer-induced pressures to violate the law can be overcome only be avoiding the company of delinquent peers altogether."

Warr (1993a) used data from the National Youth Survey to evaluate how differential association theory was able to explain the age distribution of crime as posited by Gottfredson and Hirschi (1990). The exposure to peer delinquency was found to vary by offense and over age in different forms. The examination of the nature of peer relations led Warr (1993a: 25) to deduce that

The relevance of peers in the lives of young persons reaches its zenith in the middle-to-late teens. Age-related changes in the importance of peers, the amount of time spent in their company, and loyalty to peers are substantial enough that they can reasonably be expected to exert strong, even profound, effects on the behavior of adolescents.

In multiple regression models, the effect of age on self-reported delinquency was rendered non-significant when the number of delinquent peers was introduced into the equation, except in the case of cheating at school. In further models, the attributes of the peer relationships, such as the amount of time spent with peers and level of intimacy, were introduced and the only consistent effect was a reduction in the effect of the number of delinquent peers. Warr (1993a: 28) summarizes that "...these additional peer variables are already captured to some degree by the number of delinquent peers the respondent has." This leads to the conclusion that "...it may be no easy matter to disentangle the elements of differential association" (Warr, 1993a: 28).

The strong intercorrelation between peer-related variables (e.g. duration and quality), as found by Warr (1993a; 1993b), has been a problem when empirically testing differential association theory. For example, Warr (1993a) reports a correlation ($r > .60$) between number of delinquent peers and time spent with delinquent peers. It is unclear from the data presented whether or not delinquents spend more time with delinquent friends than non-delinquents do with non-delinquent friends. However, Warr does indirectly tackle this area in his analysis of parent and peer effects (1993b) and the amount of time spent with parents. The dilemmas faced by Warr have not been unique to his investigations from the differential association perspective. As early as 1960, Short pointed out the difficulties inherent in operationalizing key terms in the theory. This has led to numerous interpretations of these terms by different researchers and that variety of interpretations has left the empirical tests open to criticism. The theory is very clear, however, on causal ordering: exposure to an excess of unfavourable definitions, of which delinquent peers is but one source, may lead to delinquency.

The Gluecks and Early Social Control Theory

The work of Sheldon and Eleanor Glueck (1934, 1950, 1964, 1968, 1972) has re-emerged in contemporary criminology mainly because of the re-analysis of their Unraveling Juvenile Delinquency data by Sampson and Laub (1993). However, the Gluecks' work formed the basis for social control theories and many aspects of their work have maintained their relevance over time (Laub and Sampson, 1991). A major objective of their work was to obtain facts from research to derive prediction tables of delinquency. They saw the production of such tables as a social contribution of criminology to the prevention of delinquency (Glueck and Glueck, 1934; 1964). While their work was multi-disciplinary in nature and examined many aspects of the lives of delinquents and non-delinquents, the emphasis was on the family and the school. The role of the family was given priority: "...since the family is the first and foremost vehicle for the transmission of the values of a culture to the young child, lack of family unity may leave him without ethical moorings or convey to him a confused and inconsistent cultural pattern" (Glueck and Glueck, 1964: 22).

The early elements of social control theory can be discerned in their statements about the background of delinquents:

> The picture is one of social inadequacy, unwholesome psychologic atmosphere, poor heredity, low moral standards and family criminality. And these are the influences which acted upon the formative years of our delinquents (Glueck and Glueck, 1934: 82-83).

The Gluecks' approach to the causes of crime made the causal ordering of certain behaviours differ from that of differential association theory, especially when it came to delinquent peer associations. The Gluecks could not be clearer when they pointed out

> ...that there are certain forms of maladapted behavior, in and out of school, which cannot, strictly, be included among the causal pressures to delinquency because, according to our theoretical framework, they are largely *consequences* rather than *causes* (Glueck and Glueck, 1964: 23, emphasis in the original).

They continued to explain how this related to delinquent peers:

In their choice of companions, also, the delinquents differed markedly from the other boys, almost all of them (in contrast to very few of the non-delinquents) preferring to chum with other delinquents and over half the group (compared to less than 1 per cent of the non-delinquents) having become members of gangs (Glueck and Glueck, 1964: 25).

The Gluecks' explanation of the delinquent peer association came from their conclusion in Unraveling Juvenile Delinquency which suggested that "...birds of a feather flock together..." (Glueck and Glueck, 1950: 164). This position, while somewhat supercilious, "...is an apt formulation of a central assumption of control theories" (Hirschi, 1969: 136).

In this regard, the Gluecks' position was the complete opposite of that of Sutherland and differential association theory. This polemic of theoretical positions soon brought the Gluecks and Sutherland into an open debate (see Laub and Sampson, 1991 for a full description). Even though Sutherland's position appeared to dominate the debate and, subsequently, set the criminological agenda, the stage was set by Hirschi (1969) for the rediscovery of social control theories in competition to differential association.

Sampson and Laub's Analysis of the Glueck Data

In Crime in the Making, Sampson and Laub (1993) published their analysis of the Gluecks' data used in Unraveling Juvenile Delinquency. Their theoretical perspective differed from that of the Gluecks' as they used the data to test their theory of age-graded informal social control that consisted of three main hypotheses:

- Structural context mediated by informal family and school social controls explains delinquency in childhood and adolescence,

- There is continuity in antisocial behavior from childhood through adulthood in a variety of life domains, and

- Informal social bonds in adulthood to family and employment explain changes in criminality over the life span despite early childhood propensities (Sampson and Laub, 1993: 7).

Sampson and Laub's theory questioned Gottfredson and Hirschi's (1990) stability thesis on the basis that changes in behaviour are more common than stability and attribute this change to informal social bonds in adulthood. Sampson and Laub (1993: 13) state that "...change is the norm for the majority of adolescents, stability characterizes those at the extremes of the anti-social conduct distribution...". Sampson and Laub's comments blur the distinction between behaviour and the characteristic of self-control which Gottfredson and Hirschi went to some length to separate. However, Sampson and Laub (1993: 16) do acknowledge the role of individual characteristics, such as self-control, play in the life course. On the whole, Sampson and Laub (1993: 18) adopt a social control theory perspective in relation to adolescent delinquency and a social capital approach to adult delinquency.

In their treatment of the delinquent peer association, they found that the "...bivariate relationship between delinquency of the subject and delinquent friends is so high that it suggests a tautology, especially when considered in conjunction with the Gluecks' research design" (Sampson and Laub, 1993: 108). To overcome this problem, they included in their model a measure of high attachment to delinquent peers that came closer to social learning theory but enabled them to test the main assumptions of control theory by comparing effects of family and school with delinquent peers (Sampson and Laub, 1993: 109).

Sampson and Laub (1993: 115-116) also tested for background factors that may explain high levels of attachment to delinquent peers and found that father's deviance (measured by official crimes and frequency of drunkenness) and family size (measured by the number of children in the home) were the only two significant predictors. When they modeled delinquent peer attachment as a predictor of official and self-reported delinquency, controlling for structural and background factors, they found that it was the most important predictor (Sampson and Laub, 1993: 116). Additionally, Sampson and Laub (1993: 119) included attachment to delinquent peers as a predictor in a model with other social process variables (reflecting their social learning approach to the delinquent peer association), structural variables, and child effects variables. In this case they found

that attachment to delinquent peers was the most important predictor of official delinquency and the second most important of unofficial delinquency.

Hirschi's Social Bond

In Causes of Delinquency (1969), Hirschi introduced his social control theory in which he hypothesized that "...delinquent acts result when an individual's bond to society is weak or broken" (Hirschi, 1969: 16). This bond consisted of four elements: attachment, commitment, involvement, and belief. In his selective analysis of the Richmond Youth Project data (N=905), Hirschi concentrated on six main areas relative to the elements of the bond: attachment to parents; attachment to the school; attachment to peers; commitment to conventional lines of action; involvement in conventional activities; and belief.

When dealing with the subject of attachment to peers, Hirschi (1969: 137-138) contrasts control theories with differential association theory:

> In one view, then, the companionship factor is a central cause of juvenile delinquency. In another view, companionship with delinquents is an incidental by-product of the real causes of delinquency. There are many variations on these basic, if extreme, positions...There are also two basic approaches to this question within control theory. One assumes a causal ordering opposite to that assumed by differential association theorists...A second approach from a control theory perspective takes the question of causal ordering as less crucial, suggesting that the relation between [peer delinquency] and delinquency is spurious.

Therefore, Hirschi agrees with the Gluecks that peer delinquency is a consequence of delinquency rather than a cause of delinquency. In the empirical test of his theory, Hirschi (1969: 153-154) constructed a model indicating the relationship between peer delinquency and delinquency from a control theory perspective, as in figure 1.2.

In his concluding remarks about the delinquent peer association, Hirschi (1969: 159-161) makes four points. First, that his analyses lend support to the position that one's stake in conformity affects one's choice of friends. Second, that "...the idea that delinquents have comparatively warm, intimate social relations with each other (or with

anyone) is a romantic myth." Third, the susceptibility of delinquent influences is inversely related to one's stake in conformity. Finally, that the effect of delinquent influences varies inversely with one's stake in conformity.

Figure 1.2: Causal Ordering under Social Control Theory
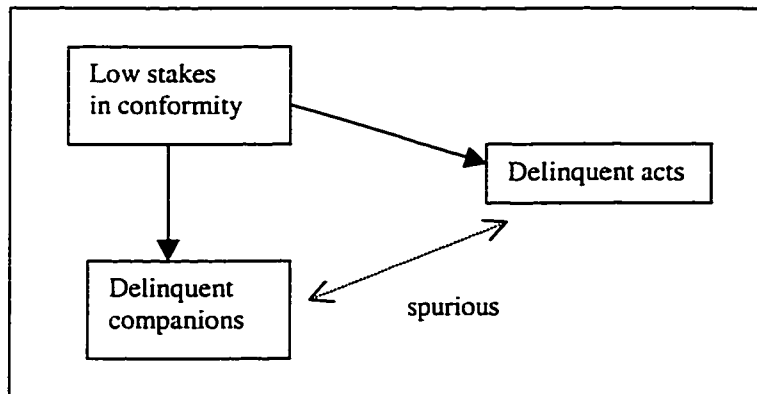
Hirschi's conclusions, except the second point concerning the nature of delinquent associations, are based on his theoretical inclination rather than the data used in his study. As the data were cross-sectional, it is a matter of theoretical bent whether "...boys with low stakes in conformity are more likely to have delinquent friends..." (Hirschi, 1969: 156) or boys with delinquent friends are more likely to have low stakes in conformity. The data presented make both alternatives equally plausible. This criticism of studies using a social control perspective and cross-sectional data is picked up by Agnew (1991b, see below).

However, a large amount of research has been influenced by Hirschi's theory and it is a testament to its position in criminology that it continues to dominate contemporary research and empirical studies. It has also been broadly applied across a range of areas such as: school rebellion (Kelly and Pink, 1973), school intervention programs (Farnworth, Schweinhart, and Berrueta Clement, 1985), white collar crime (Lasley, 1988), adolescent drug use (Marcos and Bahr, 1988), biological predisposition and social control (Udry, 1988), religiosity (Foshee and Hollinger, 1996), and habitual offenders (Knight and Tripodi, 1996). Generally, these empirical studies have found support for social control theory (e.g. Hindelang, 1973; Junger-Tas, 1992), however some have mis-specified the theory by adding the delinquent peers association as a predictor of

delinquency and then claiming that the model supports differential association theory (Thompson, Mitchell, and Dodder, 1984). And others have suggested modifying the theory to take account of structural variables that their studies have indicated remain significant (Wiatrowski, Griswold, and Roberts, 1981).

Agnew's (1991b: 126) criticisms of social control theory are based on the results of several longitudinal studies which "...have begun to raise serious questions about the importance attributed to the theory." He supports his contention by claiming that most of the empirical support for Hirschi's theory was derived from cross-sectional studies and that "...the association between social control and delinquency is not necessarily due to the causal impact of control on delinquency" (Agnew, 1991b: 126). To test these assertions, Agnew uses data from the first two waves of the National Youth Survey (N=1,725) to model social control longitudinally. He finds that "...the social control variables have a weak effect on the three forms of delinquency examined..." (Agnew, 1991b: 150). Even when the delinquent peers variable was removed from his model, Agnew (1991b: 147) found "...that commitment is the only social control variable to have a significant effect...". Agnew is somewhat tentative in his conclusions based on his findings and discusses a number of alternative hypotheses based in the developmental theory literature such as: the impact of social control varying with age of onset and type of offense (cf. Thornberry, 1987).

The amount of criticism and analyses of Hirschi's theory after he had adjusted his theoretical position in A General Theory of Crime (1990) again demonstrate the dominant position it has occupied in criminology for nearly thirty years.

Gottfredson and Hirschi's General Theory

Gottfredson and Hirschi (1990) proposed a general theory of crime that was based on the individual characteristic of low self-control. Their concept of self-control revolved around the ability of a person to defer gratification as opposed to low self-control that was characterized by a "here and now" approach (Gottfredson and Hirschi, 1990: 89). The consequences of low self-control were theorized to manifest themselves in a number of ways, of which crimes and deviance are but two. They also propose that the

characteristic of low self-control is stable over the life of the individual and is rooted in the child-rearing practices of the family and the school. This emphasis on the early social development of the child heralded a shift in focus for contemporary criminological study although this had always been critical for developmental psychologists and their studies of adolescent misconduct (e.g. Ramsey, Patterson, and Walker, 1990; Moffitt, 1993).

Although not strictly part of their general theory, the invariant distribution of crime with age was a key part of the work. They maintain that the age-crime relationship is so powerful that no social factor can account for it (Gottfredson and Hirschi, 1990: 130). The effects of age, and gender for that matter, are theorized to be separate from those of self-control, so the age-crime curve is used to illustrate the difference between individual propensity toward crime (low self-control or "criminality") and crimes as events that require a set of particular conditions (opportunity or "crime"). The decline of the age-crime curve is attributed to "...the inexorable aging of the organism..." which leaves the stable characteristic of low-self control to manifest itself in other ways such as inconsistent employment and fractious marriages (Gottfredson and Hirschi, 1990: 141).

In regard to the delinquent peer association, Gottfredson and Hirschi (1990: 234) are very clear on their position:

> Our theory is consistent with the Gluecks' hypothesis (1950) that delinquency causes association with other delinquents (i.e., "birds of a feather flock together"). This hypothesis reverses the causal order from that asserted by differential association theory, according to which association with delinquents is a major or, in some versions, the sole cause of delinquency.

However, they do acknowledge the potential role of delinquent peers, once the association has been formed, as facilitators of continued delinquency towards which one was already predisposed:

> The theory advanced here is compatible with the idea that some criminal acts are facilitated by group membership or a group context. Facilitation is another word for reduction of difficulty, for the "ease" with which an act can be performed. Adolescents clearly use groups to facilitate acts that would be too difficult or dangerous to do alone (such as robbery) but this does not mean that they *learn*

lack of self-control in such groups. On the contrary, participation in such groups is itself indicative of a lack of self-control...(Gottfredson and Hirschi, 1990: 158-159).

Gottfredson and Hirschi's (1990: 234-235) stance on the causal ordering of the delinquent peer association is based in their acceptance of a control theory perspective and also in a critical assessment of longitudinal research on the matter. They criticize longitudinal designs for failing to test alternative hypotheses and *a priori* subscription to a particular theory of crime, which includes the delinquent peer association. Further, they maintain that even with a theoretical bias toward treating delinquent peers as a substantive cause of crime, longitudinal studies have not proved that issue. Indeed,

[t]his summary of some of the social and demographic correlates of crime leads us to conclude that the causal-order problem is an illusion that largely disappears when it is addressed one variable at a time. We find no evidence that existing longitudinal research has resolved any issue of causal order more adequately than has cross-sectional research (Gottfredson and Hirschi, 1990: 235).

The inconclusive nature of the results of longitudinal studies have been mainly due to the emergence of delinquency and peer delinquency during the same periods of data collection. Not only do delinquency and peer delinquency emerge together but often at the same time as other relevant factors. Thus, each wave of longitudinal studies faces problems similar to cross-sectional studies in determining causal ordering.

After this dismissal of the causal effects of the delinquent peer association, Gottfredson and Hirschi (1990: 157), in their critique of the methodology used by Elliott, Huizinga, and Ageton (1985) in their analysis of the National Youth Survey data, go on to suggest some possible explanations for the high correlation between self-reported delinquency and peer delinquency. These explanations boil down to two points: first, peer delinquency is "...really delinquency of respondent..." in that it reports the respondent's own behaviour in league with others; and, second, it is "...really hearsay or rumor...". While the methodological argument follows their theoretical perspective on the delinquent peer association as an artifact of self-reported delinquency, it also lays down a

challenge to future research, from whatever theoretical perspective, to clearly differentiate the behaviour and attitudes of peers from that of the respondent.

Agnew (1991b: 143-144) answers their specific arguments in relation to the measures used in the National Youth Survey. First, Agnew notes that the self-reported delinquency and peer delinquency items did not load onto the same construct by either exploratory or confirmatory factor analysis. Second, in a structural equation model, self-reported delinquency and peer delinquency were "...differentially related to certain of the other variables in the model. So there is some empirical justification for treating these variables as distinct." However, Agnew does concede that these measures are highly correlated and that may be the result of a partial overlap in the measurement.

Elliott and Menard (1996) addressed the temporal issue of delinquent peers and self-reported delinquency in data from the first six waves of the National Youth Survey. Elliott and Menard (1996: 43) claim to have found evidence supporting social learning theory over control theory as more adolescents experience peer delinquency first. However, their evidence for social learning theory included adolescents who experienced peer delinquency and then did not report any delinquency themselves; evidence that would tend to disprove social learning theory. When these adolescents are adjusted for in the results, the findings are inconclusive for either social learning and social control theories.

Matsueda and Anderson (1998) also addressed Gottfredson and Hirschi's criticisms of the National Youth Survey measures by using a LISREL measurement model. They found, in support of the criticisms, that

> ...the strong correlation between delinquent peer associations and delinquent behavior, derived from cross-sectional data, may have an ambiguous interpretation. The contemporaneous correlation is, in part, due to correlated measurement errors, or alternatively, to "differential bias," in which true delinquency exerts direct effects on individual measures of delinquent peers (Matsueda and Anderson, 1998: 298).

The impact of A General Theory of Crime on criminology has been substantial and it has certainly drawn attention to the effects of childhood on delinquency (see also

Wilson and Herrnstein, 1985; Loeber and Stouthamer-Loeber, 1986). However, few empirical studies have been a straight forward test of the theory (e.g. Grasmick, Tittle, Bursik, and Ameklev, 1993) and most have used the overall thrust of the theory to incorporate individual level characteristics into a social control model.

Grasmick et al. (1993: 7) note that "...to their credit, Gottfredson and Hirschi usually are very explicit in defining the concepts in their theory..." and go on to operationalize their concepts of self-control and crime to test on a sample of adults from Oklahoma City in 1991 (N=395). Their findings indicated that "...the theory clearly merits serious consideration..." and that their measures of self-control did reflect an unidimensional trait (Grasmick et al., 1993: 23). However, the finding that self-control had a significant interaction effect with opportunity caused them to claim that Gottfredson and Hirschi had not paid enough attention to the role of opportunity. Another criticism leveled by Grasmick et al. (1993: 25) was Gottfredson and Hirschi's assumption of invariant motivation to commit crime:

> As did Hirschi (1969) in his earlier work, Gottfredson and Hirschi assume that everybody is equally motivated to commit acts of fraud and force, the differences in actual commission being due to variations in self-control and/or opportunity. There is good reason, however, to think that the things one can obtain by force and/or fraud carry different values for different individuals - that is, the motivation for crime is not equal for everybody.

Keane, Maxim, and Teevan (1993) tested Gottfredson and Hirschi's general theory on the outcome of drinking and driving. Their data were derived from the 1986 Ontario Survey of Nighttime Drivers (N=12,777). The results of their analysis were interpreted as being generally supportive of Gottfredson and Hirschi's general theory (Keane et al., 1993: 42). No measures of peer delinquency or peer influence were included in their study.

Brownfield and Sorenson (1993) used data from the Richmond Youth Survey (see Hirschi, 1969) to empirically test Gottfredson and Hirschi's general theory. The analysis was restricted to data from the 1,500 white males in the complete sample (Brownfield and Sorenson, 1993: 252). Their findings indicated some support for the concept of self-

control as well as support for Hirschi's (1969) elements of the social bond. However, when Brownfield and Sorenson (1993: 257) used an index of self-control to predict delinquency, they added a measure of peer delinquency as a predictor, completely contradicting Gottfredson and Hirschi's stance on the causal ordering of the delinquent peer association. And, not surprisingly, they found that peer delinquency was the strongest predictor of both self-reported and official delinquency (Brownfield and Sorenson, 1993: 257).

Strain Theories and Delinquent Peers

The influence of pure strain theories in contemporary criminology is, at best, marginal despite the considerable influence of Robert Merton, leaving only one major proponent and one main theory: Agnew's general strain theory. Agnew (1992: 47) traces the origins of strain theories to the work of Merton (1938), Cohen (1955), and Cloward and Ohlin (1960) but admits that the questioning of the underlying assumptions of these works has led him to attempt to develop a general strain theory for crime and delinquency.

Agnew (1992: 48-50) contrasts his general strain theory with social control or differential association/social learning theories by stating that "...strain theory focuses explicitly on *negative relationships with others*..." and that "...while these other theories view delinquency as the result of drift or desire, strain theory views it as the result of pressure" (emphasis in the original). He goes on to claim that by identifying "strain", it provides the motivation that leads to delinquency (cf. Grasmick et al., 1993). The types of strain are identified by Agnew (1992: 50-59) as being:

- The failure to achieve positively valued goals by:
  - the disjunction between aspirations and expectations/actual achievements,
  - the disjunction between expectations and actual achievements, or
  - the disjunction between just/fair outcomes and actual outcomes.
- The removal of positively valued stimuli from the individual.
- The presentation of negative stimuli.

The pressure resulting from the strain created by one or more of these situations necessitates "...corrective action and *may* lead adolescents to (1) make use of illegitimate channels of goal achievement, (2) attack or escape from the source of adversity, and/or (3) manage their negative affect through the use of illicit drugs" (Agnew, 1992: 49 emphasis in original).

The corrective action to this pressure relies on the individual's own coping strategies and these can be either delinquent or non-delinquent. Agnew (1992: 73) posits that this is partly dependent on the individual's disposition to delinquency and this is the point of the theory that examines the role of delinquent peers. Agnew (1992: 73) hypothesizes that delinquent peers may have an effect on the coping strategies of the angry/frustrated individual by their ability to assist in attributing the adversity to others and, therefore, disposing the individual to delinquency. This overall description indicates that the causal ordering theorized by Agnew could be illustrated as in figure 1.3.

Figure 1.3: Causal Ordering under Strain Theory
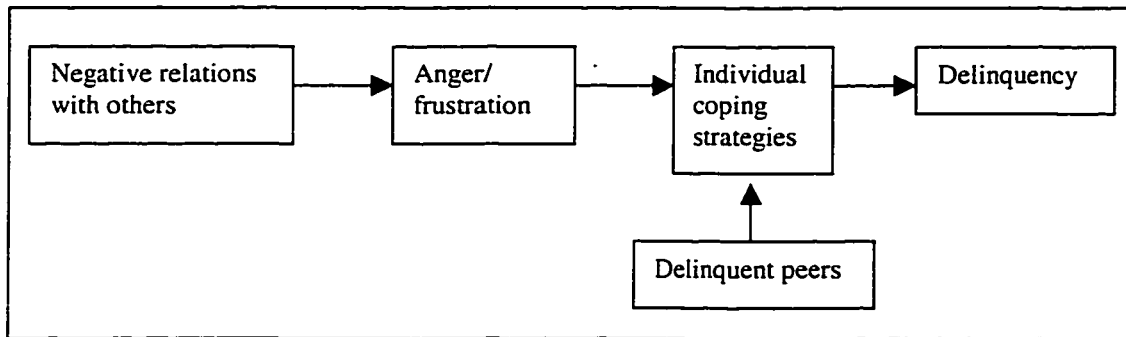
The emphasis of negative relationships rather than attachment to conventional beliefs, leaves Agnew (1992: 76) hoping that "...the general strain theory will revive interest in negative relations and cause criminologists to 'bring the bad back in'."

This last comment by Agnew is misleading as for a number of years prior to his article researchers have considered the negative side of the bonds theorized by Hirschi (1969). For example, the negative effects of broken homes and ineffective parenting have been revisited by Wilson and Herrnstein (1985) reanalyzing Hirschi's (1969) data, Loeber and Stouthamer-Loeber (1986), Matsueda and Heimer (1987), Gottfredson and Hirschi (1990) and McCord (1991) among others.

In an empirical test of Agnew's general strain theory, Agnew and White (1992: 479) used data from the Rutgers Health and Human Development Project (N=1,380), a longitudinal study that focused on alcohol and drug use. Agnew and White found general support for strain theory when modeled with social control and differential association variables. Agnew and White (1992: 482-483) measured strain with eight sub-groups such as "negative life events" and "life hassles", each consisting of a scale. A summary measure of strain was employed in later analyses which consisted of four of the eight sub-groups and each weighted to form one scale of strain (Agnew and White, 1992: 487). Of particular interest is their exploration of the interactive effects of strain and friends' delinquency (Agnew and White, 1992: 488-490). They found that strain had a greater effect on delinquency the higher the number of delinquent friends one has; ranging from an effect of 0.05 when delinquent friends are scored one standard deviation below the mean to 0.33 for those with a number of delinquent friends one standard deviation above the mean. This interaction of peer delinquency and strain is an indication of peer effects on individual coping strategies.

Paternoster and Mazerolle (1994) used data from the National Youth Survey to test Agnew's general strain theory. They sought to conduct a comprehensive test of the theory using longitudinal data and examine different types of strain (Paternoster and Mazerolle, 1994: 239). At a theoretical level, Paternoster and Mazerolle (1994: 242-243) note the conceptual overlap between some of Agnew's antecedent variables and social control variables (e.g. Hirschi, 1969). However, they note that Agnew is explicit in that what distinguishes his general strain theory is the unique intervening variables between these antecedent variables and delinquency. "Strain theory...stipulates that aversive experiences and relationships result in specific negative affective states (anger, frustration, disappointment) that ultimately lead to delinquency" (Paternoster and Mazerolle, 1984: 243). Overall, they found empirical support for general strain theory and, by way of their causal model, claim that "...strain leads to involvement in delinquency, then, because it in part weakens adolescents' ties to conventional sources of social control and strengthens their ties to delinquent others" (Paternoster and Mazerolle, 1994: 251). In this regard, they view the delinquent peer association as causally prior to

delinquency and as a result of strain. However, their model contradicts their theoretical stance as previous delinquency is used as an exogenous variable. It is moderately associated with delinquent peers which still leaves the question open as to which comes first. Also, Paternoster and Mazerolle (1994: 258) were unable to replicate Agnew and White's (1992) finding of interaction effects of strain with peer delinquency.

Interactional Theory

In the introduction to his interactional theory Thornberry (1987: 864) proposes that

> ...human behavior occurs in social interaction and can therefore best be explained by models that focus on interactive processes. Rather than viewing adolescents as propelled along a unidirectional pathway to one or another outcome – that is, delinquency or conformity – it argues that adolescents interact with other people and institutions and that behavioral outcomes are formed by that interactive process.

Therefore, from this interactional perspective, Thornberry, Lizotte, Krohn, Farnworth, and Jang (1994: 49) theorized that peer delinquency and self-reported delinquency are interrelated over time and are likely to have reciprocal causal influences on each other. This takes the middle ground between the causal ordering in differential association and control theories by utilizing both so that

> ...delinquent peers are likely to reinforce delinquency, and as the subject anticipates and experiences those positive peer reactions, delinquency is likely to increase. In turn, the more a person engages in delinquency, the more likely he or she is to associate with delinquent peers.

While this position may appear logically intuitive there are some problems with specifying initial causes that are apparent in models used to test the theory. Also, the interactional effect is not unique to Thornberry's theory.

The interactive nature of Thornberry et al.'s model (1994: 52) allows the effect of peer delinquency and reactions on self-reported delinquency to be assessed over time and with contemporaneous causal loops. The variable, delinquent peers, is not thought to have a direct effect on delinquent behaviour as delinquent peers at time 1 is hypothesized

to have an effect on delinquent behaviour at time 2 via delinquent peers at time 2 and peer reactions at time 2. However, at time 1, delinquent peers and delinquent behaviour are modeled simultaneously thus avoiding the question of which comes first. Thornberry et al. (1994: 62) acknowledge the high correlation between delinquent peers and delinquent behaviour but their perspective does not add to the debate over the initial causes of delinquency or associating with delinquent peers, only to the processes of action once they exist. In relation to the initial causes of delinquency, Thornberry et al. (1994: 50) assert that "...the fundamental cause of delinquency is the weakening of a person's bond to conventional society..." which follows social control theory. Also,

> If the freedom associated with weak or absent social controls is to lead to serious and prolonged delinquency, however, an environment is required in which delinquency can be learned and reinforced. That environment is provided largely by associations with delinquent peers and by the formation of delinquent beliefs.

This way, the distal causes are in the loosening of the social bond while the proximal causes are delinquent peers and beliefs (Thornberry et al., 1994: 51). Following this thread, only the distal causes should be modeled at time 1 while incorporating the proximate effects of peer delinquency and reactions at later time periods.

Interactional theory may claim to be an improvement over other theories for addressing the question of the effects of peer delinquency but it is not a unique concept. Thornberry et al. (1994: 49) over-simplify the role of delinquent peers in differential association by not considering the receptivity of the subject and how that may come about (see above). In summarizing the control perspective, they draw on the work of Hirschi (1969) and the Gluecks (1950) to the omission of Gottfredson and Hirschi's (1990) view that delinquent peers can act as facilitators of more, or other types, of delinquency, thus recognizing the role of delinquent peers in continuing delinquency. Thornberry's (1987) position differs from that of the control theorists in that he views peer delinquency and reactions as causal in the processes of delinquency rather than artifacts or consequences of delinquency.

It appears that interactional theory does not stand in contrast to differential association or control theories as an explanation of the initial causes of delinquency but

rather as an epilogue to them by detailing the processes of continuing delinquency. This is especially so when one considers interactional theory a developmental theory that takes account of different effects in early, middle and late adolescence (Thornberry, 1987).

Dual Taxa of Delinquency

Other developmental theories of delinquency, have theorized dual explanations of persistent behaviour and adolescence-limited behaviour. Moffitt (1993: 674) develops her classifications of delinquency split between life-course-persistent and adolescence-limited on the observation that desistance from delinquency in the late-teens and early twenties is the norm but a small group do engage in antisocial behaviour at all stages of life. The dual classification of delinquency allows Moffitt (1993: 675) to offer another explanation for the age-crime curve (cf. Farrington, 1986) with adolescence-limited delinquency accounting for the steep rise and decline, and the underlying amount of delinquency at all ages being accounted for by the life-course-persistent offender. The dual classification also acknowledges Sampson and Laub's (1993: 13) observation that change is the norm for most adolescents even though Sampson and Laub did not divide their delinquents into persistent and transitional offenders.

Life-course-persistent behaviour is theorized to be, primarily, a result of neuropsychological deficits acquired prenatally or in early childhood through a number of processes including poor prenatal nutrition, maternal drug abuse, child abuse, and neglect (Moffitt, 1993: 680). The difficult child is at more risk of attaining a life-course-persistent trajectory when combined with hostile child-rearing practices. However, this risk is not solely generated by the parents but as an interactive process with the child and the environment. This "...evocative interaction occurs when a child's behavior evokes distinctive responses from others" (Moffitt, 1993: 682). The cumulative effects of early antisocial behaviour spill over into adolescence and adulthood because "...little opportunity is afforded for the life-course-persistent antisocial individual to learn a behavioral repertoire of prosocial alternatives" (Moffitt, 1993: 683). In determining those most likely to be persistent delinquents, Moffitt (1993: 695) hypothesizes that

...the strongest prospective predictors of persistent antisocial behavior are anticipated to be measures of individual and family characteristics. These measures include health, gender, temperament, cognitive abilities, school achievement, personality traits, mental disorders (e.g. hyperactivity), family attachment bonds, child-rearing practices, parent and sibling deviance, and socio-economic status, *but not age* (emphasis in original).

Adolescence-limited delinquency differs from life-course-persistent delinquency in being inconsistent across situations in that "...adolescence-limited delinquents are likely to engage in antisocial behavior in situations where such responses seem profitable to them, but they are also able to abandon antisocial behavior when prosocial styles are more rewarding" (Moffitt, 1993: 686). The onset of adolescence-limited delinquency is posited to be "social mimicry" which accesses mature status, a desirable resource denied today's adolescents by the temporal gap between biological and social maturity (Moffitt, 1993: 686). The temporary nature of adolescence-limited delinquency leads Moffitt (1993: 695) to hypothesize that

Individual differences should play little or no role in the prediction of short-term adolescent offending careers. Instead, the strongest prospective predictors of short-term offending should be knowledge of peer delinquency, attitudes toward adulthood and autonomy, cultural and historical context, *and age* (emphasis in original).

According to Moffitt's (1993: 687) taxa, peer delinquency has more effect on the adolescence-limited delinquent, but the life-course-persistent delinquent plays a role in initializing the delinquency of others when as a "...by-product of the maturity gap [there] is a shift during early adolescence by persistent antisocial youth from peripheral to more influential positions in the peer social structure." This shift in the peer social structure results in life-course-persistent delinquents acting as models for adolescence-limited delinquents, although this does not necessarily entail an exchange of affection nor does it require active education on behalf of the life-course-persistent delinquents. Under Moffitt's (1993: 688) theory, peer support appears to be necessary for the adolescence-

limited delinquent to commit crime whereas the life-course-persistent delinquent is willing to commit crime alone.

In an empirical test of Moffitt's developmental theory and Gottfredson and Hirschi's (1990) general theory, Jeglum Bartusch, Lynam, Moffitt, and Silva (1997) used data from the male respondents (N=370) in the Dunedin Multidisciplinary Health and Developmental Study to test for single or multiple underlying latent factors in childhood and adolescence delinquency. The findings indicated that two higher-order factors exist: one for childhood delinquency and one for adolescence delinquency, thus lending support to Moffitt's developmental theory and dual taxa (Jeglum Bartusch et al., 1997: 39). In addition, Jeglum Bartusch et al. (1997: 38) regressed peer delinquency, and other measures, on both childhood and adolescence behavioural factors finding that the effect was greater on adolescence behaviour but the difference did not reach statistical significance.

Another dual classification of offenders that bears similarities to Moffitt's (1993) taxonomy is early and late onset of offending (Nagin and Farrington, 1992a; 1992b; Patterson and Yoerger, 1993; Paternoster and Brame, 1997; see Mealey, 1995 for similar dual taxa for sociopathy). Paternoster and Brame (1997: 55) identify the similarities in Moffitt's (1993) and Patterson and Yoerger's (1993) offender classifications. Moffitt's "life-course-persistent" offender is Patterson and Yoerger's "early-starter" and "adolescence-limited" is a "late-starter". Moffitt and Patterson and Yoerger differ as to the role of delinquent peers in the "early-starters".

> For Moffitt, peers have no influence on the delinquent behavior of life-course-persistent offenders. Their antisocial propensities are sufficient, in her view, to explain their early and continuous involvement in crime. Patterson, however, seems to suggest that delinquent peers have a direct causal effect on the delinquent behavior of even the most poorly socialized youth... (Paternoster and Brame, 1997: 55).

Paternoster and Brame (1997) used data from the National Youth Survey (N=508) to test four hypotheses derived from developmental theories and general theories. Specifically, one of their hypothesis related to the effect of delinquent peers

across early- and late-starters. The hypothesis was based on Moffitt's prediction that peer delinquency should have no effect on the life-course-persistent offender or, at least, less effect on them (Paternoster and Brame, 1997: 58). The findings did not reveal any difference of effect between the two groups, lending support to Patterson's theorized role of delinquent peers.

Studies Involving Peer Delinquency

The review above has illustrated the various theoretical positions regarding the treatment of the delinquent peers association. Hirschi (1969) noted that both of the two extreme positions on the role of delinquent peers - cause and consequence – had numerous variations and that still holds true. Today, Gottfredson and Hirschi's (1990) general theory maintains the extreme "consequence" position while the remaining differential association/social learning proponents are still at the extreme "cause" position. In between these two are arrayed the other theories. Strain theory, while not overly explicit about the role of delinquent peers, views them as an intervening variable acting on an individual's choice of coping strategy. Interactional theory implicates delinquent peers in an on-going process of continuing delinquency while relinquishing the fundamental causes of crime of the elements of social control. Developmental theories agree on the effects of delinquent peers for adolescence-limited delinquency but differ on their effects for life-course-persistent offenders. The rise to prominence of developmental theories in contemporary criminology, complete with their dual taxa, has bridged the two extreme theoretical positions. For example, Moffitt's (1993) view that individual differences are sufficient to explain delinquency in life-course-persistent offenders, leaving peer delinquency as merely an artifact, is similar to Gottfredson and Hirschi (1990). For adolescence-limited offenders, her view gives delinquent peers a causal role by way of social mimicry, agreeing with social learning theory (e.g. Akers, 1977).

With this theoretical overview in mind, table 1.1 is designed to present a summary of a number of studies (N=32) that have considered the effects of peer delinquency. The table is organized chronologically, mainly for ease, but also to demonstrate the changing

nature of the dominant theories. In the first part of the table, differential association is the most common theoretical perspective. Social control takes over in the middle, and the most recent studies are mostly concerned with self-control and developmental theories. The table also contains details of the sample used, measures of peer delinquency, and main results.

Table 1.1: Summary of Studies Involving Peer Delinquency
Notes: [a] Author and date of the work/article [b] Sample size M=males F=females
    [c] Age of respondents   [d] Racial composition of sample
    [e] Name of study (if applicable)   [f] Theoretical perspective of the work/article

Study	Measures of Peer Delinquency
Glueck and Glueck (1950)[a] 1,000M (paired)[b] 10-17[c] White[d] -[e] Social control[f]	Paired delinquents and non-delinquents in a panel study. No direct measure of peer delinquency except the observations that more delinquents than non-delinquents are in gangs (56% to 0.6%) and that delinquents spend more time with other delinquents (98% compared to 7%).
Short (1960) 304M&F Junior high school Mixed - Differential association	Questions relating to best friends' behavior and attitudes; such as if they are law abiding, out for a good time, and "wild". Analysis restricted to frequency tables against levels of self-reported delinquency. Separate models for males and females.
Hirschi (1969) 905M 13-17 White Richmond Youth Project (RYP) Social control	Peer delinquency measure – how many friends picked up by police? Not used as a predictor variable but used to explore the nature of the relationship between delinquents and delinquent peers.
Jensen (1972) 1,588M 12-17 White RYP Differential association	Single measure of the number of close friends that had been picked up by the police. Found $\gamma = 0.60$ for the association between friends picked up by the police and self-reported delinquency.
Liska (1973) 133M 17-19 Mixed - Social control and differential association	Analysis limited to three variables to test for causal structures. Respondents were asked about their friends' attitudes toward theft, vandalism, and aggression. Found significant correlations between peer delinquency and delinquent involvement for different offenses. Concluded that delinquency not causally homogeneous.

Johnson (1979) 734M&F High school sophomores Mixed - Integrated	Delinquent peers measured by two questions about activities and three questions about peer approval for delinquency. Peer delinquency was first in the rank order of effects (0.4). Tested for differences between males and females (whites only) and found peer delinquency had greater effects for males.
Matsueda (1982) 1,140M 12-17 White RYP Differential association	Single measure of the number of close friends that had been picked up by the police. Using a path model, found that peer delinquency had a positive effect on delinquency and delinquent definitions and a negative effect on attachment to peers.
Segrave and Hastad (1985) 1,776M&F 14-18 Mixed - Strain, subculture, and control	Two item scale of peer delinquency and one item for peer approval taken from Johnson (1979). Tested for differing explanations for male and female delinquency. Found that delinquent peers has the greatest effect for both males and females but significantly more for males (.39 to .25).
Tittle et al. (1986) 1,993M&F 15 up Mixed - Differential association	Utilized delinquent peers as part of the measure of association with criminal definitions. Three groups of questions relating to people known personally who cheated on tax, stole, assaulted someone, or smoked marijuana. Found only an indirect effect on delinquency through motivation.
Matsueda and Heimer (1987) 2,589M 12-19 Mixed RYP Differential association	Separate models for blacks and non-blacks. Single measure of peer delinquency of number of friends picked up by the police. Found that there are different effects between models with only the peer effect remaining significant in the non-black model when controlling for definitions.
Orcutt (1987) 987M&F University students Mixed - Differential association	Study examined marijuana use only. Asked how many of your closest four friends smoke marijuana at least once a month? Found $r=0.65$ between friends' use and own use.
Johnson, Marcos, and Bahr (1987) 768M&F 14-19 (private H.S. students) Mixed - Integrated, but model delinquent peers as causal	Study examined for drug use only. Peer delinquency measured by how many best friends drink, smoke, smoke marijuana, and use amphetamines or depressants. This total was divided by number of friends to produce a ratio of delinquent definitions. Using a path model found an effect of 0.52 from friends' use to own use.

Warr and Stafford (1991) 1,725M&F 11-17 Mixed National Youth Survey (NYS) Differential association and social learning	NYS measures of peer delinquency – in the past year, how many of your close friends did (act)? Separate path models examined for the effects of friends' attitudes and behaviour on cheating, larceny, and marijuana use. Found that friends' behavior had direct effect on own behaviour as well as through attitudes – all about 0.40.
Agnew (1991a) 1,725M&F 11-17 Mixed NYS Differential association and social control – interactive effects	Divided delinquency of friends into minor and serious categories; each measured by three items relating to damaging property, stealing, and assault. Also, modeled peer attachment, time spent with peers, approval for delinquency, and peer pressure for delinquency.
Agnew (1991b) 1,725M&F 11-17 Mixed NYS (2 waves) Social control	NYS measures of peer delinquency – in the past year, how many of your close friends did (act)? Found that the analysis supported the differential association perspective on delinquent peers and hypothesized a causal loop between peers and own delinquency.
Pabon et al. (1992) 1,077M 11-19 Puerto Rican Puerto Rican Adolescent Survey None	How many friends did (15 acts)? Derived from NYS. Also measure time spent with peers and attachment. Examined the outcome of having delinquent peers and found the strongest predictor to be amount of time spent at evenings.
Agnew and White (1992) 1,380M&F 12-18 Mixed Rutgers Health and Human Development Project Strain, controlling for differential association and social control	Used a 20-item scale. No details in article, only stated that the scale was derived from previous research. Found 0.13 effect on delinquency and 0.28 effect on drug use but minimal effects predicting time 2 delinquency and drug use.
Agnew (1993) 1,725M&F 11-17 Mixed NYS Social control	NYS measures of peer delinquency – how many of your close friends did (of nine acts)? Found an interaction effect of peer delinquency and social control.

Warr (1993a) 1,725M&F 13-19 Mixed NYS Differential association	NYS measures of peer delinquency – how many of your close friends did (act)? Found delinquent peers to be the strongest predictor of delinquency. Explored idea of "sticky friends."
Warr (1993b) 1,725M&F 13-19 Mixed NYS (Wave 3) Differential association	NYS measures of peer delinquency – how many of your close friends did (act)? Examined effects of parents and peers and found that time spent with parents mediated the effects of peer delinquency.
Brownfield and Sorenson (1993) 1,586M 12-17 White RYP Self-control	RYP measure – how many friends picked up by police? Changed into a dichotomous variable. Found 0.30 effect on self-reported delinquency and 0.20 effect on official delinquency.
Sampson and Laub (1993) 1,000M (paired) 10-17 White Glueck data Social control and social capital	Utilized a measure of high attachment to delinquent peers to avoid the tautology of the Gluecks' research design. Found that it was the most important predictor of official delinquency but only a moderate one of self-reported delinquency.
Thornberry et al. (1994) 841M&F (males 75%) 12-18 Mixed Rochester Youth Development Study Interaction	Peer delinquency measure by an eight item scale relating to friends' behaviour in the past six months. Using LISREL, tests three models across three time periods with reciprocal effects between behaviour and peer delinquency. Across time and contemporaneous causal loops are tested.
Paternoster and Mazerolle (1994) 1,725M&F 11-17 Mixed NYS (2 waves) Strain vs. social control	NYS measures of peer delinquency – how many of your close friends did (of nine acts)? Found an effect of 0.30 of delinquent peers on time 1 crime. An effect of 0.09 on time 2 delinquency when controlling for time 1 crime. Modeled social control and self-control variables.
Simons et al. (1994) 169M 12 White - Differential association	Included a sibling report as well as self-report of friends' delinquency. How many of close friends did (of fifteen acts)? Different latent variable models and effects of peer delinquency for early and late starters. Peer delinquency having more effect on late starters.

Aseltine (1995) 435M&F (paired) 14-16 Mixed - Integrative, modeling a reciprocal association	Paired friends allow for direct measure of friend's delinquency. Separate latent variable models for delinquency and marijuana use over three time periods. Found a significant reciprocal effect between friend's delinquency and own delinquency.
Elliott and Menard (1996) 1,725M&F 11-24 Mixed NYS (6 waves) Social learning	Examined for temporal ordering of peer delinquency and self-reported delinquency. Claimed to have found evidence supporting social learning theory over social control theory. Tested for stability in peer delinquency and self-reported delinquency and found substantial stability across all levels.
Jeglum Bartusch et al. (1997) 370M 5-18 Mixed but 93% white Dunedin Multidisciplinary Health and Development Study Developmental vs. self-control	Measured peer delinquency once at age 13 using a self-reported sum of 58 items (29 norm violations and 29 illegal offenses). The regression of peer delinquency on higher-order factors of childhood and adolescence anti-social behaviour resulted in a higher coefficient (0.18) for adolescence behaviour but the difference with the childhood coefficient (.01) was not statistically significant.
Evans et al. (1997) 477M Median 40.5 White - Self-control	Measure the number of criminal friends by, "In the last 12 months, how many of your five closest friends have done something they could have gotten arrested for?" As the analysis was testing self-control, criminal associates was one of the outcome variables with it being strongly predicted by low self-control (.24) and analogous behaviours (.52).
Paternoster and Brame (1997) 508M&F 11-16 Mixed NYS Developmental vs. self-control	NYS measures of peer delinquency – how many of your close friends did (act)? Found peer delinquency to be the most important predictor in both antisocial attitude and behaviour outcomes. Did not find difference in effects of peer delinquency between early- and late-starters.
Warr (1998) 1,725M&F 15-24 Mixed NYS (Waves 5 and 6) Life-course	NYS measures of peer delinquency. Tested for effect of marriage on self-reported delinquency and peer delinquency. Found that the desistance effect of marriage operates through its impact on friendships.

Matsueda and Anderson (1998) 1,725M&F 11-17 Mixed NYS (3 waves) Interactional	NYS measures of peer delinquency. Found a greater effect of self-reported delinquency on peer delinquency than peer delinquency on self-reported delinquency. Also found evidence of correlation of measurement errors between self-reported delinquency and peer delinquency.

The review of studies in table 1.1 raises issues about the operationalization of peers and the measurement of peer delinquency. Peers has been taken to mean friends without specifying the closeness or number as in the Richmond Youth Project question, "How many friends picked up by the police?" (Hirschi, 1969). The National Youth Survey specified how many "close friends" had done particular acts and limited the time to the last year. However, the similarities of the peer delinquency and self-reported delinquency measures have received considerable criticism (Gottfredson and Hirschi, 1990) but also have their supporters (e.g. Warr, 1993a). Other studies have derived their measure of peer delinquency from the National Youth Survey (e.g. Simons et al., 1994 and Pabon et al., 1992) and others have used the same questions but limited the time span to six months (e.g. Thornberry et al., 1994). Sampson and Laub (1993) overcame the possible tautology of peer delinquency in the Glueck data by constructing a dichotomous variable that reflected high levels of attachment to delinquent peers. The only data to match self-reported delinquency of friends rather than asking the respondent about their peers delinquency was used by Aseltine (1995). The method of matching specific, named friends allowed Aseltine to construct a peer delinquency variable free from "rumour or hearsay" (cf. Gottfredson and Hirschi, 1990).

These studies have a large number of male-only samples (12 from 32), mostly those using the Richmond Youth Project data but also others such as Glueck and Glueck (1950), Liska (1973), Pabon et al. (1992), Simons et al. (1994), and Evans et al. (1997). The other feature of the samples worth noting is the racial composition; seven of the 32 studies employed white-only samples. These gender- and race-limited samples are restrictive to the exploration of differing effects of peer delinquency across sub-populations and weaken any claims of generalizability, although this did not stop some researchers proposing general theories from their findings, notably Hirschi (1969).

Two studies, Johnson (1979) and Segrave and Hastad (1985), explicitly tested for differences in effects between males and females. Both found that gender differences exist in the magnitude of the effect of delinquent peers and other predetermined variables on delinquency. These findings, combined with significant differences in explained variance, may suggest separate etiologies for male and female delinquency but the rank ordering of the causal variables were similar, suggesting the same model may suffice.

The range of effects found in the above studies is as varied as the models tested but overall the conclusion that peer delinquency was a strong, if not the strongest, predictor of delinquency is supported with a few exceptions. Tittle et al. (1986) modeled a direct effect but found it non-significant with delinquent peers only having an effect on probable delinquency through motivation (see above). Thornberry et al. (1994) did not model a direct effect but hypothesized that peer delinquency will only have an effect through peer reactions.

While these studies each have their own strengths and weaknesses, reviewing them sensitizes the researcher to possible biases and problems in one's own investigation of peer effects. In this manner, the following analyses will be careful to address the main biases and problems raised in this chapter. The theories and studies reviewed in this chapter will be developed into testable hypotheses relating to the delinquent peer association in the first section of the next chapter.

CHAPTER TWO: METHOD, DATA, AND MEASURES

> That involvement in delinquency is related to delinquency of companions is a fact established in all inquiries that have investigated this relationship. This fact has been offered in evidence of the truth of cultural deviance theory. Yet it is a fact as compatible with control and other models as with cultural deviance models.
> Ruth Kornhauser, Social Sources of Delinquency.

Method

The "cause" and "consequence" positions on the extremes of the debate over the role of delinquent peers appear to stem from differing ontological views as to what can and cannot be considered a cause. Social learning and differential association theorists extend their perception of cause from the individual level to include group processes. In doing so, they give priority to external factors acting on the individual which, in their view, are sufficient to be considered causal. While social control theorists are the mainstays of the "consequence" camp, strain theorists have a similar ontological position. Both view cause at the individual level and give priority to what an individual perceives, either the freedom to deviate in social control theories, or anger and frustration in strain theories.

The lack of consensus on what is or is not a cause is not restricted to this point and permeates through most areas of study, resulting in similar polemics (Sobel, 1996: 357). However, this philosophical debate has important consequences for research in the area but it is impossible to reconcile because, as Kornhauser notes, the effect of delinquent peers is compatible with rival theories. The cross-sectional nature of most data used to test competing theories also does not lend itself to helping resolve the causal claims surrounding the delinquent peer association. However, it must be noted that longitudinal studies designed to resolve the quandary failed to discern any temporal priority in delinquent peer association (Gottfredson and Hirschi, 1990).

Control theorists generally argue that the delinquent peer association is a product of other factors or processes. The clearest example of this line of reasoning is Gottfredson and Hirschi's (1990: 156) suggestion that peer delinquency is another report of the respondent's own delinquency. Claims that peer delinquency is created or heavily

influenced by other factors leads us to term these "artifact" arguments. These other factors may be, at varying levels, conceptually different from peer delinquency but the measurement may contain substantial overlap. While Gottfredson and Hirschi's claims are the most extreme, citing almost complete overlap or rumour, others have suggested that variables such as gender or age may be another reflection of peer delinquency. This vein of the artifact argument suggests differences across groups rather than the blanket dismissal of Gottfredson and Hirschi. The following analyses concentrate on testing for any evidence that peer delinquency is an artifact and specifically in the four areas discussed below.

Gottfredson and Hirschi's (1990: 156) critique was specifically aimed at the measures in the National Youth Survey, but they have to be accounted for in any other research and can be addressed logically and empirically. The measures of peer delinquency and self-reported delinquency used in the following analyses are unlike the ones in the National Youth Survey and by avoiding overlap in activities between the two may negate the criticisms raised by Gottfredson and Hirschi. In this way, we agree with Thornberry et al. (1994: 62fn) when they argue that,

> An alternative way to address Gottfredson and Hirschi's argument is to use a measure reflecting peer misbehavior that does not contain items overlapping with those of the self-reported delinquency measure in the analysis.

An empirical test of Gottfredson and Hirschi's criticism is also suggested by Thornberry et al. (1994) and Agnew (1991a; 1991b) by way of conducting a factor analysis of the peer delinquency and self-reported delinquency items and scrutinize the extracted factor loadings. This will be the first test of the artifact argument. If the measures of peer delinquency and self-reported delinquency load on the same factor then Gottfredson and Hirschi's criticism would be supported.

Alternatively, the influence of delinquent peers may be an artifact of gender because of the differences in male and female group dynamics (Giordano et al., 1986; Maccoby, 1986). Giordano et al. (1986: 1194) conclude from their findings that

> If we conceive of delinquent acts as a set of behaviors requiring some risk-taking or daring...it may be that the friendship styles of males are most conducive to the

kind of group processes that move individual members to the point of collective action. In contrast, females are less likely to indicate that these overt pressures and conflicts characterize their relationships.

These conclusions are in agreement with Maccoby's (1986: 277) observation that "...even though many boys' groups socialize their members in prosocial ways, certain forms of aggression, risk-taking, noise-making, and showing off are both tolerated and even encouraged more than in girls' groups." The large number of male-only studies bolsters the possibility of a gender artifact and the minimal treatment of gender differences in the studies reviewed above. To test for this artifact, it is proposed, first, to look for gender differences in the amount of peer delinquency and, second, to look for differences in effects of delinquent peers. If the analyses reveal a gender difference in the amount and effect of delinquent peers then it would lend support to the artifact argument.

In another line of reasoning, Gottfredson and Hirschi's (1990) treatment of the age-crime curve suggests that peer delinquency may be an artifact of age. Following their argument that the age-crime distribution is invariant and no social factor can account for it, the extension can be made to peer delinquency following a similar distribution with age. As overall delinquency changes with one's age then peer delinquency should also change as one's peers are increasingly delinquent on their own age-crime curves. In other words, just as one's delinquency varies with age it may be expected that the effect of delinquent peers would also change with age. These two extensions of the age-crime curve will be tested by, first, inspecting the age-peer delinquency curve to see if it resembles the age-crime distribution in the sample and, second, by calculating the effect of peer delinquency on the respondent's delinquency for each age and also seeing if that resembles the age-crime curve. Peer delinquency is expected to vary with age because of the variation of delinquency with age, but the key question is whether or not the changes in exposure to peer delinquency result in a change of effect. If the effect varies with age then it is reasonable to argue that peer delinquency is an artifact of age.

As early as 1950 the Gluecks identified that delinquents tended to associate with other delinquents. This idea became a central idea in control theories and was extended by Hirschi (1969) to the point of being a spurious association. Gottfredson and Hirschi's

(1990: 158) stance on causal ordering of the delinquent peer association lead them to assert that people choose to keep company with people of similar dispositions, especially those with low self-control seeking out like-minded others. The idea of group selection is not restricted to delinquents and has been posited as a general phenomena for external affirmation of one's opinions and behavioural choices (Festinger, 1954). Social comparison theory is emerging in contemporary criminological literature from both a social control perspective (e.g. Matsueda and Anderson, 1998) and a subcultural perspective (e.g. Hagan, Hefler, Classen, Boehnke, and Merkins, 1998). Matsueda and Anderson (1998: 299) claim to have found evidence supporting the group selection hypothesis in the National Youth Survey data as self-reported delinquency had a greater effect on peer delinquency than peer delinquency had on self-reported delinquency.

According to these hypotheses of group selection, it is possible to suggest that peer delinquency may be an artifact of group selection processes. If so, then we would expect to find similar levels of heterogeneity in self-reported delinquency across levels of peer delinquency. Taking Gottfredson and Hirschi's point, a possible conclusion is that we would expect to find lower levels of heterogeneity at the higher levels of peer delinquency reflecting the selection of others with similar low levels of self-control. As noted above, the measures of self-reported and peer delinquency used in these analyses do not overlap in any activities which may complicate any interpretation but the data do contain an overlap on self and friend's marijuana use. The selection artifact will be tested using both the non-overlapping measures and the marijuana use.

Moffitt (1993: 695) tackles the effects of peer delinquency in her classification of life-course-persistent and adolescence-limited offenders. From her position it is possible to suggest that any delinquent peer effect may be an artifact of offender typology with adolescence-limited offenders experiencing greater effects. One of the problems here is finding a reasonable way to identify the life-course-persistent offender in cross-sectional data. Moffitt (1993: 687fn) indicates that early sexual experience may be a pointer to the male life-course-persistent offender:

> Several longitudinal studies have shown that a history of antisocial behavior predicts early sexual experience for males relative to their age peers...Specifically,

almost all of the sexual experience of an early adolescent cohort is concentrated among the most seriously delinquent 5% of its boys.

If Moffitt is correct, and these adolescents only represent 5% of the population, their numbers in any data set are going to be small which makes comparison with the remainder problematic. Also, this pointer is limited to males but will be extended to females in these analyses with suitable caution. Another problem with choosing early sexual experience as a proxy for life-course-persistent offenders is that the measure may be simply a reflection of early physical maturity, especially for females. Caspi, Lynam, Moffitt, and Silva (1993: 23-24) investigated the effects of maturation in females and found that early maturation was associated with norm violations and exposure to peer delinquency. In view of these findings, tests will be conducted to discern between early maturation and life-course-persistent offenders.

In order to assess the process of choosing early sexual experience as a reasonable indicator, two tests of differences will be conducted. First, the group differences in delinquency are expected to be significant and, second, the life-course-persistent group are expected to have consistently higher levels of delinquency across age and those levels are expected to be fairly consistent. If these tests support the classification, then a test of significant differences in the effect of peer delinquency will be conducted. As Moffitt (1993: 695) theorizes that peer delinquency should have a greater effect on adolescence-limited offenders we expect to find a significant interaction between peer delinquency and her classification of offenders.

Table 2.1 summarizes the tests to be used to examine for the artifacts derived above.

Table 2.1: Summary of Proposed Tests

Artifact of:	Proposed test(s)
Self-reported delinquency (Gottfredson and Hirschi, 1990)	Factor analysis of peer delinquency and self-reported delinquency items
Gender (Giordano et al., 1986)	1) gender differences in amount of peer delinquency 2) peer delinquency effects across genders
Age (Gottfredson and Hirschi, 1990)	1) age-peer delinquency curve 2) peer delinquency effect across ages
Group selection (Gottfredson and Hirschi, 1990)	1) heterogeneity in self-reported delinquency across levels of peer delinquency 2) heterogeneity in peer delinquency across levels of self-reported delinquency 3) differences in marijuana use across levels of peer marijuana use
Offender typology (Moffitt, 1993)	1) group differences in delinquency/peer delinquency 2) difference of delinquency/peer delinquency by group across age 3) peer delinquency effects across groups

The National Longitudinal Study of Adolescent Health

The data for this study come from Release 1 of the public-use data from the National Longitudinal Study of Adolescent Health (Add Health), conducted at the University of North Carolina, USA (Udry, 1997)[1]. The Add Health study is designed to explore the health-related behaviours of US adolescents in grades 7 to 12.

The primary sampling frame for the main study was all high schools in the US that had an 11th grade and at least 30 students (N=26,666). A systematic random sample of 80 high schools was selected based on number of students and stratified by region, urban location, school type, and ethnic mix. Along with the high school, the main feeder school was also included in the final sample and of these 134 schools agreed to participate giving a response rate of 79%. Schools in the final sample ranged from those with less than 100 students to those with in excess of 3,000 students (Udry, 1997).

The schools provided a roster of all students eligible to attend that school. This roster included adolescents who had stopped attending school so that these adolescents could be included in the sampling frame for respondents. Of the 134 schools, 129 (96%) arranged for a confidential in-school survey to be completed between September 1994 and April 1995. This survey was completed by 90,118 of the 119,233 eligible students (Udry, 1997).

From the student rosters, a random sample of 15,243 stratified by grade and sex were selected for in-home interviews. Of these, 12,118 completed the interviews and 75% of those had also completed an in-school survey. The first wave of interviews was held between April and December 1995.

Data collected during the in-home interviews provided information on subjects such as: sexual behaviour, drug and alcohol use, delinquent activities, health status, family dynamics, romantic relationships, and aspirations. The interviewer asked most questions verbally but for the more sensitive parts of the interview respondents listened to questions through earphones and entered their answers directly into a laptop computer. This technique was designed to reduce the potential of interviewer or parental influence (Kelley, Peterson, and Peterson, 1997).

A parent of 85.6% of in-home survey adolescents completed a parent questionnaire. Also, 130 school administrators completed a questionnaire providing information on school policies, environments, and characteristics.

The public-use data consists of 6504 respondents made up from 50% of the core sample and 50% of the oversample of African American respondents. In the public use data, 6,072 respondents are from the core sample that was designed to be a representative sample of US students from grade 7 to 12. The oversample of African American respondents, approximately 500 in the public use data, were drawn from African American homes where at least one parent had a college degree (Kelley et al., 1997). For purposes of generalizability, it is preferable to restrict the statistical analysis to the 6,072 core respondents.

Tables 2.2 to 2.8 provide information on some of the major variables in the core sample.

Table 2.2: Distribution of Currently in School

In school	Frequency	Percentage
Yes	5947	97.9
No	125	2.1
Totals	6072	100.0

Table 2.2 reflects the adolescents included on school rosters but who are not attending school for whatever reason. Students suspended at the time of the survey were deemed to be in school but those who had been expelled were not.

Table 2.3: Grade Distribution

Grade	Frequency	Percentage
7	918	15.4
8	934	15.7
9	1015	17.1
10	1054	17.7
11	1044	17.5
12	943	15.8
N/A	38	0.6
Totals	5947	100.0

Table 2.3 only includes respondents in school at the time of the survey. The category "N/A" refers to schools that do not have grades (Kelley et al., 1997: 21).

Table 2.4: Age Distribution

Age	Frequency	Percentage
12	8	0.1
13	537	8.8
14	996	16.4
15	846	13.9
16	1067	17.5
17	1092	17.9
18	1084	17.8
19	381	6.2
20	41	0.6
21	18	0.2
Refused	2	0.0
Total	6072	100.0

The frequency distribution of the age of respondents is illustrated in table 2.4. The age of the respondent is derived from the year of birth question, as there were only two refusals. In response to the actual question about age, there were 1,771 missing values because of these respondents that did not complete the in-school questionnaire and those that did not answer that question on the in-home questionnaire (Kelley et al., 1997: 15).

Table 2.5: Gender Distribution

Gender	Frequency	Percentage
Male	2941	48.4
Female	3130	51.6
Refused	1	0.0
Totals	6072	100.0

Gender, in table 2.5, was a pre-loaded variable from the school roster that was confirmed by the interviewer. In the whole data set there was one refusal to confirm the gender of the respondent.

Table 2.6: Racial Distribution

Race	Frequency	Percentage
White	4264	70.2
African-American	1200	19.7
American-Indian	223	3.6
Asian	270	4.4
Other	115	1.8
Totals	6072	100.0

Table 2.6 is derived from five dichotomous variables in which respondents could indicate more than one category in answer to the question "What is your race?" Those who chose more than one response are included in the "other" category.

Table 2.7: Distribution of Place of Birth

Place of birth	Frequency	Percentage
USA	5688	93.7
Other	384	6.3
Totals	6072	100.0

Table 2.7 shows data in collapsed form as the question was a legitimate skip in the questionnaire if the respondent had lived at the same address since birth (Keeley et al., 1997: 17).

Table 2.8: Distribution of Parents' Martial Status

Status	Frequency	Percentage
Single	311	5.1
Married	3736	61.5
Widowed	171	2.8
Divorced	767	12.6
Separated	276	4.5
Missing data	811	13.4
Totals	6072	100.0

Table 2.8 indicates the parents' martial status at the time of the interview. Included in the missing data are adolescent respondents with no matching parent data and those that did not answer that question on the in-home questionnaire (Kelley et al., 1997: 17).

Each subject in the core sample is given a weight designed to produce a sample-specific population estimate[2]. Therefore, applying the weight will produce univariate estimates of the US student population from grade 7 to grade 12 (Kelley et al., 1997: 7). The weight is designed to be representative of the grade of the respondent rather than the age. For example, the weight given to the eight 12 year olds in the core sample will represent 12 year olds in grade 7 nationally rather than the total 12 year old population nationally. Strictly, the weighting should be used to generate population estimates for the grade but using the grade as the baseline provides some problems. The main one is that it

excludes adolescents from schools that do not use the grade system and, more importantly for this study, those who are not in school for whatever reason. As this latter group would include those expelled from school, excluding them may miss some of the more serious delinquents. However, when age is used as a baseline other problems arise because of the small numbers at the extreme ends, especially ages 12, 20, and 21 (see table 2.5). As age is generally more inclusive it is preferable over grade, but any analysis that includes age must be restricted to ages 13 through 19 to avoid the possible distortion of the small numbers at the extremes.

A sample weight[3] was also calculated for use when employing the population weight would have rendered any tests of significance redundant. The sample weight keeps the weighted sample size close to the original and allows for traditional tests of significance. All analyses that involve univariate statistics will be weighted by the sample weight to maintain reasonable tests of significance.

Measures

The main measures in the following analyses are self-reported delinquency and peer delinquency. Other variables are included at various stages as controls or to select specific sub-groups for separate analysis. All variables to be used in the analyses are described below.

Self-Reported Delinquency

The Add Health survey collected data on a number of delinquent acts. Respondents were asked to indicate how often in the last twelve months they had:

1. Paint graffiti or signs on someone else's property or in a public place?
2. Deliberately damage property that didn't belong to you?
3. Lie to your parents or guardians about where you had been or whom you were with?
4. Take something from a store without paying for it?
5. Get into a serious physical fight?
6. Hurt someone badly enough to need bandages or care from a doctor or nurse?
7. Run away from home?
8. Drive a car without its owner's permission?
9. Steal something worth more than $50?
10. Go into a house or building to steal something?
11. Use or threaten to use a weapon to get something from someone?

12. Sell marijuana or other drugs?
13. Steal something worth less than $50?
14. Take part in a fight where a group of your friends was against another group?
15. Act loud, rowdy, or unruly in a public place?

Answers to these questions had four categories: none, one or two times, three or four times, and five or more times. This method of categorization disguises the actual number of delinquent acts but still indicates the level of delinquency.

Logically, most of the questions divided into three groups: thefts, violence, and nuisance. To test this division, the items were subjected to factor analysis and while the results for most of the items followed the logical divisions, some ambiguities arose. Items concerned with minor thefts, such as items 4 and 13, also loaded onto the nuisance factor. Suspecting a correlation among the factors, oblique rotation was used after factor extraction and it was confirmed that there existed moderate correlations between the factors ($r = 0.2$ to 0.4). Therefore, the following scales of delinquency were constructed using the results of the factor analyses and logic.

Using three dependent variables to capture different aspects of delinquency rather than a single scale of all types of delinquent acts allows us to explore the possibility of differing etiologies for these separate types of delinquency.

The composition and characteristics of the three scales are reported in table 2.9. As expected with reports of delinquency, all the scales are positively skewed with a large proportion of respondents reporting no occurrences: 73% for theft, 58% for violence, and 32% for nuisance. The distributions are shown in figure 2.1.

Smith and Davidson (1986), building on the work of Hindelang, Hirschi, and Weis (1981) and Sampson (1985), caution that measures of self-reported delinquency vary in their reliability across gender and racial groups. Specifically, they tackle questions relating to self-reported violence with three questions very similar to the ones used in the scale above. Using a latent construct approach, they found that the questions were differentially reliable across both gender and racial lines. However, the effect of the latent variable had equal effects on the self-reports of all males and the difference in reliability was due to different error variances (Smith and Davidson, 1986: 480-481). So, a difference in reliability was found between males, white females, and non-white

females. These findings are similar to those found by Sampson (1985) for a wider group of delinquent acts (Smith and Davidson, 1986: 486) and have direct implications for the analyses that follow. Reliability tests were conducted on the self-reported delinquency scales by gender and although there were differences, the scales retained their adequacy[4].

Figure 2.1: Distributions of Self-reported Delinquency Scales
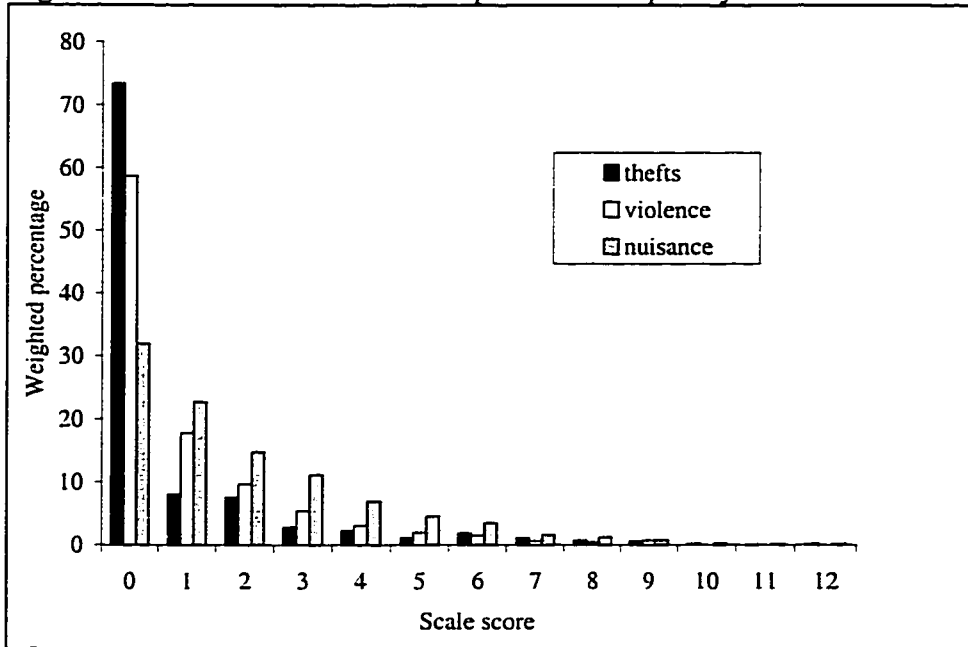
Table 2.9: Characteristics of Self-reported Delinquency Scales

Scale	Items	Item-total correlation	Factor loadings[a]	Alpha[b]	Range	Mean[c]	Stnd dev.[c]
Theft	4	.74	.59	.76	0-12	0.82	1.82
	9	.49	.75	(.78)		(0.81)	(1.83)
	10	.49	.73				
	13	.72	.56				
Violence	5	.62	.74	.74	0-9	0.94	1.60
	6	.60	.74	(.75)		(0.98)	(1.65)
	14	.52	.72				
Nuisance	1	.37	.54	.63	0-12	1.92	2.14
	2	.52	.70	(.68)		(1.94)	(2.16)
	3	.43	.67				
	15	.48	.68				

Notes: [a] Principle components extraction, oblique rotation. [b] standardized alpha in brackets. [c] weighted statistics in brackets

Peer Delinquency

In the Add Health survey respondents were asked three questions about the behaviour of their three best friends:

1. Of your 3 best friends, how many smoke at least 1 cigarette a day?
2. Of your 3 best friends, how many drink alcohol at least once a month?
3. Of your 3 best friends, how many use marijuana at least one a month?

The answer to each of these questions ranged from zero to three. In order to give an overall indication of the delinquency of the respondent's closest friends, the answers to these questions were added to form a scale of peer delinquency[5]. The composition and characteristics of that scale is reported in table 2.10.

Table 2.10: Characteristics of Peer Delinquency Scale

Scale	Items	Item-total correlation	Factor loadings[a]	Alpha[b]	Range	Mean[c]	Stnd dev.[c]
Peer delinquency	1	.55	.80	.74	0-9	2.55	2.63
	2	.59	.83	(.75)		(2.54)	(2.65)
	3	.58	.81				

Notes: [a] Principle components extraction. [b] standardized alpha in brackets. [c] weighted statistics in brackets

Again, as expected with reports of delinquency the distribution of this scale is positively skewed with a large proportion of respondents reporting no delinquency in their closest three friends. The distribution is shown in figure 2.2.

Figure 2.2: Distribution of Peer Delinquency Scale
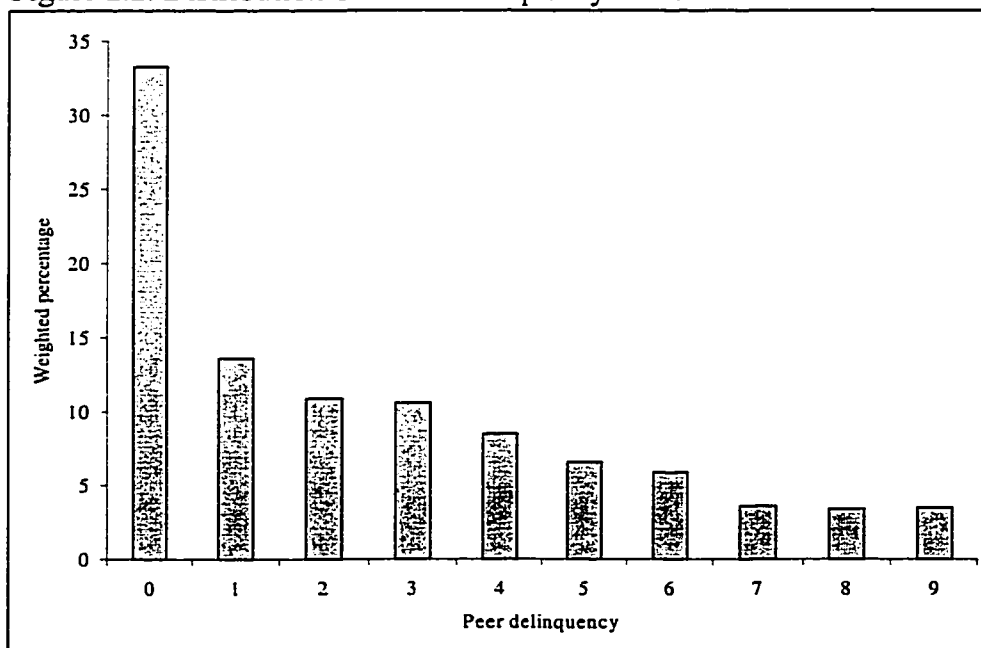
Other Measures

In the following analyses, a number of other variables are used to explore the effects of peer delinquency. Table 2.11 reports the characteristics of these variables.

Table 2.11: Characteristics of Variables

Variable	Range	Mean	Stnd dev.	N
Gender (D, female = 1)	0-1	0.52	0.50	6071
Age	12-21	16.05	1.78	6070
Race (D, black = 1)	0-1	0.19	0.39	6072
Single parent (D, single = 1)	0-1	0.11	0.32	6072
Life-course-persistent (D, LCP = 1)	0-1	0.05	0.22	5850
Marijuana use	0-100	1.54	7.78	5940
Peer marijuana use	0-3	0.59	0.97	5926
Weighting	274-18194	3677.81	1875.86	6072

Note: D = dichotomous variable.

The measures and derivation of the gender, age, and weighting variables have been discussed above. Race and single parent family will be added as control variables for all of the regression models as they are commonly cited as predictor variables in delinquency literature (e.g. Gottfredson and Hirschi, 1990).

The early sexual experience variable is derived from a parent question that asked the age of the child at their first sexual intercourse. Self-reported date of first sexual intercourse was included in the in-home questionnaire but had more missing values. The parent report also is probably more conservative and relates to the more blatant adolescents which is compatible with the proxy usage in this analysis. Setting the age for what is considered "early" is an arbitrary choice but we consider 14 years and under a reasonably conservative choice especially since it is parent reported. This cut-off point identified 4.8% of the males and 5.1% of the females in the core sample.

Self-reported marijuana use is measured by the number of times the respondent smoked pot in the previous 30 days. This self-reported measure matches with the report of peer marijuana use which also was restricted a month time span. The peer marijuana use variable is one of the items contained in the peer delinquency scale.

Statistical Techniques

The distribution of the dependent variables in the following analyses are far from normal which has implications for the most appropriate statistical technique to employ. The proposed tests require an appropriate method of factor analysis and an appropriate regression model.

Factor analysis of highly skewed variables can be tackled by using either unweighted least squares or maximum likelihood extraction procedures. Unweighted least squares extraction does not rely on any assumption of the distribution of the variables and maximum likelihood is considered accurate if the variables are skewed in the same direction (Smith and Davidson, 1986: 477). As in all factor analyses, the Kaiser dictum must be borne in mind and we expect whatever extraction technique employed to produce similar results (Kim and Mueller, 1978).

The highly skewed distributions also lead us to expect that at least two fundamental assumptions of OLS regression will be breached, namely normality of errors and homoscedasicity. The resulting OLS coefficients will be biased, inefficient, and insufficient (King, 1988: 846; Long, 1997: 217). A possible alternative is to use a Poisson regression model that accounts for the highly skewed variables. However, Poisson regression models have their own set of assumptions that have to be met.

Poisson regression models are suitable for event count data when the dependent variable is the number of occurrences in a fixed domain and consists of discrete non-negative integers (King, 1988: 838). The dependent variables in these analyses are not strictly event counts as the data are presented in a collapsed form i.e. none = 0, one or two times = 1, three or four times = 2, etc. The restriction of non-negative integers in the dependent variable also prohibits us from using the traditional method of choosing the midpoint of each category to more fully capture the distribution of delinquent acts. In this way the resulting scales are discrete and closely represent event count data. The fixed domain criterion is met by restricting the observations to delinquent activities in the 12 months prior to completing the questionnaire.

The most restrictive property of Poisson regression models is the equality of mean and variance - equidispersion. The mean and variance are also equal to λ. "The parameter

λ may be interpreted as the mean rate at which events occur per unit time; consequently, we refer to λ as the mean rate of occurrence of events" (Land, McCall, and Nagin, 1996: 390). This property can be tested for by inspecting table 2.9 and noting that for all three delinquency scales the variance is greater than the mean. This indicates that the dependent variables are overdispersed. The overdispersion raises some problems when fitting a Poisson regression model as

> ...the variances of the estimated regression coefficients (and, therefore, standard errors) are underestimated. The consequence will be inflated t ratios and potentially erroneous inferences about the significance of particular regressors and the associated regression model (Land et al., 1996: 400).

The statistical software employed for these analyses, Generalized Linear Interactive Modeling (GLIM), is able to model the overdispersion[6]. The mean-variance equality is relaxed and then adjusted by a ratio derived from first fitting a strict Poisson model (Francis, Green, and Payne, 1993: 237):

overdispersion ratio[7] = $\sum$ modified Pearson residuals / degrees of freedom

This relaxation of the Poisson model negates the consequences of overdispersion by estimating more accurate standard errors. Consequently, it comes close to fitting a negative binomial distribution which is more appropriate for overdispersed data (King, 1989: 769).

GLIM estimates the linear parameters by the method of maximum likelihood and the significance of the estimated parameters are judged either by comparison with their standard errors or by inspecting the fit of the model when the variable is added:

> The use of the t distribution when parameter estimates are compared with their standard errors...is exact for the classical linear model, but is otherwise justified only by asymptotic theory. No general results are known about the adequacy of this approximation for all other models covered by GLIM, so the standard errors provided must be regarded as only a general guide to the accuracy of the estimates, no attempt being made to provide 'exact' p-values for significance tests (Francis et al., 1993: 279).

The sample size used in these analyses, approximately 6,000, supports assuming that the standard errors are reasonable by asymptotic theory. Therefore, the minimum t ratios for adequate evidence can be set by reference to Raftery's (1995: 140) application of Baysian inference to account for sample size: 3.10 – positive, 3.70 – strong, and 4.25 – very strong. Raftery (1995: 112-114) argues that the use of traditional p values with large sample sizes tended "to indicate rejection of the null hypothesis even when the null model seems reasonable" and, therefore, "for the sample sizes often found in sociology, values of α much lower than the conventional ones can be appropriate."

The GLIM method of measuring goodness of fit is the production of a scaled deviance statistic which for a Poisson distribution is the log likelihood-ratio statistic (Francis et al., 1993: 275). This property allows for a number of methods for judging goodness of fit: computation of a pseudo-R^2, computation of a χ^2, and deriving a Baysian Information Criterion (BIC'). Raftery (1995: 130) introduces the BIC as an approximation for the Bayes factor and BIC' replaces it as an approximation for the Bayes factor for the null model against the model of interest. In other words, the BIC' statistic indicates which model is more likely given the data and the more negative the BIC' value, the more likely the model. For these regression models, BIC' is calculated thus:

$$\chi^2 = (-2*\text{null deviance}) - (-2*\text{model deviance})$$

$$\text{BIC}' = -\chi^2 + (p_k*\text{lnN}) \quad \text{where } p_k \text{ is the number of independent variables.}$$

As the χ^2 statistic is partially determined by the sample size, only the pseudo-R^2 [8] and the BIC' will be reported.

CHAPTER THREE: RESULTS AND CONCLUSIONS

> The validity of most criteria in this book is not demonstrable; for example, the three criteria of causality...cannot be validated by any kind of logical derivation. They rest, instead, on the consensus of sociologists...In the end, even mathematical derivations rest on such consensus, for all derivations depend eventually on undemonstrable assumptions that people have agreed to accept.
> Travis Hirschi and Hanan Selvin, Delinquency Research.

An Artifact of Own Delinquency?

The first test deals directly with Gottfredson and Hirschi's (1990) argument that peer delinquency is another indicator of the low self-control that underlies the respondent's own delinquency. The first factor analysis examines how the delinquency and peer delinquency items load onto factors, as in Agnew (1991a) and Thornberry (1994). The second analysis goes beyond their inspection to consider the possibility of a higher factor and examines how the delinquency scales and peer delinquency scale load onto factors. Table 3.1 reports the adequate loadings for the first analysis.

Table 3.1: Factor Loadings of Delinquency and Peer Delinquency Items

	Item	Factor 1	Factor 2	Factor 3	Factor 4
Self-Reported delinquency	1	-	-	-	-
	2	.524	-	-	-
	3	-	-	-	-
	4	.812	-	-	.521
	5	-	-	.697	-
	6	-	-	.696	-
	7	-	-	-	-
	8	-	-	-	-
	9	-	-	-	.679
	10	-	-	-	.645
	11	-	-	-	.503
	12	-	-	-	-
	13	.816	-	-	-
	14	-	-	.669	-
	15	-	-	-	-
Peer delinquency	1	-	.642	-	-
	2	-	.744	-	-
	3	-	.728	-	-

Notes: Unweighted least squares extraction. Oblique rotation. Only loadings > 0.5 shown.

The results in table 3.1 clearly show that the three peer delinquency items load onto their own factor. This supports the findings of Agnew (1991a) and Thornberry (1994) but it was noticed that when the extracted factors were subjected to oblique rotation, the factors were reasonably correlated ($r > 0.30$). This level of correlation supported the possibility of a higher factor. When the three delinquency scales and the peer delinquency scale were subjected to factor analysis, all four loaded onto one factor no matter what extraction method was used[9]. This result indicates that the factor structure can be represented as in figure 3.1.

Figure 3.1: Factor Structure of Delinquency and Peer Delinquency Items
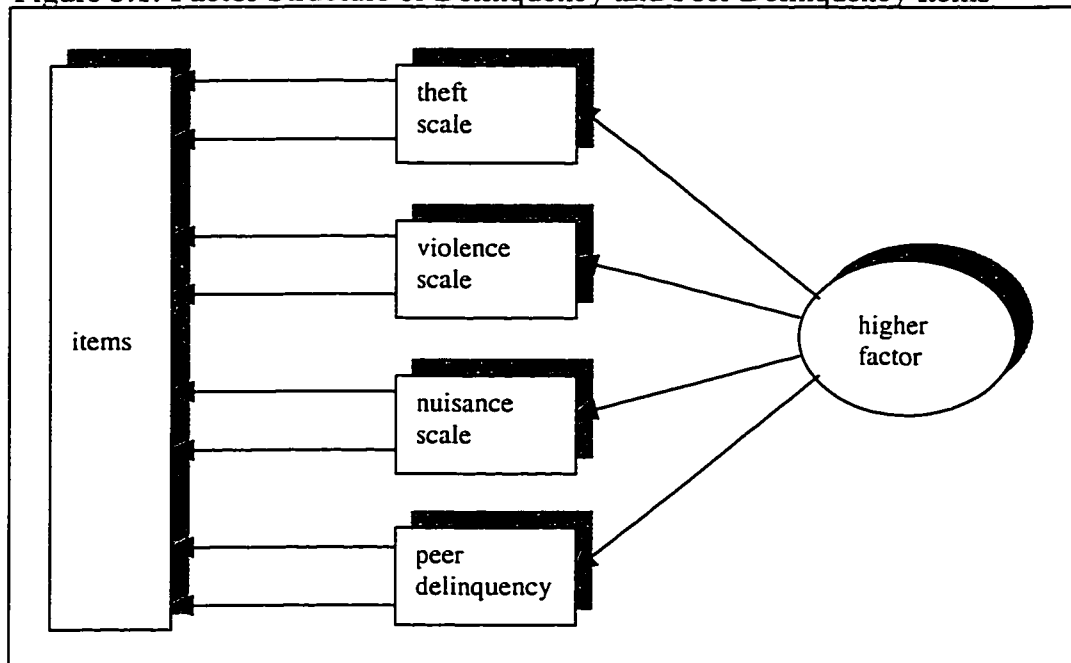
These results indicate that the self-reported delinquency scales and the peer delinquency scale are all indicators of a single latent factor. What actually constitutes that higher factor in this case is a matter of theoretical bent. According to Hirschi (1969) it would be low stakes in conformity and to Gottfredson and Hirschi (1990) it would be low self-control. Either way, the results of the second order factoring lend support the contention that peer delinquency is produced by the same underlying trait(s) as self-reported delinquency. Therefore, it is possible to conclude that peer delinquency may not be either a "cause" or "consequence" of one's own delinquency but an association that

co-appears with the respondent's own delinquency. This line of argument supports the control theorists' position which is not unexpected with cross-sectional data as the temporal ordering has to be determined theoretically. If the factor structure of delinquency suggests a co-appearance, the following examinations of peer delinquency across gender and age may shed more light on possible variations of the association.

An Artifact of Gender?

The tolerance and encouragement of risk-taking in male groups proposed by Giordano et al. (1986) and Maccoby (1986) suggest that males would be expected to have more delinquent peers. If peer delinquency co-appears as suggested by the factor analysis, then we would also expect males to have more delinquent peers as they have higher levels of self-reported delinquency. Figure 3.2 illustrates the distribution of peer delinquency by gender.

Figure 3.2: Distribution of Peer Delinquency by Gender
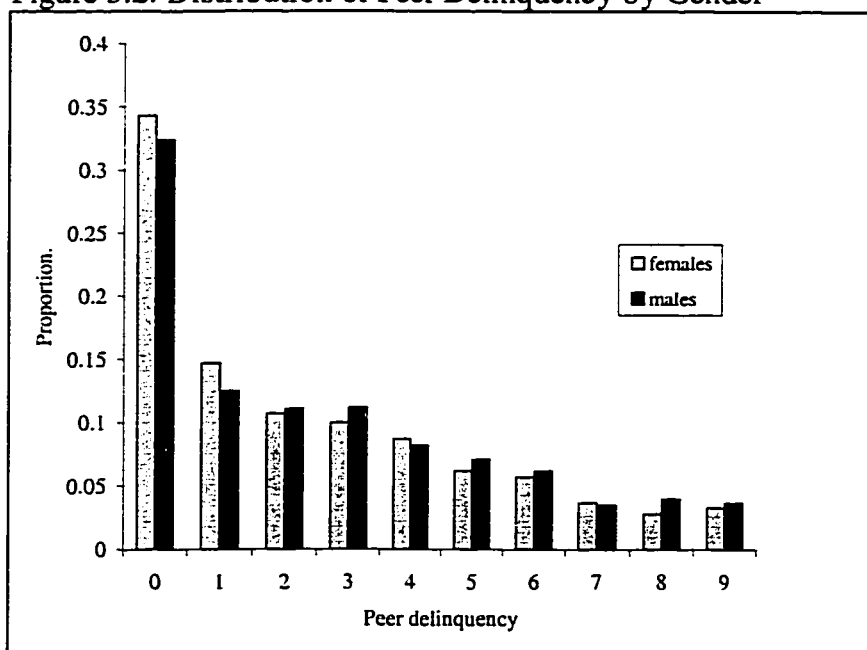
In this case a visual inspection of figure 3.2 may be sufficient to conclude that there are no differences in the distribution of peer delinquency across genders. To ensure that conclusion is reasonable, a test of difference in proportions was conducted and none of the statistics reached significance[10].

Segrave and Hasted's (1985) findings indicated that peer delinquency has a greater effect on the self-reported delinquency of males compared to that of females. To test for differences in effects of peer delinquency between males and females, three modified Poisson regression models were constructed, and estimated using GLIM. All included an interaction effect of peer delinquency and gender. The results of these models are reported in table 3.2.

Table 3.2: Parameter Estimates for Gender Interaction Models (N = 5,833).

Independent variables	Dependent variable		
	Theft	Violence	Nuisance
Peer delinquency	0.17•• (14)	0.14•• (15)	0.13•• (21)
Gender[a]	-0.48•• (5.1)	-0.73•• (10)	-0.06 (1.5)
Race[b]	-0.01 (0.1)	0.38•• (7.7)	-0.10 (1.7)
Single parent[c]	0.05 (0.6)	0.17 (2.8)	-0.02 (0.6)
Interaction: Gender x peer delinq	0.02 (1.3)	0.01 (0.8)	-0.01 (1.1)
BIC'	-869	-1472	-1552
Pseudo-R^2	0.11	0.14	0.12

Notes: [a] female=1. [b] black=1. [c] single parent=1. t ratios in brackets.
Grades of evidence:*positive •strong ••very strong.

As can be seen from table 3.2, none of the estimates for the interaction terms in all three models reached statistical significance. Therefore, there are no differences in the effect of peer delinquency between males and females. These results do not lend support to Segrave and Hasted's (1985) conclusions that peer delinquency has a greater effect for males. A point to note on the implications of these results is that Maccoby (1986: 270) describes male groups as generally larger than female groups. The peer delinquency questions in these data are restricted to the respondent's three best friends which may be underestimating the amount of peer delinquency males are exposed to through associating in larger groups. With nuisance occurrences, the estimate for the gender variable is non-significant indicating that the amount of occurrences reported by males and females is not significantly different when controlling for peer delinquency.

Artifact of Age?

The next series of analyses examines the association of peer delinquency with age. The existence of an age-crime curve has been established with other data (Farrington, 1986; Gottfredson and Hirschi, 1990) and one appears in the self-reported delinquency data used in these analyses. The distributions of the self-reported delinquency scales and peer delinquency with age are shown in figures 3.3 and 3.4.

Figure 3.3: Distribution of Self-Reported Delinquency and Peer Delinquency by Age for Males.
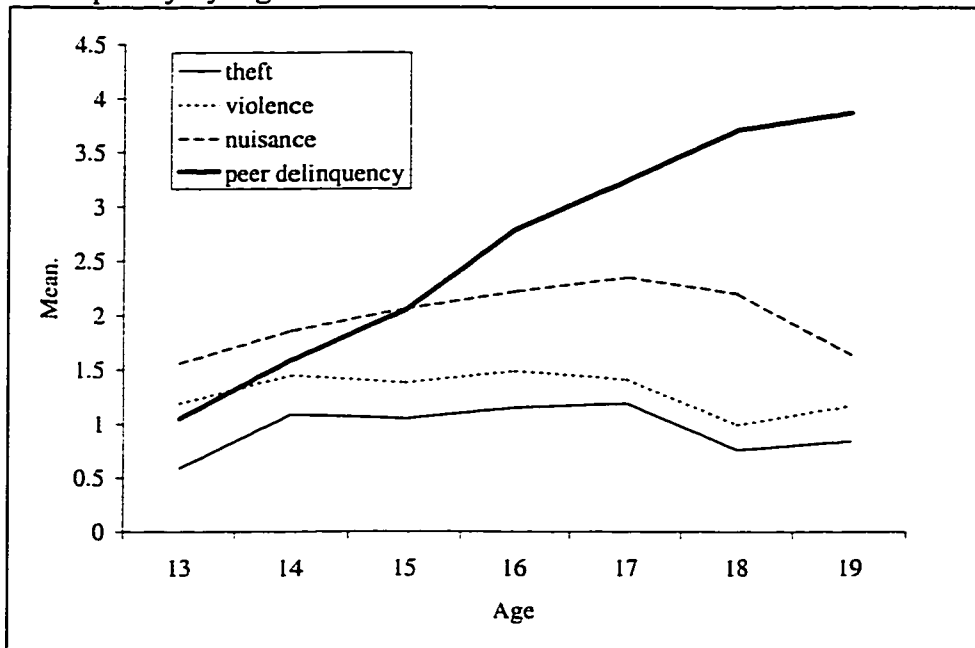
Using the means at each age produces a flatter curve than would be expected using absolute numbers as in Farrington (1986) and Gottfredson and Hirschi (1990). The small increases in the means would produce larger differences in absolute numbers but the means provide for a better comparison with the measures of peer delinquency as in this case we are looking for similarities in general distributions.

In figure 3.3 the peer delinquency for males rises steady with age while all self-reported delinquency follows a curve that decreases over the ages 17 to 19. The decline of self-reported behaviour while reporting increasing levels of peer delinquency indicates that, for males, peer delinquency does not vary with age in a similar fashion to self-reported delinquency. However, for females the distributions show more similarity with

peer delinquency stabilizing at age 17. The stabilizing of peer delinquency occurs at the same age that self-reported delinquency starts to decline. Even so, there remains marked differences in the distributions of peer delinquency and self-reported delinquency with age for females.

Figure 3.4: Distribution of Self-Reported Delinquency and Peer Delinquency by Age for Females.
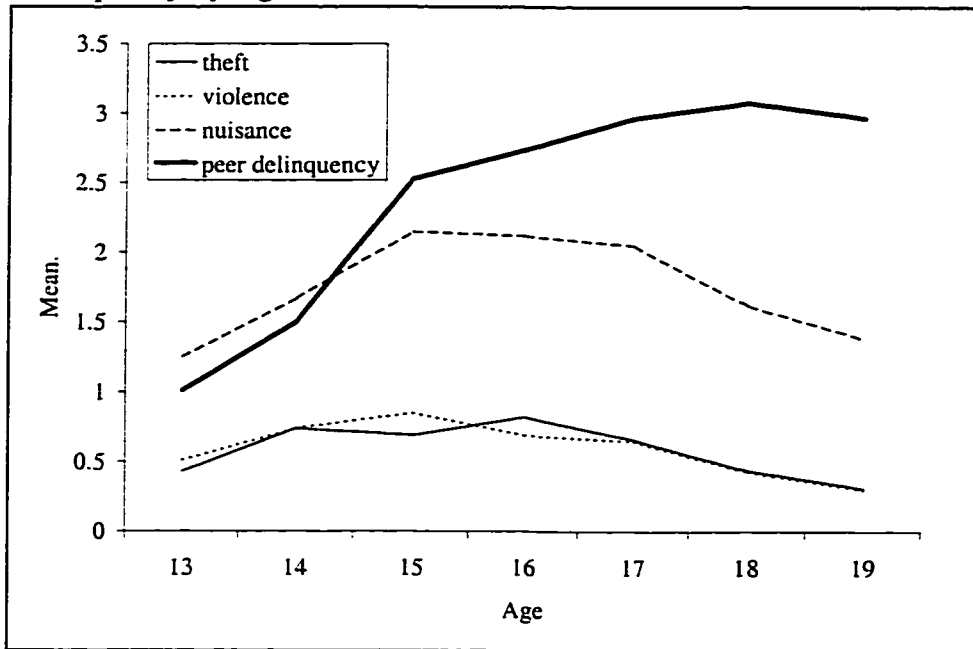
Another possibility raised by the measures used here is the overestimation of peer delinquency at the older ages. Age grading the peer delinquency measures to reflect the declining seriousness of smoking and drinking would be conceptually appropriate but raises some statistical problems. Choosing the proportions of seriousness for each age would be an arbitrary decision and the proportions would still have to maintain the same scale range. A graded scale[11] was tested and found to make minimal or no difference in the regression models and only small differences in distribution by age. It did have the effect of stabilizing peer delinquency for males at ages 17, 18, and 19 rather than the small increases in figure 3.3.

The results have to be interpreted in the light of the actual acts they measure and in this case not having an overlap in activities, to negate the criticisms of Gottfredson and Hirschi, allows for the exposure to delinquent peers, measured by relatively minor

occurrences, to increase while self-reported delinquency of more serious occurrences declines at the older ages.

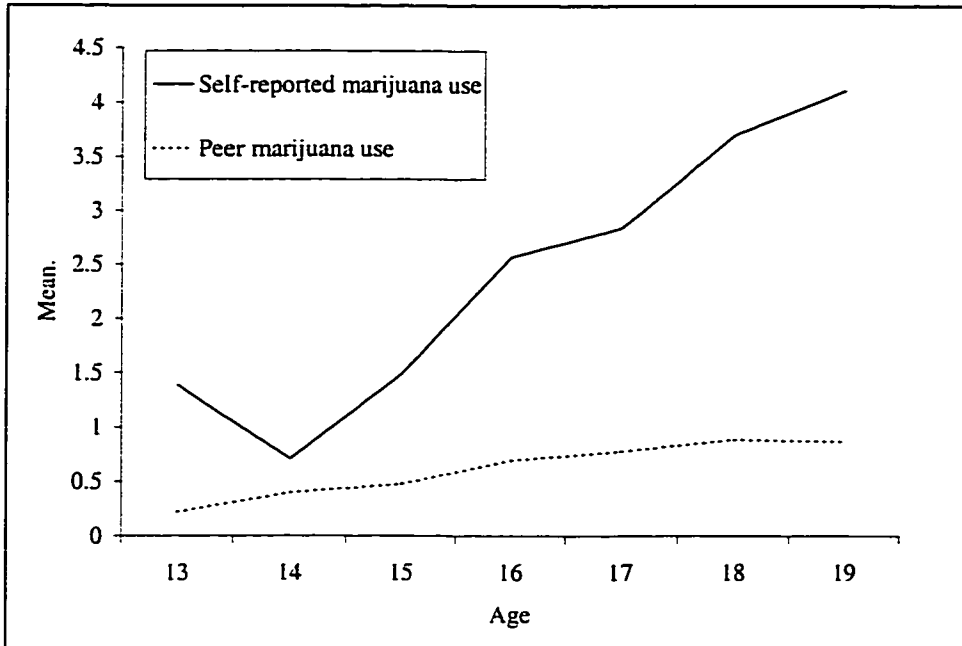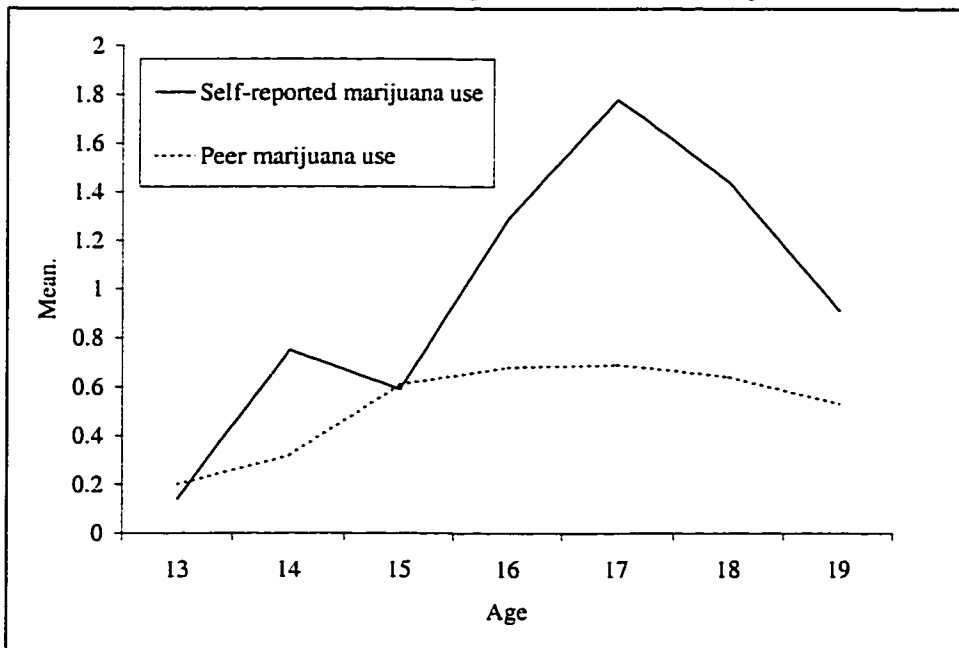Figure 3.5: Distribution of Self-Reported and Peer Marijuana Use for Males.

Figure 3.6: Distribution of Self-Reported and Peer Marijuana Use for Females.

Adding to this question of overlapping activities it is possible to examine the distributions of peer and self-reported marijuana use with age to test if these distributions show similarities. The distributions are shown in figures 3.5 and 3.6. These plots for males and females, while different, match on peer and self-reported marijuana use. For males, both peer and self-reported use increase steadily with age. Whereas for females, both peer and self-reported use decline noticeably from age 17.

Another way to demonstrate the exposure to peer delinquency with age is to plot those who report no delinquent peers for each age as in figure 3.7.

Figure 3.7: Distribution of Respondents with No Delinquent Peers by Age.
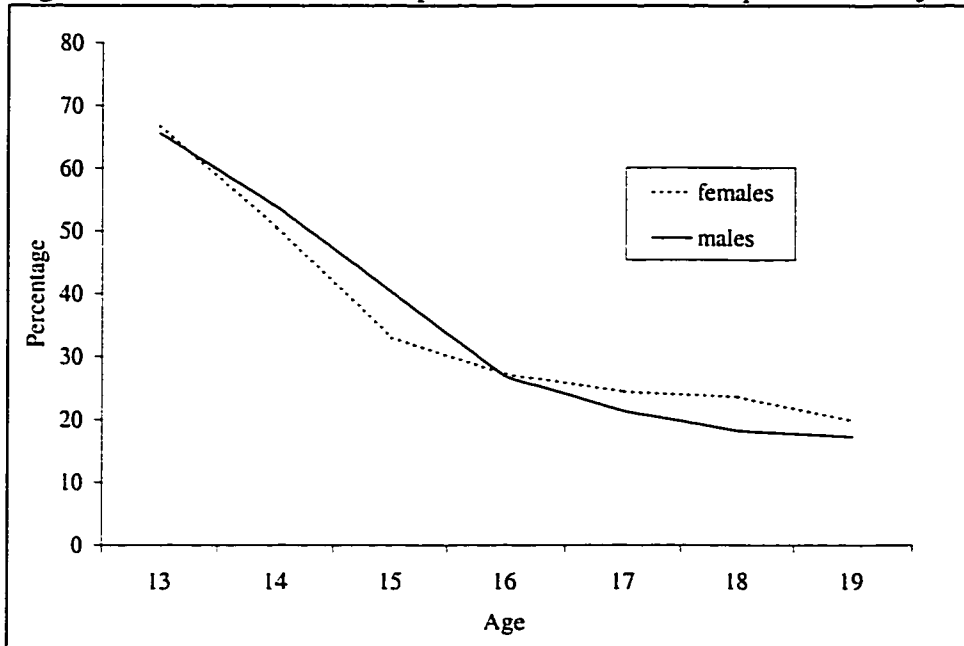
The plots in figure 3.7 indicate that the proportion of respondents with no delinquent peers decreases rapidly from age 13 to age 16 (65% to 28%). Then the rate stabilizes with only small changes to age 19 to finally reach only 20% reporting no delinquent peers.

To test if the effect of peer delinquency varies with age, three modified Poisson regression models were constructed. For these models each year of age was coded as a dichotomous variable and age 13 was the omitted category. Also, each model included interaction terms for each year with peer delinquency, again except the omitted year, that were designed to capture any change in effects. The results of these models are reported

in table 3.3. For all three models the results indicate that the effect of peer delinquency does not change significantly with age. It is also worthy to note that the age categories themselves are only significant for the nuisance model which is compatible with the information gained from the plots that show little change with age for thefts and violence.

Table 3.3: Parameter Estimates for Age Interaction Models (N = 5,833).

Independent variables	Dependent variable		
	Theft	Violence	Nuisance
Peer delinquency	0.21•• (6.2)	0.15•• (6.2)	0.17•• (9.8)
Gender[a]	-0.40•• (7.3)	-0.71•• (16)	-0.10• (3.8)
Race[b]	0.01 (0.1)	0.40•• (28)	-0.08 (2.6)
Single parent[c]	0.03 (0.4)	0.16 (2.6)	-0.03 (0.8)
14	0.54* (3.1)	0.16 (1.2)	0.26* (3.2)
15	0.35 (1.9)	0.14 (1.1)	0.39•• (4.7)
16	0.55* (3.1)	-0.03 (0.5)	0.41•• (5.0)
17	0.29 (1.6)	-0.13 (1.1)	0.39•• (4.7)
18	-0.25 (1.2)	-0.46* (3.3)	0.16 (1.8)
19	-0.71 (2.2)	-0.53 (2.6)	-0.05 (0.4)
Interactions:			
14 x peer delinq	0.004 (0.1)	0.02 (0.6)	-0.005 (0.2)
15 x peer delinq	-0.007 (0.1)	-0.01 (0.4)	-0.03 (1.8)
16 x peer delinq	-0.05 (1.4)	0.01 (0.7)	-0.05 (2.7)
17 x peer delinq	-0.02 (0.6)	0.004 (0.2)	-0.05 (2.5)
18 x peer delinq	0.00 (0.0)	-0.01 (0.2)	-0.04 (2.3)
19 x peer delinq	0.07 (1.4)	0.02 (0.6)	-0.04 (1.5)
BIC'	-1141	-1667	-1725
Pseudo-R^2	0.13	0.16	0.13

Notes: [a] female=1. [b] black=1. [c] single parent=1. t ratios in brackets. Age 13 omitted category. Grades of evidence:*positive •strong ••very strong.

The plots and regression models produce mixed results in that they appear to be consistent in some aspects while contradictory in others. This is not surprising when the plots represent a bivariate relationship that under-specifies the controlling effects of other independent variables in the models. The plots show that the distributions with age of peer delinquency and self-reported delinquency are clearly different, especially for males. But the plots for peer and self-reported marijuana use, for both males and females, do show similar distributions with age. The first set of plots would suggest that the effect of peer delinquency would vary with age but this did not appear in the regression models. The similar distributions for marijuana use does suggest that the effect is invariant with

age. The regression models suggest that the differences we observe in the plots are not statistically significant.

The implications these results have for the artifact of age argument are twofold. First, the invariant effect of delinquent peers with age along with the steadily increasing exposure to delinquent peers while self-reported delinquency decreases confound each other. Second, the similarity of the marijuana use plots do indicate that peer delinquency and self-reported delinquency vary with age in the same fashion lending support to the argument that if age explains delinquency then it also explains peer delinquency. Another interpretation of the marijuana plots, as they involve overlapping activities, is that they lend support to Gottfredson and Hirschi's (1990) contention that peer delinquency is probably another report of own delinquency. The distributions of peer delinquency and self-reported delinquency with age may indicate a difference between the minor activities measured in peer delinquency and more serious activities in the self-reported scales. The possibility of a distinction is further explored in the following section on group selection.

An Artifact of Group Selection?

The theory of group selection reflecting a person choosing others with similar traits is tested for by inspecting the degree of heterogeneity of self-reported and peer delinquency across levels of each other. The first set of analyses use the non-overlapping self-reported and peer delinquency measures. Figure 3.8 shows the plot of means and standard deviations in self-reported thefts for each level of peer delinquency. Similar patterns are obtained for the means of violence and nuisance[12] so for the sake of brevity the analysis will be limited to self-reported thefts.

Interpreting the plots of means and standard deviations for skewed variables has to done with some caution as they do not have the same meaning when dealing with normally distributed variables. However, the mean and variance are defining elements of the dispersion in Poisson and negative binomial distributions. As these families of distributions closely resemble the distributions found in these data, it is appropriate to use these characteristics.

Figure 3.8: Means and Standard Deviations of Self-Reported Thefts
by Levels of Peer Delinquency.
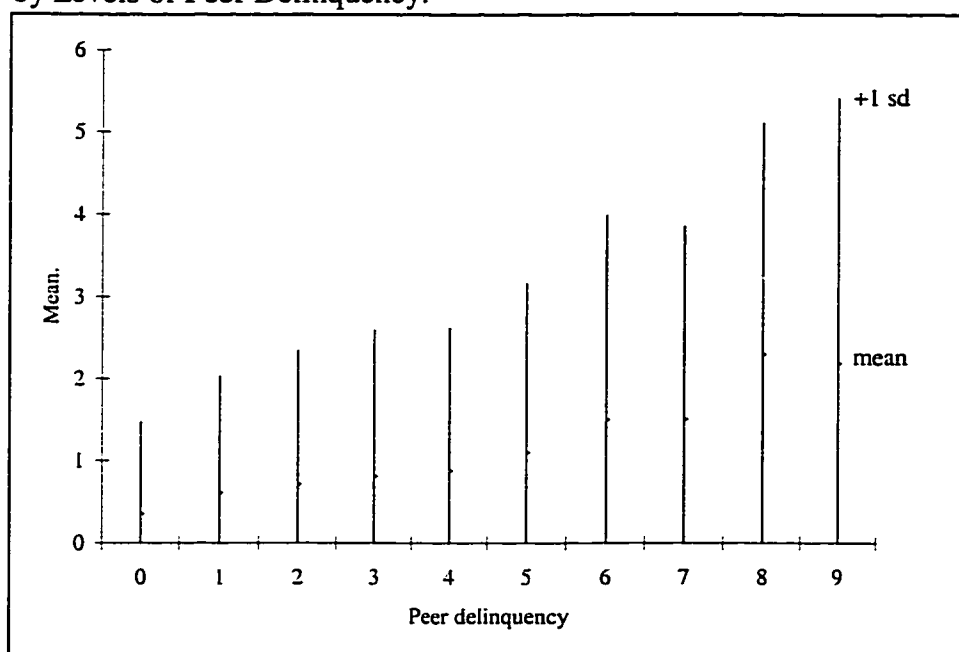
As the level of peer delinquency increases so does the mean of self-reported theft. However, the standard deviation also increases and at all levels of peer delinquency zero self-reported thefts are within one standard deviation of the mean. This indicates that there are increasing levels of heterogeneity in self-reported thefts as peer delinquency increases. Compare these results with those shown in figure 3.9 that plots the means and standard deviations of peer delinquency for levels of self-reported thefts. For this analysis, the theft scale was collapsed into five categories[13] for ease of graphing. Again, as expected, the mean of peer delinquency increases with levels of self-reported thefts but this time the standard deviation at each level remains almost constant. Also, only at the level of zero self-reported thefts does zero delinquent peers come within one standard deviation of the mean of peer delinquency. Therefore, the level of heterogeneity in peer delinquency remains stable for differing levels of self-reported thefts.

Figure 3.9: Means and Standard Deviations of Peer Delinquency by
Levels of Self-Reported Thefts.
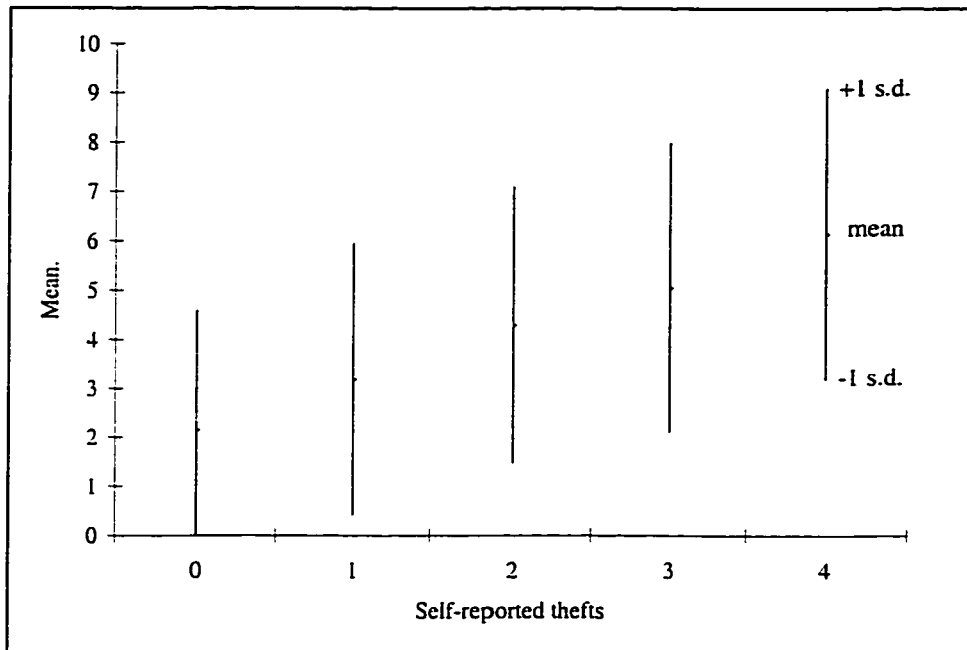
These results begin to shed some light on the structure of the delinquent peer association but to add to the analysis, the crosstabulation of peer delinquency[14] and self-reported thefts is shown in table 3.4.

Table 3.4: Crosstabulation of Peer Delinquency by Self-Reported Thefts
(N = 5,845).

Row percentage		Peer delinquency				
Column percentage		0	1	2	3	
Self-Reported thefts	0	38.6	35.5	18.8	7.1	73.5
		85.2	74.3	65.7	49.6	
	1	22.4	36.2	26.3	15.1	18.3
		12.3	18.9	22.9	26.4	
	2	10.9	32.1	29.8	27.2	5.3
		1.7	4.8	7.5	13.6	
	3	8.6	27.8	27.8	35.9	2.3
		0.6	1.9	3.1	8.0	
	4	9.2	8.7	31.7	50.3	0.5
		0.1	0.1	0.8	2.4	
		33.3	35.1	21.1	10.5	100

The dispersions shown in figures 3.8 and 3.9 can be discerned from the table but what is of particular interest is the large proportion (49.6%) of respondents who are in the top category of peer delinquency but report zero thefts. This contrasts with those in the highest category of self-reported thefts with only 9.2% reporting no delinquent peers (i.e. 90.2% having delinquent peers). The results for self-reported violence are similar but there are differences when self-reported nuisance is used as shown in table 3.5.

Table 3.5: Crosstabulation of Peer Delinquency by Self-Reported Nuisance (N = 5,838).

Row percentage Column percentage		Peer delinquency				
		0	1	2	3	
Self-Reported nuisance	0	51.0 48.5	31.4 28.3	13.5 20.3	4.0 12.0	31.6
	1	30.0 44.0	38.7 53.7	21.9 50.9	9.4 43.7	48.8
	2	13.8 6.3	34.8 15.0	30.1 21.7	21.3 30.8	15.2
	3	11.0 1.2	24.4 2.5	36.3 6.2	28.3 9.7	3.6
	4	4.2 0.1	19.5 0.4	23.7 0.9	52.6 3.8	0.8
		33.3	35.1	21.1	10.5	100

Whereas in the theft crosstabulation, most (73.5%) report no thefts but in the self-reported nuisance almost half (48.8%) acknowledge a low level of occurrences. This results in a clustering around the low levels of peer delinquency and self-reported nuisance. The difference in results is possibly because both the peer delinquency measures and the nuisance scale consist of relatively minor occurrences. This similarity of occurrences leads onto the test involving the overlapping activity of self-reported and peer marijuana use.

Figure 3.10 shows the means and standard deviations of self-reported marijuana use by levels of peer marijuana use. As expected, the mean of self-reported use increases but so does the standard deviation indicating increasing heterogeneity.

At first, the marijuana use results appear to be similar to those with the measures of peer delinquency and self-reported delinquency and are bolstered by the relatively stable heterogeneity in peer marijuana use across levels of self-reported use[15] as shown in

figure 3.11. However, for the highest three categories of self-reported marijuana use the highest level of peer marijuana use (all three best friends) is within one standard deviation.

Figure 3.10: Means and Standard Deviations of Self-Reported Marijuana Use by Levels of Peer Marijuana Use.
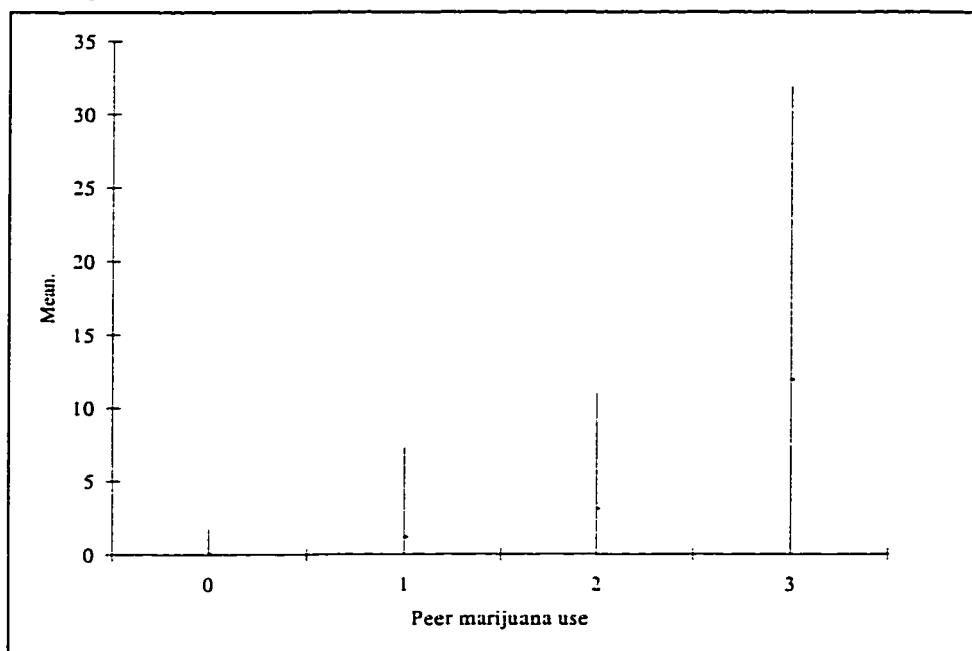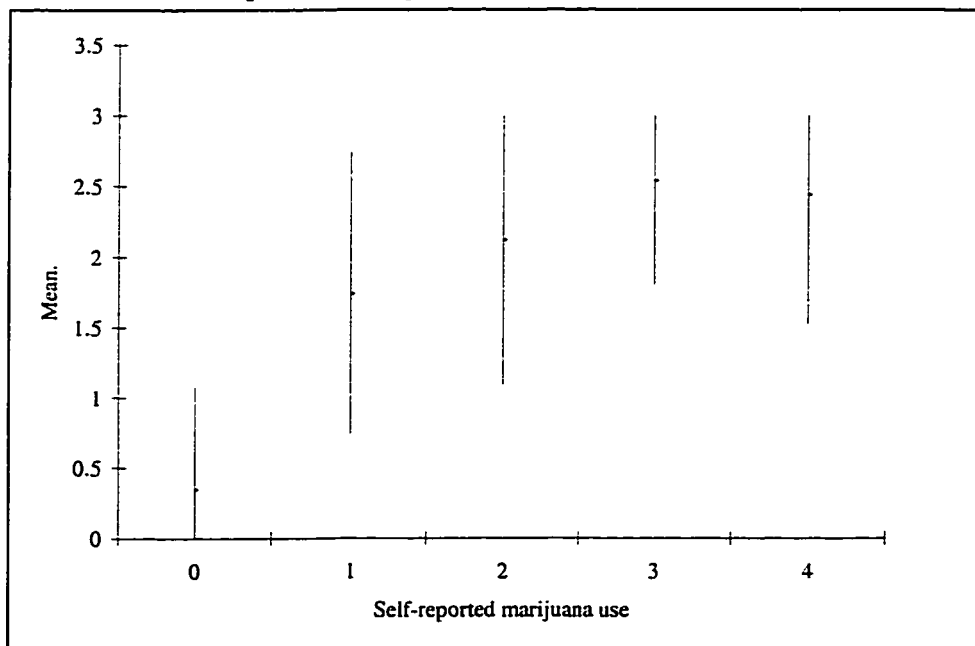

Figure 3.11: Means and Standard Deviations of Peer Marijuana Use by Levels of Self-Reported Marijuana Use.

The crosstabulation of peer marijuana use and self-reported marijuana use is shown in table 3.6. At the high levels of self-reported marijuana use the majority of adolescents have peers also using marijuana. There is also a high degree of concomitance with no self-reported use and no peer use. The crosstabulation resembles the nuisance table with some clustering around the low levels of self-reported and peer use.

Table 3.6: Crosstabulation of Peer Marijuana Use by Self-Reported Marijuana Use (N = 5,918).

Row percentage		Peer marijuana use				
Column percentage		0	1	2	3	
Self-Reported marijuana use	0	76.8	14.3	5.4	3.4	85.6
		98.1	78.0	58.2	31.6	
	1	11.6	31.5	27.2	29.7	8.1
		1.4	16.3	27.6	26.1	
	2	10.4	16.6	23.2	49.9	2.3
		0.4	2.4	6.6	12.3	
	3	1.6	10.9	19.0	68.5	2.2
		0.1	1.6	5.3	16.6	
	4	5.0	15.0	10.4	69.6	1.8
		0.1	1.7	2.3	13.3	
		67.0	15.7	8.0	9.2	100

The subtle differences in the theft and marijuana use plots combined with the results from the nuisance occurrences suggest some meaningful differences in the delinquent peers association. To do this it is necessary to draw a distinction between interpreting the results at the conceptual level and at the measurement level. At the conceptual level the results from the theft plots would suggest that regardless of the level of exposure to peer delinquency most do not engage in delinquent acts. However, returning to what type of activities these scales attempt to measure alters the interpretation slightly – regardless of the level of exposure to (minor) peer delinquency, most adolescents do not engage in (serious) delinquent acts. Drawing this distinction between minor and serious delinquency is somewhat arbitrary, but necessary, to illustrate some of the differences that appear in the analyses. The difference is particularly relevant to explain why the nuisance plots and crosstabulation are similar to the marijuana use rather than the theft or violence plots. Returning to the theft results, the majority of those

committing high levels of serious delinquency have all three best friends committing minor delinquency. At the extreme of self-reported minor delinquency (nuisance and marijuana use) most have all three best friends committing minor delinquency. But at the lower levels of self-reported and peer minor delinquency there appears to be a clustering around the low level of occurrences.

Summarizing, it appears that there is a concomitant association between low levels of peer and self-reported minor delinquency. However, this concomitance does not appear in the association between minor peer delinquency and serious self-reported delinquency. In this case, being exposed to high levels of minor peer delinquency does not result in any serious delinquency for the majority of adolescents. On the other hand, the vast majority of adolescents engaging in serious delinquency have peers engaging in minor delinquency.

An Artifact of Offender Typology?

Moffitt's (1993) dual taxa of offenders posits differing roles, and by extension differing effects, for delinquent peers. To identify Moffitt's life-course-persistent offender (LCP), early sexual experience will be used as a proxy. The first test of that proxy is an examination across groups of mean levels of delinquency and peer delinquency.

Table 3.7: Means of Adolescence-limited and Life-course-persistent Offenders.

	Theft	Violence	Nuisance	Peer delinq.
Adolescence-limited	0.79	0.93	1.90	2.44
(N)	(5,696)	(5,691)	(5,684)	(5,561)
Life-course-persistent	1.26	1.93	2.59	4.36
(N)	(304)	(306)	(304)	(292)
t (sig)[a]	3.6 (.00)	7.6 (.00)	4.6 (.00)	11.1 (.00)

Notes: [a] Variances unequal by Levene's test.

The results are reported in table 3.7 which indicates higher levels of delinquency for LCPs compared to adolescence-limited (AL) offenders. The t values for thefts and nuisance appear satisfactory but for this sample size are probably marginal and must be viewed with some caution, especially when the difference in size between sub-samples is

large. However, overall it appears that early sexual experience may be a reasonable proxy for LCP offenders.

The use of early sexual experience as a proxy for life-course-persistent offenders raises the possibility that it is another measure of early physical maturity. The Add Health data contains a question relating to comparative physical development with other adolescents of the same age. For males, this maturity variable is correlated at only $r = 0.05$ with early sexual experience. Thus, negating the possibility of a maturation effect.

Further examination for differences between LCP and AL offenders are shown in figures 3.12 and 3.13. Figure 3.12 shows the mean level of total delinquency by age for males and figure 3.13 for females.

Figure 3.12: Distribution of Delinquency for LCP and AL Males with Age.

The differences in these plots are clearer for male LCPs than female LCPs. The small numbers in the LCP sub-sample effect the consistency of the means, producing erratic plots compared to the AL sub-sample, and must be interpreted with caution. The plot for LCP females falls below the level of AL females at ages 18 and 19 while the plot for LCP males remains well above the AL male level. This may indicate that early sexual experience is a better proxy for male LCPs than female LCPs. As Moffitt (1993: 687fn) did note this co-appearance for males only, the extension to females would appear to be

unsupported. Therefore, the remaining analyses involving LCP and AL classifications will be limited to males only.

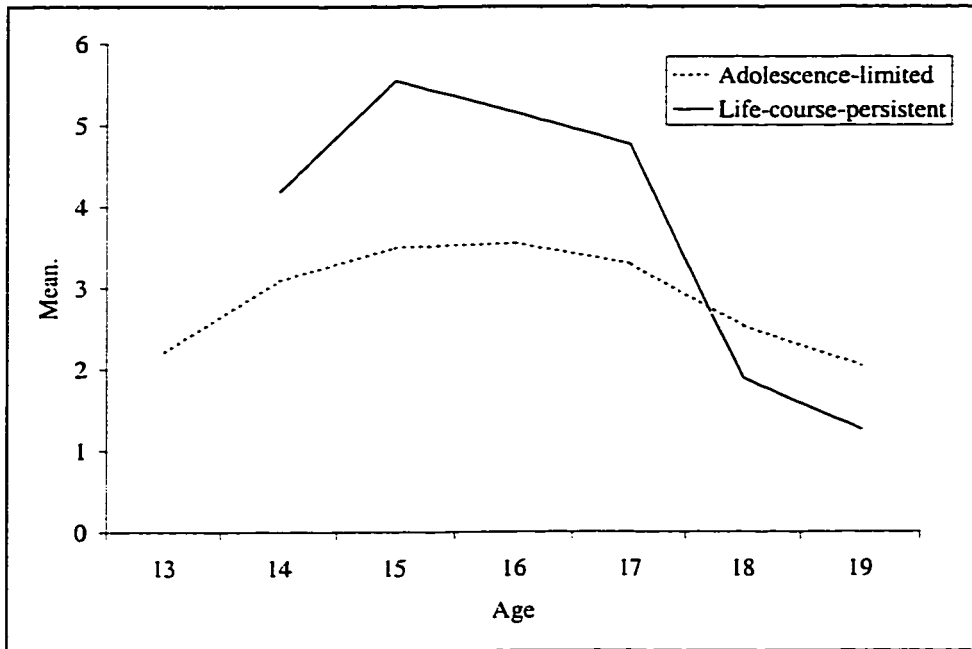Figure 3.13: Distribution of Delinquency for LCP and AL Females with Age.

Figure 3.14 shows the distribution of peer delinquency for LCP and AL males with age. LCP males have consistently higher levels of delinquent peers across all ages. Tests for a difference of means were conducted and there was a statistically significant difference at ages 14 through 19.

The general trend for LCP males corresponds with that for AL males as both increase with age. However, from age 17 the LCP males appear to increase at a rate far more than that of AL males. The disparity in amount of delinquent peers between the two classifications, especially at the older ages, may forewarn of varying effects of peer delinquency. Drawing on Moffitt (1993) we expect that peer delinquency will have a greater effect on AL males which is counter-intuitive to the amounts of delinquent peers between the groups.

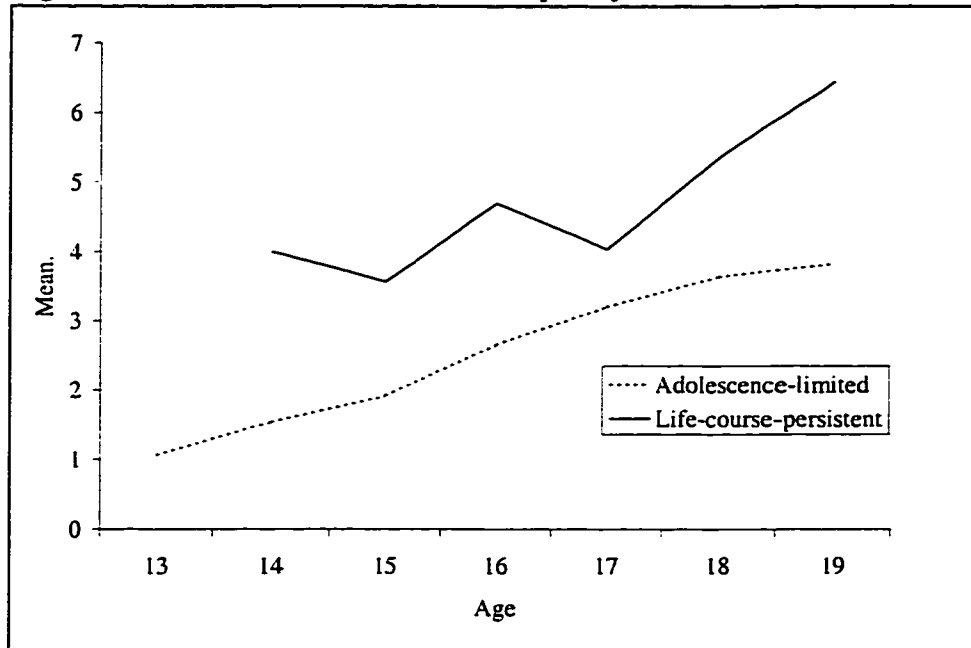Figure 3.14: Distribution of Peer Delinquency for LCP and AL Males by Age.

Table 3.8 reports the estimates for three modified Poisson regression models all containing an interaction term designed to capture any difference in effects of peer delinquency between LCP and AL males. None of the interaction terms reach significance leading to the conclusion that there is no difference in the effect of peer delinquency between LCP and AL males.

Table 3.8: Parameter Estimates for Male LCP Interaction Models[16] (N = 2,779).

Independent variables	Dependent variable		
	Theft	Violence	Nuisance
Peer delinquency	0.19•• (15)	0.15•• (16)	0.14•• (19)
Age	-0.09•• (4.3)	-0.09•• (6.2)	-0.04• (4.1)
Race[b]	0.02 (0.2)	0.29•• (4.6)	-0.19* (3.3)
Single parent[c]	-0.02 (0.2)	0.03 (0.3)	-0.02 (0.3)
LCP[a]	0.41 (1.4)	0.79•• (4.5)	0.08 (0.4)
Interaction: LCP x peer delinq	-0.03 (0.7)	-0.04 (1.5)	0.01 (0.5)
BIC′	-424	-630	-864
Pseudo-R[2]	0.11	0.12	0.14

Notes: [a] LCP=1. [b] black=1. [c] single parent=1. t ratios in brackets.
Grades of evidence:*positive •strong ••very strong.

The results in table 3.8 are not surprising in light of the plots previously shown. When controlling for age, the LCPs only have a significantly higher level of self-reported violence. The lack of significance in the interaction term is consistent with the higher levels of self-reported delinquency and higher levels of peer delinquency in LCP offenders. The results also have implications for Moffitt's taxonomy that will be discussed in the next section.

Conclusions

This section will be in two parts. The first will summarize the findings of the previous section and relate them to each of the artifact arguments and each other where necessary. The second part will discuss the theoretical debate reviewed in chapter one in the light of these findings.

The factor analysis of the individual items reproduced Agnew's (1991a) and Thornberry's (1994) findings that peer delinquency items load onto a different factor from self-reported delinquency items. But the second-order factor analysis indicated that peer delinquency and self-reported delinquency are both measures of a common higher factor. In themselves, these results would tend to support the artifact of self-reported delinquency argument as they both are measures of the same latent construct. However it must be borne in mind that Gottfredson and Hirschi's (1990: 156) artifact argument is designed to compliment their general theory in that both peer delinquency and self-reported delinquency are produced by (low) self-control. In this light, the results of the group selection tests must be added to the factor analyses which will be discussed below.

The equality in peer delinquency between males and females was a surprising finding considering that there were gender differences in self-reported delinquency in the data. Teasing apart the different types of self-reported delinquency helps answer this contradiction in that the gender differences were only significant in thefts and violence but not in nuisance. This suggests that both males and females are exposed to and commit minor delinquency at about the same rate and gender differences only appear at the more serious level of self-reported delinquency. Even with this similarity at the minor level of self-reported delinquency and peer delinquency the differences in self-reported serious

delinquency suggested a possible interaction effect with delinquent peers having a greater effect on males. However, this interaction was not significant possibly because the majority of both males and females do not commit serious delinquency which can be seen from the distributions of the self-reported delinquency scales. The limitations of the peer delinquency measures, three best friends, may account for these results as males are generally thought to have larger circles of friends than females. Overall though, the results do not find any evidence of peer delinquency being an artifact of gender.

The artifact of age argument received some support from the data but this has to considered in light of the activities measured. By age 19, only 20% of adolescents report no peer delinquency and both male and female plots show peer delinquency increasing with age without the decline in later years associated with self-reported delinquency. The peer and self-reported marijuana use plots showed similar distributions with age. However, the male and female plots showed different trends with males increasing over all ages while for females peer and self-reported use declined from age 17. These similar distributions with age indicate that if the age-crime relationship is a genuine one (Gottfredson and Hirschi, 1990: 130) then there is an age-peer delinquency relationship as well that no social factor can account for also. The differences in distributions for the peer and self-reported delinquency plots can be attributed to them measuring minor peer delinquency and more serious self-reported delinquency. This indicates that age has different relationships with minor and serious delinquency. Females appear to reach a maximum point of peer delinquency at age 17 whereas males continue increasing across the ages under study. The commonness of minor peer delinquency by age 19 comes into the exploration of the group selection artifact as well.

The examination for group selection produced the most interesting findings that illustrated a number of relevant theoretical and measurement points that will be discussed later. Altogether, the results did not lend support to the artifact of group selection argument. If anything, the increasing amount of heterogeneity in self-reported delinquency across levels of peer delinquency indicated that the premise of seeking out similar people as peers may be more appropriate for non-delinquents. The minor peer delinquency and minor self-reported delinquency appear to be concomitant. But minor

peer delinquency does not relate with serious self-reported delinquency for most but almost all serious delinquents have (minor) delinquent peers. Taking the group selection, factor analysis, and age distributions together it is possible to conclude that minor delinquency and minor peer delinquency is very common for the vast majority of adolescents and mostly at low levels. However, this does not translate into more serious delinquency. Unfortunately, because of the restrictions in the measurements available in these data, further conclusions are not possible in relation to the association between serious delinquency and serious peer delinquency.

Moffitt's (1993) dual taxa of offenders suggested that peer delinquency would have a greater effect on adolescence-limited offenders but no evidence to support this contention was found. This was not surprising as life-course-persistent offenders had consistently higher levels of delinquent peers compared to adolescence-limited offenders. From these data it was unclear as to who are the delinquent peers of the life-course-persistent offenders; either other life-course-persistent offenders or adolescence-limited offenders at the peak of their own age-crime curve. Nevertheless, the findings from other tests have implications for Moffitt's taxonomy of offenders. It is clear from these findings that Moffitt's description of delinquency as an adolescence norm is limited to the minor types of offenses and serious offenses would be rare in her adolescence-limited category. Finding a significant gender difference in violence and then another significant difference within males between life-course-persistent and adolescence-limited offenders indicates that most of the violence is produced by the life-course-persistent male. If, as the findings suggest, minor delinquency is so pervasive that treating it as a norm may lead to focusing on the extremes for more complete explanations of no delinquent behaviour and high levels of delinquent behaviour, especially violence. This would be especially so if the range of minor delinquent activities was expanded beyond the ones in these data making those who report zero to be a very exclusive category indeed. All of this leads us well away from general theories and toward a hierarchy of delinquents and offenses that may well require differing etiologies.

Before tackling the ramifications of these findings for various theories it is necessary to comment on some issues that could not be tackled by data analysis. If the

ontological differences as to what can and cannot be a cause are entrenched to the degree they appear to be at the extremes of the polemic then each side is talking past each other and reconciliation is nigh impossible. Attempts to forge a middle ground (e.g. Thornberry, 1987) in the causality debate while acknowledging the interactional nature of peer relationships have been a refreshing addition even if the modeling of those theories has been ambiguous over the onset of delinquency. If we follow that lead and relax some of the extreme positions, the differential association/social learning and control theories can mutually add what each lacks in its explanations.

Differential association theory gives credence to individual characteristics in the idea of individual receptivity and to individual choice in that excessive exposure to delinquent definitions *may* lead to delinquency. However, the theory leaves the individual action-less when it comes to choosing companions from whom delinquent or non-delinquent definitions emanate. This choice of companions goes beyond the individual receptivity as theorized by Sutherland. Incorporating the individual level concepts of control theories at the point of individual receptivity may lead to a fuller explanation of why some people exposed to an excess of delinquent definitions do not commit delinquency themselves. And also go some way to negate the criticism of an infinite regress in the theory.

Conversely, control theories could benefit from the addition of group processes in their explanation of delinquency. It appears contradictory for social control theories (e.g. Hirschi, 1969) to recognize, on one hand, social processes in the forming of stakes in conformity while, on the other, dismissing the social processes occurring in peer groups. Gottfredson and Hirschi's (1990) general theory makes no apology for not granting causal status to group processes outside of the family socialization of the child. However, in their crusade for an extremely parsimonious general theory, they dismiss virtually all other social and interactive processes as non-causal but grant them "facilitator" status. Their argument of stability in (low) self-control further leaves the individual impervious to positive interactions with the social (normal) world. However, Gottfredson and Hirschi do tackle the reasons why people choose the companions they do. Their position gives the individual action to choose companions, unlike differential association theory, and

that choice reflects companions of similar levels of (low) self-control. This vastly oversimplifies the work in the field of social comparison theory. The choice of peers has been proposed to be based on similar opinions and abilities (e.g. Festinger, 1954) which does mesh with Gottfredson and Hirschi's explanation but further research has shown that there is not a single referent group for all situations (Masters and Smith, 1987: 3). These initial musings may indicate that a synthesis of elements from differential association, control, and social comparison theories may be possible and provide for a more complete explanation of the delinquent peer association with crime (cf. Matsueda and Anderson, 1998).

Even if this synthesis were possible, one has to question the pursuit of general theories of crime considering the wide heterogeneity in crimes and offenders. The data analyses suggested a qualitative difference between minor and serious delinquency and their relationship with minor peer delinquency. The drawing of arbitrary lines around classifications of offenses is suggested with caution as it could be the start of endless typologies (Gottfredson and Hirschi, 1990: 50). On the other hand, the total homogenizing of delinquency and peer delinquency could lead to disguising some of the differences in relationships and etiologies.

Classifying, or not, differing types of delinquency and peer delinquency has consequences for measurement in research and modeling. We were obliged to address Gottfredson and Hirschi's criticism of overlapping measures of self-reported and peer delinquency especially in formats similar to the National Youth Survey that asked exactly the same questions of respondents' and their peers' activities. The measures used in our analyses attempted to address the criticism by not containing overlapping activities but this restricted the scope of investigation by not matching serious self-reported delinquency and serious peer delinquency. This shortcoming in the measures led to not being able to examine for differing etiologies for minor and serious delinquency. However, it should be noted that relating statistical findings to the actual measures employed, rather than the concept, is not that common in the delinquent peer literature.

The apparent pervasiveness of minor delinquency throws serious doubt on the usefulness of modeling it as a predictor of delinquency when what is measured is only

going to be a small proportion of all minor delinquent acts available to adolescents (and adults). The decision of what specific acts entail minor delinquency is arbitrary and the choice will probably have consequences for the effect obtained in any model, depending on the delinquent activities that constitute the dependent variable (i.e. other similar acts or widely disparate acts). To some extent this is what has occurred in these analyses – modeling peer smoking, drinking, and marijuana use as predictors of gang fights and serious thefts. This leap of judgement is somewhat ludicrous but very common in the studies reviewed in chapter one and mostly driven by attempts to form or confirm a general theory that posits that the same underlying structure will explain widely disparate acts.

Low levels of minor delinquency and, by extension, low levels of minor peer delinquency by their ubiquitousness form a constant "background noise" for more serious delinquency and peer delinquency. But trying to explain activities that are so common across the population inevitably results in unsatisfactory explanations because of the large amount of heterogeneity that cannot be accounted for. Following this line of argument, and the results of the data analyses, the case for delinquent peers as a cause of delinquency is questionable: the temporal criterion has failed to be resolved by longitudinal studies; factor analysis identified it as a measure of a common latent construct along with self-reported delinquency; and there is some evidence that peer delinquency exhibits the same relationship with age as self-reported delinquency for similar activities. The first two points can be accounted for by the virtual omnipresence of minor delinquency and the third by the age-crime relationship which follows that peers would also be on their own age-crime curve producing concomitant distributions.

Taking all of the above points together, it would appear that the analyses generally support the social control perspective on the delinquent peer association, especially the factor analyses. The temporal aspect of the causality arguments could not be addressed with these cross-sectional data but the review of other studies that have, unsatisfactorily, attempted to solve the quandary leaves substantial doubt over the causal nature of delinquent peers. The most damning evidence against the differential association / social learning perspective is in the reduction of self-reported delinquency in

the older adolescents while their exposure to peer delinquency continues to increase, especially for males.

These conclusions have to be tempered with the observations that low levels of minor self-reported and peer delinquency are almost universal resulting in a wide range of heterogeneity that defies satisfactory explanation. The qualitative difference that emerged in these analyses between serious and minor delinquency indicates that more productive research may have to focus on the most seriously delinquent adolescents, especially violent occurrences, rather than homogenizing them into the mass of common minor events that probably disguises differing etiologies. In this regard, Moffitt's (1993) dual taxa of offenders would be an excellent starting point.

NOTES

[1] The Add Health project is a program designed by J. Richard Udry (PI) and Peter Bearman, and funded by grant P01-HD31921 from the National Institute of Child Health and Human Development to the Carolina Population Center, University of North Carolina at Chapel Hill, with cooperative funding participation by the National Cancer Institute; the National Institute of Alcohol Abuse and Alcoholism; the National Institute on Deafness and Other Communication Disorders; the National Institute of Drug Abuse; the National Institute of General Medical Sciences; the National Institute of Mental Health; the National Institute of Nursing Research; the Office of AIDS Research, NIH; the Office of Behavior and Social Science Research, NIH; the Office of the Director, NIH; the Office of Research on Women's Health, NIH; the Office of Population Affairs, DHSS; the National Center for Health Statistics, Centers for Disease Control and Prevention, DHSS; the Office of Minority Health, Office of Public and Science, DHSS; the Office of the Assistant Secretary for Planning and Evaluation, DHSS; and the National Science Foundation.

[2] Kelley et al. (1997) refer users of the Add Health data set to the work of DuMouchel and Duncan (1983) and Winship and Radbill (1994) for strategies involving sample weights and regression analyses. However, their work only deals with OLS parameter estimation. The statistical method employed in these analysis employs maximum likelihood estimation and requires a correction for accurate standard errors (see below). It is not known how employing weighting variables may effect either the estimated parameters or the standard errors in this specific method of estimation. Therefore, all regression models are unweighted and the results must be viewed with some caution. On the plus side, the large sample (approx. 6,000) supports the accuracy of the estimates through asymptotic theory.

[3] The sample weight is calculated by: $W_s = W_i / (\Sigma W_i / N)$
where W_i is the individual weight. This produces a range of weights whose mean is one.

[4] The results of the reliability tests by gender are reported below:

Scale	Item	Males		Females	
		Item-total correlation	Alpha (standardized)	Item-total correlation	Alpha (standardized)
Theft	4	.72	.77	.76	.74
	9	.52	(.79)	.43	(.76)
	10	.52		.43	
	13	.69		.75	
Violence	5	.62	.75	.59	.68
	6	.62	(.76)	.50	(.69)
	14	.52		.46	
Nuisance	1	.39	.67	.33	.58
	2	.59	(.70)	.45	(.65)
	3	.45		.42	
	15	.49		.45	

[5] The peer delinquency scale was also tested for reliability across gender:

Scale	Item	Males		Females	
		Item-total correlation	Alpha (standardized)	Item-total correlation	Alpha (standardized)
Peer	1	.53	.73	.57	.76
Delinquency	2	.57	(.73)	.61	(.76)
	3	.57		.59	

[6] The software employed is GLIM4 – "...a general-purpose program for fitting Generalized Linear Models together with associated facilities for managing, manipulating and displaying data. It is a result of a project sponsored by the GLIM Working Party of the Royal Statistical Society..." (Francis, Green, and Payne, 1993: ix).

[7] For a Poisson distribution, the modified Pearson residuals are:

$r^P_i = (y_i - \mu_i) / \sqrt{\mu_i}$ where μ_i are the GLIM fitted values (Francis et al., 1993: 284).

The overdispersion ratio is then entered into the GLIM program as the scale parameter. This has the effect of adjusting the standard errors of the parameters while their actual value is static.

[8] Pseudo-R^2 = improvement in deviance / null deviance

[9] The factor loadings for the second analyses are:

Variable	PC	PAF	ULS	ML
Theft scale	.748	.631	.630	.634
Violence scale	.689	.534	.533	.528
Nuisance scale	.809	.773	.774	.775
Peer delinquency	.617	.450	.450	.451
Eigenvalue	2.07	1.48	1.48	1.48
% of variance	51.8	37.1	37.2	37.2

[10] The results of the tests for difference in proportions are:

Peer delinquency	Females		Males		Z
	Prop.	N	Prop.	N	
0	34.3	990	32.4	961	0.64
1	14.7	423	12.5	371	0.86
2	10.7	309	11.1	330	-0.12
3	10.0	290	11.2	332	-0.44
4	8.7	252	8.2	244	0.08
5	6.2	178	7.1	211	-0.20
6	5.7	163	6.2	184	-0.14
7	3.7	107	3.5	104	0.03
8	2.8	80	4.0	119	-0.32
9	3.3	95	3.7	111	-0.18
	Total	2887	Total	2965	

[11] The peer delinquency variables were weighted thus:
up to and including age 14: peer delinquency = frsmoke + frdrink + frmaji
age 15: peer delinquency = (0.5*frsmoke) + (1.0*frdrink) + (1.5*frmaji)
age 16: peer delinquency = (0.25*frsmoke) + (1.0*frdrink) + (1.75*frmaji)
age 17: peer delinquency = (1.0*frdrink) + (2.0*frmaji)
age 18 and older: peer delinquency = (3*frmaji)

[12] The results for violence and nuisance are:

Violence category	Peer delinquency		Number of cases
	Mean	Stnd dev.	
0	2.06	2.42	3435
1	2.93	2.71	1919
2	4.12	2.86	388
3	5.18	2.86	96

Nuisance category	Peer delinquency		Number of cases
	Mean	Stnd dev.	
0	1.53	2.15	1846
1	2.55	2.54	2851
2	3.88	2.78	886
3	4.70	2.79	211
4	6.30	2.89	45

[13] The collapsed theft scale was recoded: zero = 0, 1 to 3 = 1, 4 to 6 = 2, 7 to 9 = 3, and 10 to 12 = 4.

[14] The collapsed peer delinquency scale was recoded: zero = 0, 1 to 3 = 1, 4 to 6 = 2, and 7 to 9 = 3.

[15] The collapsed self-reported marijuana use variable was recoded:
zero = 0, 1 to 5 = 1, 6 to 15 = 2, 16 to 30 = 3, and 30 to 100 = 4.

[16] Owing to the lower number of cases, the t values to reach significance in these models are: positive- 3.0, strong – 3.65, and very strong – 4.2 (Raftery, 1995: 140).

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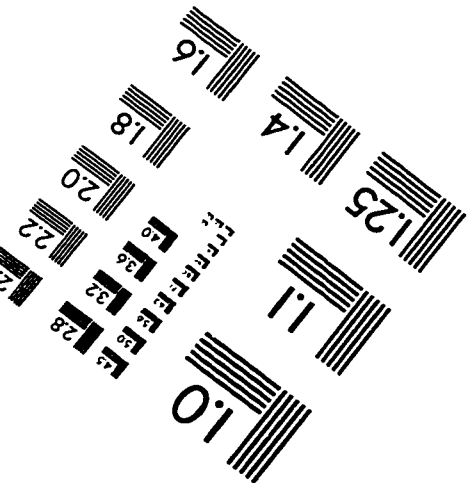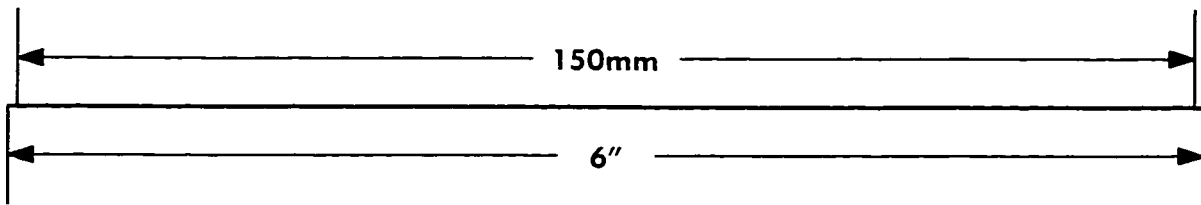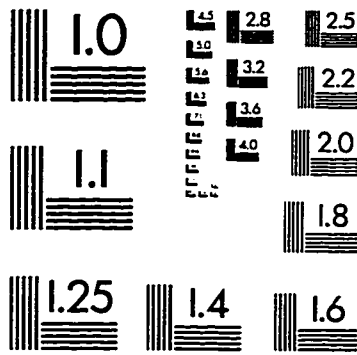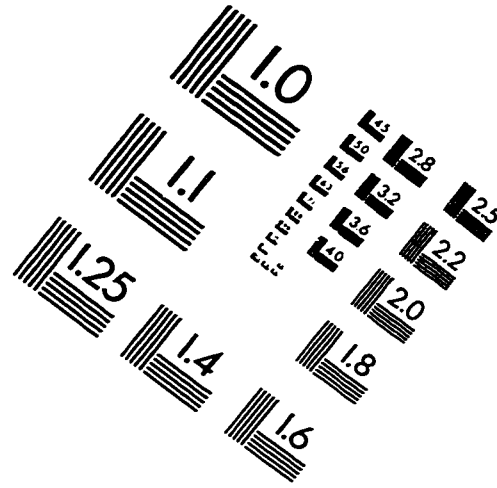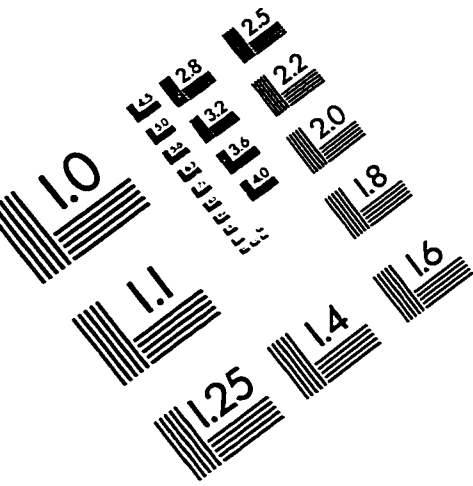
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IMAGE EVALUATION
TEST TARGET (QA-3)

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