UNIVERSITY OF CALGARY

Offence Specialization Among Juvenile Serious Habitual Offenders During the Early Stages of Criminal Careers

by

Ryan K. Williams

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE

DEGREE OF MASTERS OF ARTS

DEPARTMENT OF SOCIOLOGY

CALGARY, ALBERTA

APRIL, 1998

ABSTRACT

This study questions whether criminal careers may be the manifestation of time invariant factors or if they may vary as a result of a variety of factors and circumstances at different transitional points throughout criminal careers. Using a sample from official police data (N=386), this study examines offence specialization among juvenile serious habitual offenders as indicators of behavioural turning points in the onset of criminal careers. It is argued that delinquency transitions in the initial stages of criminality have important implications in the development of criminal careers. Using Farrington's (1986) forward specialization coefficient analysis, findings suggest a reconsideration of the development of both stability and change at different transitional stages in criminal careers.

ACKNOWLEDGEMENTS

I would like to take this opportunity to thank the following people and organizations for their help and assistance over the last few years. This research would not have been possible without the combined contributions of each of these individuals and groups. First I would like to acknowledge the Social Sciences and Humanities Research Council of Canada (Grant #410-96-1165) as well as the Research Unit for Socio-Legal Studies at the University of Calgary and the Solicitor General for their support of this project.

I would like to give my appreciation to the entire support staff in the Department of Sociology for their assistance, especially Thomas Huang whose patience and guidance are truly appreciated and will be missed. I would like to thank Dr. Yvonne Ko from the Calgary Police Service and Dr. Louis Knafla for serving on my examining committee and bringing a fresh perspective to my work with their comments and suggestions.

Thanks to Dr. Bruce Arnold for all of his guidance over the years. I consider Bruce a mentor and have learned much not only from his academic views, but from his attitude toward teaching in general and its value in the "real world." I would also like to thank Bruce's family for giving up much of his valuable time so that he can help myself as well as many other students. I can only hope that my future successes will be thanks enough for the patience and time put in by Bruce and yourselves.

Finally I would like to thank my own family who have never stopped supporting my efforts over the many years and to Krista for her love and support throughout.

TABLE OF CONTENTS

LIST OF TABLES

OFFENCE SPECIALIZATION AMONG JUVENILE SERIOUS HABITUAL OFFENDERS DURING THE EARLY STAGES OF CRIMINAL CAREERS

CHAPTER 1

CONCEPTUAL FRAMEWORK

1.0 Introduction

If criminologists can agree on one issue, it is that for those offences which persons of all ages have opportunities to commit, crime is committed disproportionately by those who are 15-25 years of age (Braithwaite, 1989:46). According to an annual report by Statistics Canada, there has been a general decrease in all areas of criminal activity in Canada in 1995 (Statistics Canada Report, 1995). The police-reported crime rate fell for the fourth consecutive year in 1995. However, while the overall violent crime rate for Canadians decreased by 4.1%, the largest annual decline since 1962, the rate of youths charged with violent crime increased by 2.4% and was more than twice the rate in 1986. The disproportionate number of crimes committed by youths may sometimes appear to be a result of indiscriminate, random behaviour. In an attempt to predict, prevent, and ultimately understand youth crime as well as adult crime, many researchers have set out

to determine whether certain behaviours displayed early in the life of an offender can help us to identify and understand future transitions and trajectories in a young offender's life.

The purpose of this study is to investigate the offending careers of a group of young serious habitual offenders early in their life course in an attempt to see whether offending patterns are random and versatile, or whether they are predictable and/or specialized. By studying the patterns of offenders over time we are better able to see what patterns exist, if any, in an offending career. The answer to this question will lend empirical support to either a general criminological explanation of crime where crime is predicted to be random or a developmental explanation which sees different types of offenders committing different types of crimes over their careers. Many studies of the careers of criminal offenders have appeared in a diverse group of disciplines such as history (Robertson, 1981 and Desroches, 1996), as well as within the criminological literature (Farrington et al., 1988; Blumstein et al., 1988a; Stander et al., 1989; Lattimore et al., 1994 and Britt, 1996) have attempted to find the existence of a specialized offender. Results of these studies indicate that some offenders do in fact specialize in certain types of offences. Although the theoretical implications of a specialized offender indicate that there are different types of offenders, most studies fail to look at the differences in specialization for offenders who begin their careers at different points in their life-course. As a result, a lack of any theoretical

explanation for the existence of specialization for some offences and not for others is often overlooked. Also, age of onset has been shown to be an important predictor of future offending with different factor affecting different behaviour depending on the age a youth begins offending (Loeber & LeBlanc, 1990). Therefore, looking at groups of offenders whose antisocial behaviour is the result of different causal factors may help to shed light on why or if some offenders specialize in certain offences while others do not.

Not only are there theoretical implications in specialization studies but there are policy implications as well. If offending is found to be specialized, knowledge about earlier types of offences may assist estimating later offences and might be used to assist criminal justice decision making. Crime control efforts can therefore be made to focus on offenders who are most likely to continue to exhibit particular offence types that are of policy concern. Information about developmental sequences that lead to the onset of offending can help policy makers determine when they should intervene with educational measures to help prevent the possibility of future offending.

The following chapter will begin by discussing the concept of career lines and the similarities of conventional careers with those of a more criminal nature. Discussion will then move toward explaining the recent debate amongst criminologists as to the advantages and disadvantages of looking at crimes within a career framework. An attempt is then made to

move discussion forward in a more productive manner by looking at how the life-course perspective of crime can help to possibly move debate forward. From life-course theories of crime, developmental models (Moffitt, 1993)have emerged which address issues of dynamic offending even more than previous research using a criminal career framework. An overview of developmental criminological theory is given including references to notions of criminal propensity and delinquent peer associations. Finally a review of previous offence specialization literature is presented from which specific research questions are generated which help to guide the current investigation.

1.1 Conventional and Non-Conventional Careers

As we have stated, in order to study the offending patterns of youth over time, many researchers look at the overall offending careers of youth. Researchers commonly define the term "career" in two ways. First, one can define a career as a way of making a living. For example, doctors, lawyers, construction workers and teachers all have occupations or professions that they engage in as life work. This definition of career is the basis for much of the socioeconomic achievement literature (eg. Blau & Duncan, 1967) within conventional career research. This literature places emphasis on analysing the effects of characteristics prior to entering the labour force on an individual's occupational standing and earnings in later life. The concept of

career is used frequently but only in reference to a period in a person's life cycle such as the "early career" or the "mid-career" or to an unspecified progression of jobs (Spenner et al., 1982). Only certain points of a person's career, such as the first job or the current job, are the subject of study. One critique of research utilizing this type of career definition is that little attention is given to the linkages which exist among jobs (Abbott & Hrycak, 1990). Work positions, such as time spent as a doctor or professor, are rarely viewed as parts of larger, coherent career lines. However, other researchers (Hughes, 1958; Rosenfeld, 1980 and Abbott & Hrycak, 1990) have viewed a career as a course of continued progress through life, as in the life of a person or nation.

One of the first sociologists to make explicit use of the term *career* was Everett Hughes (1958). Hughes influenced many scholars to study people in a wide variety of conventional occupations such as medical students, school teachers, lawyers, taxi drivers and many others. Hughes (1937) distinguished between two aspects of a career. An *objective* career is the series of positions or offices that a person can hold throughout their life. The objective career is what a person's career looks like from external observers. A person's *subjective* career is his or her own individual view of his or her career experiences. A subjective career is "the moving perspective in which the person sees his life as a whole and interprets the meanings of his various attitudes, actions, and the things which happen to him" (Hughes, 1937:403).

Hughes and his colleagues moved the definition of career away from simply meaning one's individual achievement in a profession to applying the concept of career to any social role or aspect of a person's life. With Hughes, the Chicago school helped sociologists develop understanding of the various roles and stages through which people are recruited by, enter, move through, and move out of conventional careers (Hall, 1991:496).

Similar to Hughes, Spilerman (1977:555) believes that many researchers have conceptualized the notion of career in a way that detracts from the overall picture of actual career lines and the study of their determinants. Spilerman goes on to point out that these traditional accounts of a career are biased in the types of careers that are discussed. Many of the studies done on conventional careers focused on individual occupations or industries with little attention to career lines that transverse institutional boundaries. Additionally, Abbott and Hrycak, (1990) state that often what seem to be disorderly careers may in fact be logically structured from the individual's point of view. More recently, researchers have begun to look at the structure of non-conventional careers.

In his essay titled "The Moral Career of the Mental Patient" Erring Goffman (1961) investigated the more non-conventional careers and lifestyles of mental patients. Goffman looked at the entire career line of the patient beginning with the "pre-patient phase" when the patient first submits to a psychological examination to the point when the patient is finally

released from the hospital. David Karp (1996:55) speaks of another similar career with discernable stages. Karp is concerned with describing the career features associated with another ambiguous illness, that of depression. Like the conventional career, the career of a depressed person is characterized by discernable stages. Since a depression consciousness arises in a patterned way, it is possible to analyse the depression experience as a "career" sequence characterized by distinct identity transformations. One of the most influential studies of non-conventional careers was Howard Becker's investigation of deviant careers in his 1963 work *Outsiders*. Becker shows how the model of a conventional career can be transformed for the use in the study of deviant occupational groups such as dance musicians or deviant social practices such as marijuana use. Use of the concept of a deviant career has extended to a group of contemporary studies which have investigated the careers of individuals who have been defined as criminal.

1.2 Criminal Career Framework

A "criminal" career describes the sequences of offending during some part of an individual's lifetime. Unlike definitions of conventional careers where an individual's actions are viewed as ways of making a livelihood, within a criminal career framework there is no suggestion that offenders use their criminal activity as a crucial means of making a living (Farrington, 1992:1). Similar to studying the sequence of jobs in an individual's career, criminal

career research focuses its attention on the interval between the onset and termination of an individual's offence history.

The criminal career construct has been a major topic of study for sociologists and criminologists at least since the time of the Glueck study of juvenile delinquency which was begun in 1930 (Blumstein et al., 1988a). In the Glueck study, the formation and development of delinquent behaviour were the prime focus. Longitudinal research on delinquency and crime reemerged in the early 1970's with the focus of study becoming what was originally referred to as the "chronic offender" (Wolfgang et al., 1972). More current research has moved toward a broader concern with the longitudinal sequences of offences committed by individual offenders (Farrington, 1992). Similar to conventional careers, the criminal career is characterized by a beginning (onset), an end (termination), and a duration (career length). Most criminal career research puts its focus on the interval between onset and termination where features such as the rate of offending, the pattern of offense types, and any trends in offending patterns, like specialization, can all be analysed (Blumstein et al., 1988a). Despite a widely held belief that the criminal career framework has greatly advanced criminological knowledge about sequences of offences (Farrington, 1992), there recently have been a number of publications (Gottfredson & Hirschi, 1986, 1987, 1988) which question the value of applying the concept of "career" to crime. The main critiques of the career paradigm come from

proponents of general theories of crime such as Michael Gottfredson and Travis Hirschi. These critics of the career paradigm see no empirical support for the view that the time has come to apply career terminology to the study of crime (1988).

General theories (Gottfredson & Hirschi, 1990) of crime assert that there is one single casual process which can be used to apply to all offenders. The differences in offending are believed to be attributed to a variation in some casual trait. Gottfredson & Hirschi (1990), argue that criminal activity, along with other self-destructive behaviour, reflects a single, time-stable individual trait or propensity toward crime established early in life: lack of social control. Those youth who lack this self-control tend to be "impulsive , insensitive, physical (as opposed to mental), risk-taking, short-sighted, and nonverbal, and they will therefore tend not to engage in criminal and analogous acts" (Gottfredson & Hirschi, 1990). Criminal acts are viewed as being able to provide immediate gratification for those who commit them. This persistent-heterogenic interpretation of crime views individual differences in criminal potential as being stable over time.

However, general theorists believe that criminal propensity is not always directly proportionate to crime. For Gottfredson and Hirschi, many non-criminal acts such as smoking and alcohol use are also manifestations of low self-control. This leads to the implication that no specific act, type of crime, or form of deviance is "uniquely required by the absence of self-

control" (Gottfredson and Hirschi, 1990:91). Since crime is viewed as "impulsive" and "short-sighted" Gottfredson and Hirschi predict that there will be great versatility in crime rather than specialization in one particular type of crime. In fact these authors go on to state that "no credible evidence of specialization has been reported" and that evidence of the versatile offender is "overwhelming." These conclusions are based upon studies done in the early 1980's and prior. Unfortunately for general theorists, researchers continued studying specialization after 1982 (see appendix A) and have found overwhelming evidence that a specialized offender exists. Although they don't state that there is currently "overwhelming" evidence of criminal specialization, Gottfredson & Hirschi do acknowledge that most criminological theories suggest that offenders do tend to specialize (1990:91).

Two other major concepts in criminal career research that are debated by general theories are that of prevalence, or participation, and frequency. Prevalence refers to the proportion of the population who are active offenders at any given time. Prevalence reflects the extent of involvement of crime within a population (Blumstein et al., 1988b). Frequency of offending by active offenders is referred to in the criminal career literature as an individual crime rate, or lambda (λ). The concept of λ helps to reveal the magnitude of offending by individuals within a unit of time (Blumstein et al., 1988a). The use of lambda helps to identify distinct features of offending as

well as a possible subgroup of offenders. Gottfredson and Hirschi (1988) contend that λ has no independent usefulness other than connecting participation and aggregate crime rates concluding that all theoretical and policy implication of lambda are unwarranted However, Blumstein et al. (1988a) state that participation and λ "are the most basic constructs of interest" and that the aggregate crime rate is "a derivative concept whose level depends entirely on participation and λ" (pg.4).

Another important issue surrounding criminal careers where researchers disagree is the relationship between age and crime. Gottfredson and Hirschi (1988) contend that "the propensity to commit criminal acts reaches a peak in the middle to late teens and then declines rapidly throughout life" (pg. 219). Moreover, the researchers believe that this age-crime curve is extremely invariant regardless of sex, country, sex, time, or offense. However researchers such as Tittle (1988) contend that the belief in a completely invariant crime curve is perhaps a little premature and that "too little evidence has been brought to bear to allow any strong conclusions" (pg. 76). In fact, Blumstein et al., (1988a) show that there are very different peak ages in the curve for different types of crime such as aggravated assault which has a peak age of 21, and burglary where the peak age is 17 (pg.9). Research by Blumstein et al., (1988a) also suggest that a subpopulation of offenders exist where the frequency (λ) of offending remains high throughout the individual's entire career. The criminal activity of these individuals does

not decrease with age. Such variations in the age/crime curve raise questions of theoretical importance of social, cultural, psychological, and other factors that may account for difference in the age-crime relationship among different subgroups (pg. 64).

Though not a theory itself, the criminal career construct can be viewed as valuable for the development of criminological theory. The criminal career construct distinguishes between the individuals who commit crimes from the different crime that they commit rather than treat crime as undifferentiated unitary phenomena (Blumstein et al., 1988a). Such a framework allows researchers to possibly distinguish between the causal factors stimulating individuals to first become involved in crime (onset) from those factors which effect the frequencies (λ) with which individuals commit crimes. In other words, a criminal career approach to crime allows researchers to investigate whether different types of offending reflect different theoretical constructs such as violence potential, theft potential, rape potential, etc. A career approach also helps to better understand common social processes that are relevant to an understanding of the similarities and differences of conventional and deviant careers (Arnold & Hagan, 1992).

1.3 Life Course Perspective of Offending

The possibility that offending is dynamic is an important assumption in the theory advanced by Sampson and Laub (1993). This life-course

perspective is similar to that of a criminal career framework in that it suggests that criminal behaviour is a fluid concept and can change over time. The life course perspective proposes that offending patterns are developed through a series of events. They suggest that certain events in one's life, such as marriage and employment, can greatly influence criminal tendencies. The major appeal of a life-course perspective is that it emphasizes that certain events and transitions in a person's life may be linked into life trajectories with much broader significance.

For criminological research, the life-course perspective helps to lead the focus away from the peak years in adolescence, or on the constancy of criminality amongst high rate offenders and shifts attention toward the causes and consequences of events called crimes in the life course (Hagan & Palloni, 1988). Use of the life-course framework helps to show how the implications of early life choices extend into the later years of life. As Elder states, "the later years of aging cannot be understood in depth without knowledge of the prior life-course" (1994: pg.5). With regards to the lives of young offenders, a life-course perspective can help researchers to see how, if at all, life events which occur early in the criminal career effect smaller transitions and overall trajectories later in the offender's life. However, in regards to changes in offending, a life course framework sees much more continuity in offending behaviour than change over time (Sampson and Laub, 1993).

Even though Sampson and Laub acknowledge that criminal propensity is not stable over time, their theoretical framework does not make crime-specific estimates. Although it is dynamic in nature, a life-course framework still resembles Gottfredson and Hirschi's approach in the sense that it states that a single casual process may apply to all offenders. For Sampson and Laub, relative lack of social control or social capital, is the principal cause of criminal behaviour. For Sampson and Laub, social capital is viewed as the accumulation of different types of social investments people make through their lives. Such investments would include schooling, jobs, marriage, etc. The authors state "both social capital and informal social control are linked to social structure, and we should distinguish both concepts as important in understanding changes in behaviour over time" (1993 pg.19). Where Sampson and Laub's theory differs from Gottfredson and Hirschi is in its assertion that social controls rise and fall over time in response to changing life circumstances. Any variability in the social controls for life-course theorists is the key to understanding any variation in criminal behaviour. The life course assumption that all offending shares a common etiology is disputed by theories of crime which propose an even more dynamic model of offending which argues that there may not only be different types of social control, but perhaps different types of criminals.

1.4 Developmental Theories of Crime

Recently a group of theories called developmental theories of crime (Loeber & LeBlanc, 1990; Moffitt, 1993) have attempted to address issues of dynamic offending more explicitly than previous research using a criminal career framework. Although proponents of developmental theory agree that it is important to distinguish different facets of offending such as frequency and participation, they take the dynamic model one step further by more forcefully arguing that prior behaviour is causally linked to future behaviour and/or that different factors affect behaviour at different ages and over stages of the criminal career (Nagin and Farrington, 1992). Sociologists such as Goffman (1961) and Becker (1963) have shown previously that the "first step" in a deviant career can help us to better understand future career stages and transitions. It has been well documented in the criminal career literature that early onset of delinquent behaviour is often predictive of more persistent offending (Farrington et al., 1990). There is however, two distinct interpretations of the predictive ability of prior criminal activity. A persistent-heterogeneity interpretation of the relationship between prior and future offending is that it reflects time-stable individual differences in criminal potential that appears early in the life-course (Gottfredson & Hirschi, 1990). Persistent-heterogeneity theories do not allow for any causal linkage between past and future behaviour. Since the determinants of offending are assumed to be stable over time (Gottfredson & Hirschi,

1990:107), there is no possibility that determinants of criminal activity could vary with age or even depend on what stage an offender is in during his or her career. If there were differences in age, the propensity theorist would contribute them to differences in degree of propensity, not differences in age.

In contrast, a state-dependence theory of the association between age of onset and future activity states that the relationship reflects a "genuine causal linkage whereby past criminal involvement reduces internal inhibitions or external constraints to future crime or increases the motivation to commit crime" (Nagin and Farrington, 1992). From a policy perspective, the state-dependence interpretation would see the delay of the onset of a career as beneficial not only in reducing those crimes committed at an early age, but also in reducing the intensity of involvement at stages later in an individual's career. Aspirations to discover clues to early intervention and prevention success have led researchers to focus more attention on how the onset of an offending career can affect the type of future crime as well as the seriousness of those crimes.

Compared to general theories of offending, developmental theorists argue that the poor socialization casual path is only applicable to a small group of offenders. For developmental theorists, most youth offend primarily during adolescence. The causes of offending for this larger group of adolescent offenders is not poor socialization, but delinquent peer association. Recall from our previous discussion, this implication is also part

of the criminal career framework, which sees the existence of a small group of offenders that are different in kind from the bulk of the offending population (Blumstein et al., 1986). State-dependence models of offending such as the developmental model proposed by Moffitt, (1993) suggest then that there are two types of offenders who both differ in their developmental course of offending. For these theorists, the causes of antisocial behaviour differ among individuals who participate in their offending behaviour at certain points in their life-course. For Moffitt (1993), the antisocial behaviour that begins in early childhood is different from behaviour which begins during adolescence. Developmental theories of offending propose then that age is essential to the understanding of antisocial behaviour.[1]

Moffitt refers to the first category of offenders as "life-course persistent offenders" or early starters. The hallmark of the life-course persistent offender is continuity (Moffitt, 1993). Advocates of the developmental perspective argue that this small proportion of offenders begin their antisocial behaviour during early childhood and continue their participation long past the point when those who began their careers in adolescence have ceased. The explanation for this early and persistent

---

1

It should be noted that developmental theory is a relatively recent development in criminological literature. Although some empirical test of the theory have been made (eg. Piquero et. al, 1998) Terrie Moffitt's 1993 work "Adolescence-limited and Life-course Persistent Antisocial Behaviour: A Developmental Taxonomy" remains the most important and most often cited piece of theoretical formulation.

behaviour is said to be the result of neurodevelopmental impairments which lead to deficient self-control, which in turn disrupts normal socialization and makes these youth vulnerable to environments of offending (Jeglum Bartusch et al., 1997).

Moffitt's definition (1993) of criminal propensity includes impulsivity, hyperactivity, and verbal ability (as opposed to mental). Hence, Moffitt's definition of criminal propensity and its effect on the antisocial behaviour of early-starters, is very similar to that of Gottfredson and Hirschi's (1990). However, while Gottfredson and Hirschi believe that age has little effect on the correlations between propensity and antisocial behaviour, as life-course theory proposes, developmental theory believes that age will influence those correlations. As a result, measures of propensity and antisocial behaviour correlate strongly in childhood but weakly during adolescence.

The second type of offender group in the developmental model is called "adolescent limited youth", or late starters (Moffitt, 1994:46). This group become antisocial for the first time during adolescence but eventually desist before young adulthood. Unlike early starters, this group of offenders lack any real propensity for criminal behaviour yet are responsible for a major portion of the peak of the age-crime curve. Based on this proposition by developmental theory, a first question is proposed to be examined further in this paper using a unique sample of youth;

Question 1: **Is the duration with which adolescent-limited offenders (late-starters) have police contacts shorter than that of life-course-persistent offenders (early-starters)?**

Moffitt makes further claims that adolescent-limited offenders get involved in crime in an effort to break free from childhood constraints by mimicking the delinquent activity of their peers in order to achieve adult status. Moffitt states,

> "They (late-starters) remain financially and socially dependent on their families of origin and are allowed few decisions of any real import. Yet they want desperately to establish intimate bonds with the opposite sex, to accrue material belongings, to make their own decisions, and to be regarded as consequential by adults." (Moffitt, 1993:687)

In particular, Moffitt states that exposure to peer models, when coupled with puberty, is an important determinant of adolescent-onset cases of delinquency. Peer models are often life-course persistent youth who are already adept to deviant behaviour and who appear to be independent and who make their own decisions on how to behave. The relationship between adolescent-limited and life-course persistent offenders has then been labelled one of mutual exploitation (Moffitt, 1993:688). Life-course persistent offenders serve as core members of revolving networks. They train new, and usually younger, recruits and exploit peers as lookouts or fences. In contrast, adolescent-limited offenders usually use the support of

persistent offenders to engage in criminal activity.

Developmental theory also suggests that adolescent-limited and life-course-persistent offenders differ in the *types* of crime which they commit (Moffitt, 1993:695). Life-course-persistent offenders should commit a wide variety of offences but also victim-orientated crimes which result from lack of attachment to others such as violent offences and fraud. In contrast, adolescent-limited offenders should engage primarily in offences which symbolize adult privilege or that demonstrate autonomy from parental control. These offences would include vandalism, substance abuse and other "status" offences such as theft and burglary. These offences are instrumental in obtaining money, goods, or status. If specialization exists it then may be different for both types of offenders. These propositions of developmental theory are the basis for the second and third questions which will be looked at in this paper;

> ***Question 2:*** **Are early starters more likely than late-starters to have police contacts in "victim-orientated" offences such as violent offences and general delinquency?**

> ***Question 3***: **Are late starters more likely than early starters to have police contacts in "status" gaining offences such as burglary, robbery, and other property?**

It must be noted that these first three questions to be investigated in this thesis, as well as questions put forth further in this discussion, are not

absolute tests of developmental theory. Rather, it is proposed that developmental theory is only one possible explanation of the antisocial behaviour of the youth from our sample. Developmental theories of crime incorporate both notions of propensity, as well as social learning and peer influence models of offending. The following section will explain how these models are included in developmental theory, as well as suggest reasons why these causal models of criminal behaviour are better associated with the particular notion of offence specialization than other existing theoretical models of crime.

1.5 Specialization in the Offending Career

Similar to individuals who specialize in certain occupations over their careers, it is possible that offenders specialize in certain offences over their career. One of the fundamental dimensions of a criminal career mentioned earlier is the mix of different offence types that are committed by an offender (Blumstein et al., 1986). Many different offence types may contribute to an individual's offending frequency. Individuals may, for example, vary in the scope of their offending from "specialists" who engage in predominately one type of offence or one group of closely related offences to "generalists" who engage in a wide variety of offence types (Cohen, 1986). As was previously discussed, the topic of offence specialization occupies a central place in criminological research with much debate as to whether there even exist such

a thing as a "specialized" offender.

Farrington et al. (1988) have recently stated that, from a theoretical standpoint, research on offense specialization is an important way to understand the number of dimensions underlying delinquency. More specifically, theories of crime mentioned earlier, which state that there is only one underlying dimension to criminality such as criminal propensity, would be challenged if studies found evidence of offenders who specialized in only one type of crime. Evidence of specialization would infer that there are multiple dimensions to criminality such as burglary potential, rape potential, etc. Not surprisingly, theorists who believe in the notion of criminal propensity somehow conclude that there has been no set of consistent research which would show specialization to exist (Gottfredson and Hirschi, 1990). Another explanation of the current debate as to the existence of specialization stems from the actual definition of offence specialization. Although specialization has been operationalized in slightly different ways, the overall principle of the concept has remained the same.

A "standard approach" to defining specialization was given by Wolfgang et al., (1972) where it was defined as "the likelihood that an offence of any type will be followed by the same type within an individual's offending career" (pg. 180). For example, if an offender is first arrested for burglary and then commits a second burglary offence, some degree of specialization can be said to exist. Since Wolfgang many different definitions

of specialization have come to exist for researchers. However, the essence of Wolfgang's definition remains as a common understanding of what offence specialization is viewed as today. What is important to note is that all specialization researchers would acknowledge that offenders are not going to commit the same offence over and over *without* committing any other type of offence. However, what specialization researchers want to find out are the chances of that offender eventually committing a similar offence.

A criminal career framework can help us track individual offending transitions and trajectories in order to see whether behaviours are random or structured. If offending is found to be specialized, knowledge about earlier types of offences will assist in estimating later offences and might be used to assist criminal justice decision making. Crime control efforts can be made to focus on offenders who are most likely to continue to exhibit particular offence types that are of policy concern.

The few studies which focus on specialization in offending go back to the early 1970's. Probably the most well documented study was conducted by Wolfgang et al. (1972) which looked at the transition probabilities of 9,945 boys in Philadelphia birth cohort. The existence of a specialized offender was not strongly supported with the discouraging conclusion that there "is practically no evidence to support a hypothesis of the existence of specialization among juvenile offenders" (pg.254). However, Bursik (1980) noted that the results of the Wolfgang study may have been highly skewed.

Although analysis of transition matrices were low, evidence of nonrandomness in offending patterns could be shown to exist if transition probabilities departed markedly from that expected by chance. Bursik proposed the notion that even though a youth rarely commits the same offence two times in a row, most of that youth's offenses might be of the same type, especially if there is a high level of delinquent activity (pg. 861).

Bursik reported an offence specialization analysis of 469 five-time offenders from a sample of 750 adjudicated delinquents in Cook County, Illinois. In his study, Bursik focused on the difference between the observed and the expected values that underlie offence transitions and found "definite evidence of some specialization tendencies" (pg.860). This study was very influential for future specialization research with the introduction of the use of the adjusted standardized residual (ASR) in conjunction with the computed ratio of observed values and the expected values to further test for specialization.[2]

Using the same analysis techniques as Bursik, Rojek & Erikson (1982) again found little evidence of specialization, but did find statistically significant ASRs for runaway and property offences. Although all of the above mentioned studies found some evidence of specialization, the results were still unsatisfying for many researchers showing a need for further

---

[2] An explanation of the characteristics of the ASR is discussed further in the methodology section of this paper.

inquiry.

Some promising results were found by Smith and Smith (1984) who used a sample of 767 male juveniles who were incarcerated in New Jersey correctional institutes. They found some evidence of specialization, especially among those delinquents that began their careers with the commission of robbery. Similarly, Datesman & Aickin (1984) believed that a case could be made for the existence of a specialized offender group, at least among those youths who had no previous court record at the time of their referral. However, consistent evidence of a specialized offender was still not considered a given with many authors continuing to claim that it did not exist.

Research on specialization took a drastic shift with a study done by Farrington et al. in 1988. In this study, Farrington introduced a new measure of specialization known as the Forward Specialization Coefficient (FSC) and found a small but significant degree of specialization in the midst of a great deal of versatility in delinquent offending. For instance, the most specialized offences were runaway, liquor, burglary, incorrigibility, motor vehicle, theft, and drugs. Among the least specialized were vandalism, possessing stolen property, delinquent traffic, and trespassing. Results held over all ages. The introduction of the FSC would be seen to provide much more consistent results for future studies on specialization.

Using this same FSC measure, Blumstein et al. (1988c) also found

some degree of specialization in each of their crime types. Observed levels of specialization were generally similar across races and across different jurisdictions. Specialization was highest in drugs, particularly for white offenders and in auto theft where black offenders were particularly specialized. Violent crimes such as rape and homicide were among the least specialized. Tracy et al. (1990) who found evidence of offence specialization among recidivists (as opposed to occasional delinquents). The evidence became more pronounced as the number of offences increased with almost all FSCs being significantly greater than zero.

Finally, Lattimore et al., (1994) examined the offense-transition behaviour of a cohort of California Youth Authority parolees and found results broadly consistent with other researchers. FSC analysis lead to the conclusion that "criminal careers, as represented by arrest sequences are neither wholly random nor "memoryless" but evidence patterns of behaviour over time" (Lattimore et al., 1994). Significant coefficients of specialization were particularly high for burglary and violent offences. All of the studies above which use an analysis of the forward specialization coefficient have found that offending behaviour is more likely to be specialized than versatile. The previous review of specialization research shows that with the introduction of the forward specialization coefficient, almost all studies regarding specialization have found at least one type of offence where specialization can be said to exist. Based on these recent findings, a fourth

question can be put forth to be investigated using the current data.

> ***Question 4:*** **Are offending patterns of youth more likely to be patterned and specialized than they are to be random and versatile?**

The existence of a specialized offender would offer considerable support to theories of crime, such as peer association and social learning models, which view the differential associations of youth in their everyday lives as an essential causal variable for the existence of antisocial behaviour. Both of these theories of criminal behaviour are incorporated into the more developmental theory proposed by Moffitt (1993).

1.6 Social Learning and the Role of Peer Influence

While the early starter model in developmental theories of delinquency is consonant with the predictions of general propensity theories, the late starter models strays from propensity theories in its contention that some youth are greatly influenced by their friends' values and behaviours. Offenders then are not different from non-offenders in regard to the number or quantity of relationships with peers. Instead, the actions of offenders reflects the type of deviance that is encouraged and reinforced by friends. This late starter model of offending then combines propositions which were first put forth by theories of peer association as well as social learning. (Akers, 1985).

Social learning theory proposes that deviant behaviour occurs to the extent that is has been differentially reinforced over alternative behaviour, whether that behaviour is conforming or otherwise. Differential reinforcement refers to the balance of anticipated or actual rewards and punishments that follow or are consequences of behaviour (Akers, 1997). The probability that an act will be committed or repeated is increased by rewarding outcomes or reactions to it. Such rewarding outcomes can include money, pleasant feelings, and obtaining approval from peers. In a developmental model of offending, late starters can be said to *imitate* the actions of their peers in order to receive approval. This imitation is also referred to in developmental theory as "social mimicry" (1993, pg.688). Imitation or social mimicry refers to the engagement in behaviour after the observation of similar behaviour in others (Akers, 1997). Akers goes on to state,

> "the process of social learning is one in which the balance of learned definitions, imitation of criminal or deviant models, and the anticipated balance of reinforcement produces the initial deviant act...After initiation, the actual social and nonsocial reinforcers and punishers affect whether or not the acts will be repeated and at what level or frequency" (1997, pg.71)

Empirical research has shown that once affiliation with deviant peers is introduced as a control, parenting factors no longer are seen as an

influence on deviant behaviour (Elliot et al., 1989). This contrasts proponents of a general theory of crime who argue that inadequate parenting contributes directly to the development of antisocial traits and view this antisocial propensity as causing involvement with delinquent peers, rather than the peers causing the antisocial behaviour. In other words, both Gottfredson and Hirschi, as well as Sampson and Laub would state that "birds of a feather flock together."

However, there is strong empirical support for the existence of different correlates of offending by age. Patterson and Yoerger, (1993) found that childhood onset behaviour is more strongly related to measure of verbal abilities and behavioural self-control than is adolescent onset. As well, Simons et al. (1994) found that adolescent onset antisocial behaviour is more directly dependent on delinquent peers than is childhood onset behaviour. They state,

> "Contrary to Gottfredson and Hirschi's contentions, however, affiliation with deviant peers mediated much of the relationship between oppositional/defiant behaviour and involvement with the criminal justice system...these results suggest that affiliation with deviant peers is the means whereby adolescents with antisocial tendencies learn to commit delinquent behaviour" (pg.269)

On the basis of Simons et al.'s findings, Patterson and Yoerger conclude that different theories may not be needed to explain each type of delinquent

behaviour, but different theoretical processes may be required to account for early and late starters who manifest dramatically different criminal careers (pg. 271). Based on these findings we put forth two final hypotheses to be tested in regards to the effect of age of onset on specialization. For this study, the category of "delinquent" is similar to an "other" category which includes many different types of offences not covered by the other categories. Recall from the previous discussion that life-course persistent offenders are said to commit a wider variety of offences than limited offenders, we would propose that we will find greater specialization for persistent offenders in this category;

> ***Question 5:*** **Where specialization exists, are life-course persistent offenders (early starters) more likely than adolescent-limited offenders (late starters) to specialize in violent and delinquent contacts?**

In contrast, late-starters are believed to engage in crimes that symbolize adult privilege. As a result these offenders should specialize in offences which help to achieve this status;

> ***Question 6:*** **Where specialization exists, are adolescent-limited offenders (late starters)more likely than life-course persistent offenders (early starters) to specialize in "status gaining" contacts (robbery, burglary and other property)?**

Warr (1993) shows a considerable amount of evidence showing that peer associations precede the development of deviant patterns more often

than involvement in deviant behaviour precedes associations with deviant peers. Advocates of social learning theory would then agree with the general theorists that "birds of a feather do flock together" but they differ in that they believe that these "birds" may join a flock first and then change their feathers (Akers, 1997). In regards to specialization then, social learning theory would propose that adolescent youth will repeat criminal acts, such as burglary or robbery, so far as it is differentially reinforced by delinquent peers. Warr (1996), found that when offenders repeat an offence, it is not uncommon for them to repeat the offence with the same companions. It was considerably less common, however, for offenders to commit *different* offences with the same companions. Warr speculates that,

> "it may in fact be the case that offence specialization is the fundamental source of group differentiation...It would then follow, that the versatility of individual offenders is directly proportional to the number of groups to which they belong, and that individual and group specialization are themselves inversely related." (pg.26)

Such a finding would contrast the views of propensity theorists who would say that the reason youth associate with delinquent peers is simply because they are delinquents themselves.

No known study on specialization to date has looked at the differences between early and late starters. By empirically testing these hypotheses we can speak to the notion of whether delinquency stems from a generalized

propensity or trait (such as lack of self control). If this is the case, we would expect to find no difference between the specialization of early starters and that of late starters for the same offence, if we were to find that specialization exists at all. If we find that there is a difference in the levels of specialization for early and late starters for the same offences we could support a developmental theory of crime.

In the next chapter we will discuss some of the methodological issues surrounding the study of criminal careers and specialization. A discussion of the use of official longitudinal secondary data will be then followed by a description of the sampling procedure and an explanation of how offence categories were classified. Finally, an explanation of the measures of specialization most often used in specialization studies is given with particular focus on the forward specialization coefficient.

CHAPTER TWO

METHODOLOGY

2.0 Introduction

As briefly mentioned in chapter one, there are not only theoretical debates surrounding specialization but also methodological issues surrounding the actual study of crime. This chapter discusses some of the current debates in criminology surrounding the value of longitudinal date compared to data that is collected cross-sectionally. We will then look at some of the major methodological issues surrounding the use of secondary data, specifically that collected by official agencies. The sampling procedure is discussed as well as some of the other methodological problems one encounters when studying offence specialization. Finally, a brief history of the methods previously used to study specialization, along with more recent analytical tools are described. A description of the particular method used for the present study is given along with a rational for its use.

2.1 Longitudinal Data in Studying Criminal Careers

The very nature of the "career" framework implies that events change over time. This study utilizes secondary data as part of a longitudinal design to study criminal careers. Longitudinal research is basically data collected on the same individuals at two or more points in time (Blumstein et al.,

1988b). Longitudinal data can be collected *retrospectively* or *prospectively*, the main difference being the time interval over which data collection extends. For example, offending patterns from age 10-18 can be collected by asking a cross-section of people who are now 19 years old to recall the types and dates of their specific offences from age 10-18. Even though this type of retrospective longitudinal design is possible, it is often inadequate due to the fact that the recall of specific events of this type is simply not good enough (Blumstein et al., 1988b).

In their study of retrospective recall over long periods, Yarrow et al. (1970) found low agreement between the recollections of certain events between 3 and 30 years later by mothers and those of their children. As the interval before recall lengthened, the agreement between mother and child decreased. We can then see how asking subjects to retrospectively recall the exact number, type, and ordering of their previous offending behaviour would result in unacceptable measurement error. Self-report data collected retrospectively then, are not really longitudinal data but a "cross-section of rememberences" (Menard & Elliott, 1990). Accurate data can still be collected retrospectively from official records since collection entailed examining an archive of data that were originally collected in a prospective fashion (at the same time as the events occurred).

Currently, there is great debate amongst researchers over the merits of longitudinal research compared to research using cross-sectional designs

(Blumstein et al. 1988a, 1988b; Gottfredson & Hirschi, 1986, and Greenberg, 1985). There are some obvious advantages to studies using a cross-sectional design (where a cross-section of the population is studied at one time). These advantages would include the saving of time and money, reduced risk of panel attrition through death, unwillingness of respondent to participate in later years, and/or inability to locate respondents (Menard & Elliott, 1990). Where debate arises is whether longitudinal data that are collected cross-sectionally tell as just as much about what we want to study as when collected by prospective longitudinal methods. Researchers such as Gottfredson and Hirschi (1988) believe that the results of studies using a longitudinal design give us no different results than those of less-expensive cross-sectional studies. However, many recent studies have labelled Gottfredson & Hirschi's comments as an "unwarranted dismissal" of longitudinal research (Esbensen & Menard, 1990:3). In fact there are many dangers in using cross-sectional designs to address issues of causality and temporal ordering when studying how age affects offending behaviour. When there are changes over time to the variable being studied, especially when effects differ across ages, cross-sectional data then give us a biased picture of changes with age. As Babbie states, "this problem is somewhat akin to that of determining the speed of a moving object on the basis of a high-speed, still photograph that freezes the movement of the object" (1995: 96). This is not to say that cross-sectional research is incapable of examining topics

such as prevalence and incidence in offending. However, there is a widely held belief that longitudinal data are "the most viable and productive way to study the multitude of issues the surround delinquency and adult careers in crime" (Tracy et al., 1990).

Understanding criminal careers then requires longitudinal data in order to examine the continuities and/or discontinuities in offending over time, especially when examining patterns of specialization. When testing causal relationships, longitudinal research has been shown to be advantageous because it allows for the estimation of covariation between variables and the elimination of rival causal hypotheses (Esbensen & Menard, 1990). Longitudinal information about the same individuals over time further helps to reveal the casual effects or progressions that link specific events to subsequent developments in offending (Blumstein et al. 1988b:30). In other words, use of longitudinal research helps to show the extent to which one event precedes or follows another in developmental sequences, and how well later events might be estimated from earlier ones (Blumstein et al., 1988b).

2.2 Official Secondary Data

As stated earlier, relatively accurate longitudinal data can still be collected retrospectively from official records. Data for this study was collected on individual criminal histories based on official police statistical data from a large Canadian city. While this method of longitudinal data

collection reduces errors due to the recall of specific timing of events, there are some limitations of such forms of investigation.

For example, official records may be lost or destroyed over time, or events may be inconsistently classified, resulting in errors of estimates of participation and λ (Blumstein et al., 1988b). More importantly certain variables needed for adequate model specification are often not recorded and omitted from the data. Omission of such variables sometimes poses potential problems of misspecification in estimating the parameters of the variables that are included in the proposed model (Stewart, 1984). There are also more specific limitations to official data collected by police agencies.

As mention earlier, the events that are actually recorded by police may be affected by the nature of police activity. The amount and type of crimes recorded also vary as a result of shifting law-enforcement policies (Gomme, 1989). Finally, crimes recorded by the police far exceed the number of charges laid. Only a small proportion of charges laid by police actually result in the conviction of an offender (Silverman, Teevan, & Sacco; 1991).

To help reduce these possible measurement errors the units of analysis for the current study are not limited to arrests, but to the more inclusive unit of police contacts. A "contact" was operationalized to refer to behaviour requiring police attention that warranted the filing of an occurrence report. The reliability of these occurrence report could be questioned to some extend due to the nature of policing. These occurrence reports give the officers very

little information to record due to the time it would take to fill out long reports. Only the most basic of information is recorded such as age, gender, offence type and ethnicity. Even some of this basic information can be altered since the reports go through other hands while they are being processed.

The types of contacts for which a youth can be charged are basic summaries of criminal code offences. For the city from which these youth were sampled, a Police Information Managment System (PIMS) is the main source of information used to track the criminal history of youth and adult offenders. Each month a printout on young offenders is generated from PIMS listing each offender's name, date of birth and number of police contacts. The printout assigns points to each conviction or prosecutor validated charge and computes a total score for each offender. The list is used mainly to identify potential new SHOs at or neat the 51 point level which is the current limit for entry into the SHO program. A further explanation of the point system is given in appendix B of this paper.

Many of the police contacts with youth involved more than one offence, such as stealing a car to committing a robbery. When this was the case, only the most serious of the offences was considered. By using the "most serious offense" measure, the possibility of concealing information about diversity or specialization in offending discussed earlier is acknowledged since many of these less serious offences are left unanalysed.

It should be noted that substantial evidence is required before an officer files a contact report with very few police contacts going unprosecuted.

There are still definite advantages to the use of police contacts over actual arrest data. Analysis of police contacts give us a more broad picture of the offending patterns of juveniles. The use of police contact data over arrest data will then help to increase the construct validity of the police contact measure. This is important since the use of arrest data as an indicator of offending behaviour has been seen as lacking in construct validity since the recorded numbers of deviant and criminal activities usually drastically underestimate the actual numbers of incidents occurring (Gomme, 1989). The content validity of the police contact measure is also increased since we can be reasonably secure in believing that those youth who have been recorded as having a contact with police were involved in a deviant activity.

Another advantage of using secondary data of this type is that it allows for a sample of respondents from the larger adolescent population which far exceeds the sample size that most individual investigators could afford to collect if they were to use other methods of data collection. Large sample size enhances the precision of parameter estimates because their means are more closely clustered around the population mean (Pedhazer, 1982). As the sample size increases, the values of the variance and standard error of the sampling distribution decreases. A large sample size is particularly important for studies of specialization over time due to the high attrition of

numbers as offence switching is analysed by individual transitions and for a reasonable number of distinct offences (Cohen, 1986).

A final advantage of secondary analyses is the potential for replication using the same data or by introducing additional variables. The data set used for this study provide an opportunity to report on the frequency of serious habitual offending in the adolescent population by allowing us to see how this offending changes, if at all, over the life course. In particular, the longitudinal nature of the data allow us to see when involvement in offending begins as well as whether the behavioural repertoire (Elliott, 1994) of an offender develops over time.

2.3 Sampling Procedure

Data were collected on individual criminal histories based on police contacts from a large western Canadian and information from this city's Correctional Services on youth incarceration histories. Studies relying on arrest data are not able to extend their analysis to this large group of youth since, by definition, they are not young offenders. As stated earlier, arrest data alone is not sufficient to capture the entire picture of the offending patterns of young offenders. The original researchers operationalized "contact" to refer to "behaviour requiring police attention that warranted the filing of an occurrence report for an alleged crime (that may or may not have resulted in laying of formal charges)" (Solicitor General Report, 1993). Use

of police contacts that involved reason to suspect a youth of delinquency and the filing of an occurrence report help to reduce the effect of under reporting of crime using only convictions or sentencing data. Also, by including all police contacts this study can include delinquent career behaviour prior to the age of twelve which is the minimum age for charging under the *Young Offenders Act*.

The original sample consisted of the criminal histories of 4,565 youth from a large western Canadian city up to the sampling date on December 31, 1991. Included in this sampling frame of 4,565 youth were 200 serious habitual offenders (SHOs) and 4,365 youths who were not (yet) designated as serious habitual offenders (Non-SHOs). A disproportionate random sampling procedure (without replacement) was used to ensure a sufficient number of cases for the analysis, especially for the smaller SHO group (again, please see appendix B for a definition of SHO). The number of cases for each stratum was chosen so that both proportions totalled 1 (.955 for SHOs and .045 for Non-SHOs). Due to errors in coding, a small number of cases were removed from the sample. From this procedure a sample was chosen consisting of 191 SHOs and 195 Non-SHOs for a total sample size of 386.

Although some preliminary analyses included both SHO offenders and Non-SHO offenders, the last stage of the sampling procedure involved the elimination of the entire Non-SHO sample for this analysis (n=195). The reason why the Non-SHO group was not included in the main analysis was

because of their rate of offending. The very nature of specialization analyses calls for large data requirements (Cohen, 1986). Previous studies in specialization are often limited in the amount of offences left in the analysis after about ten offence transitions (Farrington et al., 1988). By definition, specialization requires that a second offence has occurred. Ultimately we would like to have at least five offence transitions in order to analyse any patterns in offending over time. Since, by definition, NonSHOs have had very few police contacts, any statistical analysis of offence transition matrices would not be useful for the purpose of the research question.

In order to test the effects of age of onset, the sample of youths was divided into the two categories proposed by Moffitt (1993), life-course persistent offenders and adolescent-limited offenders. Life-course persistent offenders are operationalized as those youth who have one police contact or more when they are 13 years of age or younger. Those youth who had a police contact after the age of 14 are designated as adolescent-limited offenders. Age 14 was chosen as the cut-off between both groups since it is a time of transition between childhood and adolescence (Jeglum Bartusch et al., 1997) as well as being an average age of puberty for boys (Tanner, 1978). The decision to choose age 14 was also chosen on the basis of the work of Patterson and his colleagues (Patterson & Yoerger, 1993) as well as recent work by Piquero et al.,(1998) who both used age 14 as the cut off between the two sets of offenders.

2.4 Classification of Offences

Previous studies of offence specialization (i.e. Tracy et al. 1990; Lattimore et al. 1994 and Piquero et al., 1998) have had a diverse range of classification of their offence categories. In examining the sequence of crime types, the greater number of crime-type categories for a fixed sample of offenders and arrests or contact, the smaller the number of observations in any single category, with the result of poor statistical estimates. So although the aim is to have as fine-grained a classification of contacts as possible, this study is limited to major legal categories such as burglary, robbery, etc., in order to maintain an acceptable sample size. Researchers are also faced with the dilemma when deciding how narrow, or how broad, the categorization of offences should be.

Because of these dilemmas, very few specialization studies have used the same classification scheme for their offence categories, making comparisons of findings difficult. It was decided that in order to compare the current data analysis to previous literature (Lattimore et al., 1994) the original 12 police categories were recoded into five categories of offences similar to the above mentioned study: Violence, Burglary, Robbery, Other Property, and Delinquency (see appendix C for a complete list of offence categories). Like the Lattimore study, our Violence category includes murder, assault, rape, weapons, and kidnapping. Robbery consists of shoplifting and theft. Burglary is made up of the break and enter offences.

Other property offences include car prowling, vehicle theft, damage and arson as well as drug possession[3]. Finally, Delinquency offences, our "other" category, included a variety of offences such as trespassing, forgeries, cruelty to animals, and disorderly conduct. It is then accepted that the categories for this study are not as broad as desired however, the important distinguishing features of the different types of crime has been separated which helps to keep the analysis less complicated.

Finally it is important to note that criminal classification of offences in Canada are different than those of the United States where the Lattimore study was executed. For instance, in the original Canadian data, a "robbery" contact contained offences of a much more violent nature than the equivalent "robbery" offence for Lattimore, which referred to simple shoplifting and theft. As a result of these differences in coding, the classification scheme of the original offence categories has then been modified slightly so that we are better able to address the same questions as prior U.S. studies.

3

A police contact for a drug offence was included in the "other property" category in order to replicate the Lattimore et al., (1994) study. Like the Lattimore study, drug offences make up a very small percentage of the total police contacts in the current study.

2.5 Offence Transition Analysis

As noted earlier, early studies of specialization (Wolfgang et al., 1972) utilized offence-to-offence matrices of transition probabilities to examine, for example, the probability that an offender who committed a violent offence of arrest k would then commit another violent offence on arrest k+1. These studies move beyond the more static approach of simply looking at the proportion of arrests for each crime type, without any regard for when the different offences had occurred. Transition matrices have the advantage of accommodating differences in the mix of crime types as well as the sequence in which crime types occur (Blumstein et al., 1988c). The transition matrices are made up of individual probabilities which reflect the frequency with which an arrest of type I is followed by an arrest of type j. This matrix is assumed to be constant or stationary across all of the transitions and generates the movement between offences (Bursik, 1980). Offence types of the kth arrest in arrest sequences form the rows of the matrix, and offence types of the next arrest in a sequence form the columns. The transition probabilities of each row of the matrix sum to 1.

Table 1. The Average Matrix in the California Youth Authority Study, 1994

	Arrest k +1					
	Violence	Robbery	Burglary	Other Prop.	Delinq.	Total
Arrest k						
Violence	51	17	52	42	99	261
Robbery	20	19	25	14	39	117
Burglary	63	26	207	83	201	580
Other Prop.	27	25	59	83	80	274
Delinquency	91	35	173	93	317	709
Total	252	122	516	315	736	1941

SOURCE: Lattimore et al., 1994 pg. 298

Table 1 is an example of an original transition matrix for Lattimore et al.'s 1994 study of specialization. A total of 51 youth who committed a first violent offence had a second violent offence. Specialization in offence types is then indicated by the size of the diagonal elements which are underlined in the table.

Reliance on transition matrices has been criticized because of the limited perspective on offending patterns (Bursik, 1980). There has been concern that transition matrices miss larger patterns that would be evident from a perspective which looks at an entire career rather than specific transitions. For example, a youth who begin his/her career in burglary and then switches back and forth from burglary to some other type of offence would not be seen as a specialist using transition matrices. Fortunately, more

advanced methods of studying transition matrices have been introduced which are utilized in the current study and which will now be discussed.

Bursik (1980) furthered the analysis of transition matrices by viewing them as contingency tables in order to see whether some of the transition probabilities which were not all that high, were in fact markedly different from what should be expected by chance. Bursik then developed a measure of specialization which used the ratio of the observed frequency (O) to the expected frequency by chance (E) in each diagonal cell. Cohen (1986) utilized a similar O/E ratio calling it Cohen's Z. Where C = column total of the transition matrix and T = the grand total;

$$Z=\frac{O/R}{C/T}$$

The ratio "Z" compares the observed repeat probability for a specific crime type to its relative frequency as a repeated crime. A value of Z=1 would indicate independence or no specialization. Any value over 1 would indicate that repeating the same offence type is more likely than the level of switching to that offence generally or by chance (Cohen, 1986).

A major problem with these O/E ratios is that they are subject to ceiling effects. In other words, these ratios can only be of a limited size since they reflect the relative infrequency of certain offences making comparison across offence types difficult. For example, an offence category

with a large number of offences can only get a Z ratio of a certain size. In contrast, offences with a very low column marginal probability would have inflated Z ratios. Such dependence on the prevalence of occurrence makes any comparison of Z ratios across offence types very difficult since all offences are treated equally, with no concern for the number of offences actually committed in each category (Cohen, 1986).

2.5.1 The Adjusted Standardized Residual

In order to control for difference in prevalence, Bursik (1980) and Rojek and Erikson (1982) both utilized the Adjusted Standardized Residual (ASR) to test the statistical significance of the deviation of the observed number from the expected number of offences. Unlike the O/E ratio, the ASR is not affected by the relative frequency of offending. In other words the ASR helps to control for prevalence of certain offences.

$$ASR=\frac{O-E}{\sqrt{E}\cdot\sqrt{1-\frac{R}{T}}\cdot\sqrt{1-\frac{C}{T}}}$$

The ASR is distributed as a normal deviate with a mean of 0 and a standard deviation of 1. Statistically significant positive or negative values of the ASR indicate would indicate that individual offence switches are significantly more (or less) likely than would be expected if switching were independent of the crime on the prior arrest (Blumstein et al., 1988c). The

ASRs for different crime types within a sample can then be compared to one another and their statistical significance assessed. Specialization would be a contradiction of the independence assumption and would be revealed by statistically significant positive ASR values for the diagonals in a matrix.

Farrington (1988) points out that ASRs, as tests of significance, are not naturally interpreted in terms of magnitude of specialization. As is the case with any test of significance such as Chi-square, the value of ASRs is dependent on sample size and reflects variations in *n* across samples. Even though the ASR is not affected by the relative frequency of offending , it is affected by the absolute frequency of offending (Farrington, 1988). As a result, the ASR will increase with the square root of the sample size.

2.5.2 The Forward Specialization Coefficient

In order to avoid the disadvantages of using O/E and ASR, Farrington (1988) introduced an index known as the "Forward Specialization Coefficient" (FSC). The FSC is a measure of specialization that corrects, to some extent, for the frequency of the offence and is calculated:

$$FSC=\frac{O-E}{R-E}$$

By comparing observed to expected frequencies, variations in the relative prevalence of each crime are controlled (Blumstein et al.., 1988c).

The FSC equals 0 if crime-type switching is independent of prior crime type or (O=E). There is complete specialization when the FSC equals 1. In other words, the same crime type will always be, at least statistically speaking, repeated on the next arrest. The FSC can be negative if offenders systematically avoid repeating the same crime type. Although negative FSC values have appeared in the literature (Farrington et al. 1988:478), none have been significantly different from zero (Piquero et al., 1998). The statistical significance of the FSC can be tested using the ASR. The FSC should not vary with sample size since it is basically the ASR divided by the square root of the sample size. By comparing observed to expected frequencies, the FSC controls for variations in the relative prevalence of each crime type (Blumstein, 1988c).

It is important to note that the FSC helps us to analyse offence specialization amongst *groups of offenders*. The FSC can give us a broad picture of the offending patterns of groups of individuals but does not allow us to look at the patterns of *individual* offenders. It is acknowledged then that to some extent, this analysis glosses over individual differences and possible causal factors in exchange for a more broad picture of the group nature of offending. Since it is the group nature of offending which is a key issue for this paper, as well as the theories already presented, the FSC is the most useful analysis tool we could use. Recall from the review of prior specialization literature that the introduction of the FSC has resulted in

consistent studies which have found evidence of a specialized offender. The six questions are addressed in the next chapter with the aid of the FSC and simple descriptive statistics.

CHAPTER 3

RESULTS

3.0 Introduction

Recall from the discussion in chapter 1 that the intention of this study is to examine the offending patterns of youth in order to see whether they are generally versatile or specialized. Also, we have set out to see whether the offending patterns of life-course persistent and adolescent limited offenders are quantitatively different from each other. Propensity theorists believe that low self-control manifests itself in diverse behavioural forms and that the choice of criminal activity is likely to vary from situation to situation (Piquero et al., 1998). A propensity notion of offending then would predict that there should be no evidence of a specialized offender in either group, let alone a difference between both groups in the types of offence committed. In contrast, developmental theories would argue that there may in fact be specialization in certain offences, as well as differences in the types of offences committed by early and late starters. Specifically, Moffitt (1993) states that adolescent-limited offenders (late starters) will be more likely to engage in crimes which symbolize adult privilege or that demonstrate autonomy form parental control: vandalism and theft. In contrast, life-course persistent offenders should engage in a variety of offending behaviours due to poor relations with parents, early school failure, and

difficulty with peer relations (pg.403).

The following chapter will review the analysis of police contact data previously described in chapter 2. First, some preliminary findings are deduced from a description of the sample characteristics. Patterns of specialization for the total sample are then analysed using the forward specialization coefficient. Finally, a comparison of specialization coefficients for both adolescent limited and life course persistent offenders is made to help further address the proposed empirical and theoretical questions. Overall, the present results suggest that there are in fact certain offences in which youth are found to specialize. Additionally, the age of onset of offending has an effect on levels of specialization for those particular specialized offences.

3.1 Characteristics of the Sample

Table II (pg.58)shows descriptive statistics of the types of police contacts which occurred for the sample of 191 serious habitual young offenders. This table also shows the proportional number of contacts for each offence category for both early and late onset offenders. For the first twenty transitions there were a total of 3050 police contacts which occurred for the sample of 191 offenders. The underlying concern of the criminal career paradigm, that a small sample of the population commit a large proportion of all crime, is then shown to be supported with these data. This conclusion is

a result of a preliminary comparison to offenders who have not been labelled a SHO by police (see appendix D). The average number of contacts for these youth is then almost 16 per youth. It should be emphasized that these 191 offenders have had all of these police contacts after the age of 12 but before they had reached 18 years of age. As a result it cannot be stated for sure and perhaps can be assumed that many of the SHOs continued their offending careers into adulthood.

For the total sample, Delinquency[4] was the most common type of police contact accounting for 29% (n=886) of the total contacts. This is not surprising since the delinquency category encompasses so many different types of contacts and is often found to have the highest percentage of offenders. Lattimore et al., (1994) also found delinquency offences to have the largest distribution over the first 20 offence transitions with Burglary second. For this study, Other Property contacts were next accounting for 23% of police contacts, followed by Burglary with 21.9% and Robbery at 15.8%. Violent contacts were the least common accounting for only 10% of the total police contacts. It should be noted that the preliminary analysis of Non-SHO offenders mentioned previously showed that violent contacts were proportionally more evident than for the SHO sample.

Recall that Moffitt (1993) claims that life-course persistent offenders

---

[4] The "Delinquency" category for this study contains offence types which would commonly be referred to in most offending studies as "other" or "misc." (see Lattimore et al., 1994:pg.296).

should make up only a small proportion of individuals who are engaging in antisocial behaviour and that behaviour should differ from that of adolescent-limited youth (pg. 679).

Table II also shows the distribution of police contacts controlling for age of onset. When we control for age of onset we get a somewhat different picture of the total make-up of the police contacts. There were a total of 93 youth who had experienced a police contact before the age of 14. Of the original 3050 contacts, almost half (1650) were with youth designated as early starters. The distribution of police contacts for the early starters did not differ substantially from the overall sample total. As is the case for the total sample, Delinquency contacts were by far the most common contact for early starters, accounting for 35% of that group's total contacts. Violent contacts were the smallest, accounting for only 8% of total contacts for the early starters. Robbery, Burglary, and Other Property contacts were equally distributed at about 19% each.

However, it is evident that within the late starters there is a definite change in the distribution of contacts compared to both the total sample and the sample of early starters. There were a total of 98 serious habitual offenders who began their offending careers after the age of 13. Late starters accounted for a slightly smaller number of the total contacts than early starters with a total of 1400 contacts. This finding is somewhat contradictory to Moffitt's developmental theory since she predicts a much

larger percentages of offences (about 80%) for late starters. This substantial difference may be the result of the fact that both the early starters and the late starters are serious habitual offenders and both have a substantial number of police contacts. Possible answers to the first question regarding these recidivism rates will be addressed further in this chapter. First however, results from analyses attempting to answer questions two and three regarding the types of crimes committed by both types of offending group will be addressed.

The overall findings shown in the table regrading the types of offences early and late starters will commit are more or less consistent with Moffitt's developmental theory of antisocial behaviour (1993). Moffitt's theory predicts that adolescence-limited offenders who begin their offending activity later in adolescence are motivated by the need for adult status and autonomy. Hence they are more likely to engage in property offences in order to achieve that status. In regards to the question about whether early starters would be more likely to commit violent and delinquency offences, we find that violent contacts were actually slightly higher for the late starters at 13% compared to 8% for the early starters. Again , this finding is somewhat different than what would be predicted by developmental theory. Recall that for Moffitt, life-course persistent offenders, those youth who start their antisocial activity during early childhood, should be more prone to violent offences because of their inadequate socialization and history of negative

interpersonal relationships. The present finding that violent contacts were higher for late starters could suggest that this is not the case for the present sample. It would appear from this initial analysis however that those youth who begin offending at an early age are in fact more likely to commit a number of diverse types of offences, as found in the Delinquency category than their late-starter counterparts. Delinquency offences accounted for 35% of the early starters' total while it accounted for only 23% of the late starters' total. Delinquency also had the largest percentage difference between both groups (12%).

Table II: Total Number of Contacts by Type
(Early and Late Starters)

	AGE OF ONSET					
CONTACT TYPE	**SHO TOTAL** N=191	$\bar{x}$	**EARLY STARTERS** (≤13) N=93	$\bar{x}$	**LATE STARTERS** (>13) N=98	$\bar{x}$
VIOLENT	10.3% (314)	1.64	7.9% (130)	1.40	13.1% (184)	1.88
ROBBERY	15.8% (481)	2.52	18.5% (305)	3.28	12.6% (176)	1.80
BURGLARY	21.9% (667)	3.49	19.5% (321)	3.45	24.7% (346)	3.53
OTHER PROPERTY	23% (702)	3.68	19.6% (324)	3.49	27% (378)	3.86
DELINQ.	29% (886)	4.64	34.5% (570)	6.13	22.6% (316)	3.22
TOTAL	100% (3050)		100% (1650)		100% (1400)	

The hypothesis that late-starters are more likely to commit offences to gain "status" was not completely supported. Robbery contacts accounted for only 13% of the late starter contacts while Robbery accounted for almost 19% of the early starter's contacts. Perhaps if our Robbery category was not limited to shoplifting only these numbers would be larger. Late starters, on the other hand, did seem to offend in property and burglary type offences at substantially larger rates than early starters. Other Property contacts were

the most common offence for late-starters, accounting for 27% of the late starter total. This is substantially higher than for the early starters where Other Property contacts made up for only 19% of the total. Burglary was next for the late starters contributing to 25% of the total, where for the early starters Burglary accounted for less than 20% of the contacts.

3.2 Examining the Forward Specialization Coefficient

Table III (pg.65) further indicates various patterns of offence specialization among young offenders. With the exception of three youth, all others in the sample have at least one offence transition (n=188). Moreover, in terms of attrition across criminal careers, about 50% of offenders involved in burglary, other property and delinquency appear to continue through all 20 transitional periods with a slightly larger proportion (about 60%) continuing violent offences, while only about 30% continue to specialize in robbery by their 20th transition. This suggests less attrition and therefore more of an emphasis upon specialization than in previous studies. For example, Lattimore et al.'s study (1994), 54% of her sample had 10 or more contacts and 9% had 20 or more contacts. In the Farrington sample, (1988) only 3% of the sample had 10 or more contacts. In the present study, 152 of the 191 (80%) youth had 10 or more police contacts and 84 of the 191 (44%) had 20 or more contacts.

In regards to the question of whether offending is more likely to be

specialized than versatile, the current FSC analysis provides some evidence of specialization for all five offence categories. Individual FSCs were calculated for the first twenty offence transitions and an average FSC was calculated for all 20 transitions. When we compare the means for each offence category we see that the general trend across the first 20 transitions suggests that the level of specialization is not common across all types of crime. Similar to Lattimore et al.'s study (1994), analysis of the means reveals that the least specialized offences are robbery and violent with FSC's of .1296 and .1936 respectively. Also, only 10 out of 20 FSCs were significant for robbery and only 12 were significant for violent. In contrast, other Property ($\bar{x}$ = 0.2372) and Delinquency ($\bar{x}$ = 0.2346) had somewhat higher means with 15 out of 20 significant FSCs for Other Property and all twenty FSCs significant for Delinquency. Most noticeably, burglary was by far the most specialized offence with an average FSC of .3360 and 19 out of the 20 FSCs being significant.

It should be acknowledged that the interpretation of the FSCs can be somewhat confusing. Farrington (1988), describes a FSC of 0.107 as "evidence of specialization...roughly one-tenth of the distance to perfect specialization" (p. 475). Many may be left wondering exactly what the value of this coefficient means. In his analysis of specialization in the criminal career, Chester Britt (1996) summarizes the major concern with interpretation of the FSC.

> "...yet we might note that if this value (FSC=.107) represents one-tenth of the distance to perfect specialization, then it might conversely indicate approximately nine-tenths of the distance to complete versatility. The inability to attach precise meaning to this index restricts its generality." (p. 196).

However, the FSC is an *index* of specialization. In other words, any significant coefficient that is over 0 indicates at least some level of specialization. According to propensity theorists, the type of contact an offender has at time k should have no effect on the type of crime committed at time $k+1$. Therefore the current FSC levels should be insignificant, or at least much lower than they are found to be.

Lattimore et al.'s (1994) findings also suggested overall stable patterns of specialization throughout the 20 transitions. However, our research indicates that specialization may develop at different times for different offences during the development of criminal careers. For example, specialization in Violent and Robbery contacts does not seem to occur until about the mid-point in the first 20 transitions (10th and 11th transition), at which point the FSCs for these categories become consistently significant with some noticeable increase in the FSCs. The FSC value for Robbery does not maintain statistical significance until the 11th transition (0.2361) where it generally stays significant over the next ten transitions. This lack of specialization in the earlier transitions could account for the low average

FSC for Violent and Robbery offences. This finding suggests that specialization in violent and robbery offences is not as likely to occur with offenders who have not yet had a number of contacts with police.

A possible explanation for these findings has to do with the group nature of certain types of offences. Violent and robbery offences, as they are classified in this study, may involve single offenders or only one or two peer associates while property offences and burglary may involve many more peer associations and networks of greater numbers. Perhaps the kinds of positive reinforcement needed from peers for a youth to repeat a type of offence such as violent or robbery takes longer to achieve than for other offences. In other words, building a reputation with friends as a "tough guy" or someone you do not want to "mess with" may take longer and is more difficult to earn than achieving the status of a burglar or a common thief.

In addition the courts may be specifically more severe for these violent youth when the appear for a first offence. As a result many youth may not wish to continue to offend in these categories simply as a rational choice of punishments and rewards. However, for those youth who do continue to have violent police contacts, continuing to offend in these violent and robbery categories may become more rewarding as the number of police contacts increases since they may appear to be "lost causes" by enforcement officials.

In contrast to these findings, individual transitions for the other three categories show consistently higher individual FSCs beginning with the first

offence transition and continuing through almost every point over all 20 transitions. This trend is most recognizable among youth specializing in burglary which includes the highest individual FSC at the 19th transition of .4737. For Lattimore, burglary had the highest individual FSC (.3275) at the 17th transition. This could suggest that burglary specialization gets stronger as the offender's career grows. A social learning interpretation would then propose that the practice of burglary is somehow being rewarded which teaches the offender to repeat the behaviour. Perhaps then, the offence of burglary has a differential reward structure than say robbery or violent offences for this group of offenders.

We must also be careful to recognize that these youth are considered specialists in this study not because they are getting away with their crimes, but rather because they are actually getting caught. This makes the issue of specialization that much more interesting that youth who get caught committing and offence would actually go back and do it again. One possible explanation for this phenomena of repeating an unsuccessful behaviour could be that the youth in fact see getting caught as "successful". For those people who are outside of the youth culture these events may appear as unsuccessful attempts to gain money when in fact getting arrested could actually be viewed as successful attempt at gaining status within one's own peer group. Dealing with police and having law enforcement officials "come down" on youth may in fact reinforce what is important for these youth, adult type independence

and/or group cohesion.

In dealing with these youth police may be actually producing a sense of community among delinquents. These youth may begin to know who each other are and feel a sense of identity through the fact that they all have had dealings with the police and they all have been labelled SHOs. These youth may anticipate getting caught but continue to engage in their behaviour because it reinforces their own sense of community with other youth. To then carve out a niche within their own group some may focus on certain behaviour for which they are already known such as breaking into houses or beating up other youth. The term specialization is often confused with expertise but instead should focus more on behaviour that is repeated over and over. We should move forward and look at how response to this behaviour by peers as well as law enforcement officials could be reinforcing behaviour which some are trying to prevent.

Table III: Forward Specialization Coefficients:
SHO Offenders[a]

Transition Number		Violence	Robbery	Burglary	Other Property	Delinquency
First Offence						
N=(191)		------ (14)	------ (48)	------ (30)	------ (36)	------ (63)
1	(188)	0.2086 (15)	0.0421[ns] (35)	0.2063 (37)	0.0450[ns] (44)	0.2932 (57)
2	(186)	0.0761[ns] (20)	0.1791 (33)	0.2481 (33)	0.3506 (40)	0.2788 (60)
3	(186)	0.0588[ns] (19)	-0.0526[ns] (30)	0.3023 (47)	0.2933 (36)	0.1803 (54)
4	(183)	0.2361 (16)	0.1270 (30)	0.3048 (50)	0.3585 (33)	0.2651 (54)
5	(181)	0.2357 (17)	0.0545[ns] (33)	0.4181 (38)	0.1771 (49)	0.3204 (44)
6	(175)	0.0909[ns] (17)	0.0291[ns] (25)	0.4048 (32)	0.2806 (38)	0.1949 (63)
7	(171)	0.0795[ns] (26)	0.0816[ns] (23)	0.3069 (34)	0.1813 (44)	0.2278 (41)
8	(168)	0.0640[ns] (24)	0.0338[ns] (24)	0.4268 (40)	0.3750 (39)	0.2063 (41)
9	(155)	0.0506[ns] (18)	0.0980[ns] (30)	0.3220 (31)	0.1822 (35)	0.2105 (41)
10	(152)	0.3103 (13)	0.1237[ns] (24)	0.3396 (40)	0.3038 (41)	0.2742 (34)
11	(146)	0.2000 (11)	0.2361 (17)	0.2787 (42)	0.2481 (37)	0.1613 (39)
12	(136)	0.0647[ns] (15)	0.1351 (21)	0.4709 (26)	0.2718 (28)	0.1940 (46)
13	(129)	0.2481 (15)	0.1852 (16)	0.3810 (26)	0.4000 (25)	0.2652 (47)
14	(123)	0.1975 (18)	0.1391 (17)	0.2488 (27)	0.0955[ns] (25)	0.2444 (36)
15	(112)	0.7101 (8)	0.0511[ns] (16)	0.2857 (27)	0.0816[ns] (25)	0.1440 (36)
16	(105)	0.2857 (12)	0.1538 (15)	0.4196 (29)	0.2488 (28)	0.2571 (21)
17	(99)	0.1753 (11)	0.1304[ns] (8)	0.1724[ns] (20)	0.1556 (31)	0.1026[ns] (29)
18	(93)	0.2500 (9)	0.1241 (15)	0.4268 (20)	0.3571 (20)	0.3689 (29)
19	(87)	0.0625[ns] (7)	0.2308 (11)	0.4737 (17)	0.1122[ns] (27)	0.2442 (25)
20	(84)	0.2683 (9)	0.3103 (10)	0.2836 (18)	0.2254[ns] (21)	0.2593 (26)
Mean (T=20)		0.1936	0.1206	0.3360	0.2372	0.2346

[a] FSCs are calculated for all SHO contacts. Values identified as not significant ( ) are statistically insignificant at $p < 0.05$ (based on ASR, one-tailed test).

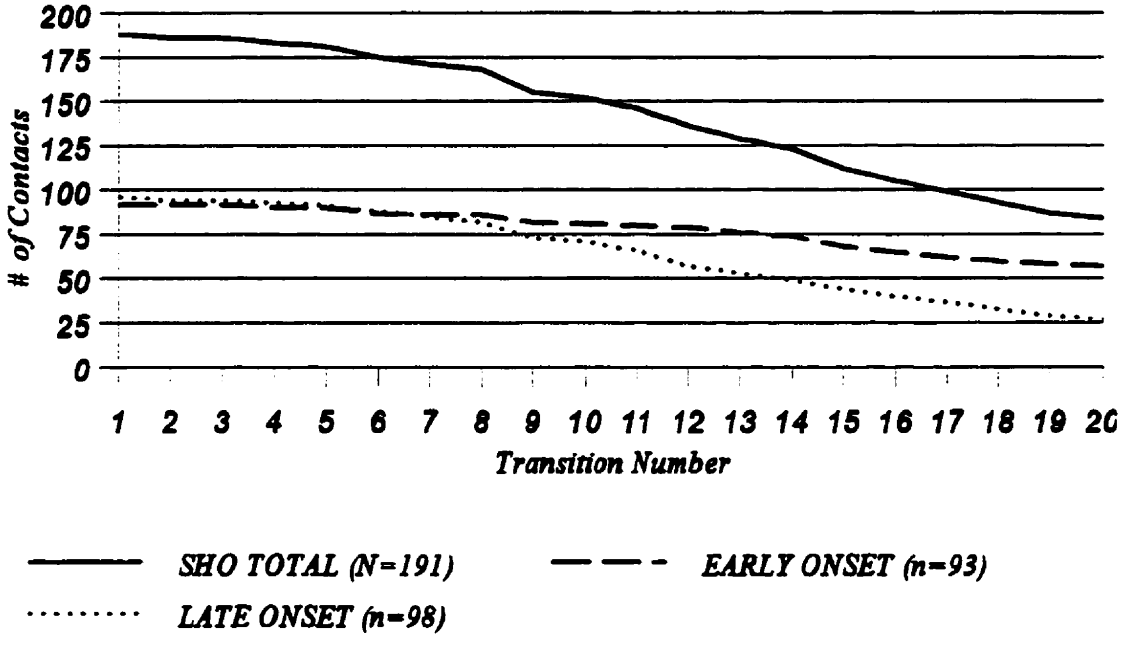
3.3 Age of Onset and Specialization

As we stated previously, committing a first offence is a very important transition in a person's life. As we have seen, the age of onset for an offender can often help predict the length of career as well as the types of crimes they will commit in their future careers. In order to test whether there is a difference in specialization controlling for age of onset, the FSCs for all 20 transition for both early starters and late starters were compared. Once we divide the original SHO sample into early and late starters a somewhat different picture emerges as to which youth specialize in certain offences. We can also see an overall difference in the recidivism rates of the two offender groups.

Table IV (pg.67) shows some support for the hypothesis that late-starters will have lower level of recidivism than early-starters. The overall offence attrition rate for both groups is noticeably greater for late starters than for early starters. For example, a total of 57 of the original 93 early starters (61%) were still offending at the 20th transition, while only 27 of the original 98 late starters (28%) were left at the same point. We can see that the amount of police contacts for both groups of offenders is similar until about the 8th transition, at which point, the adolescent-limited group begins to reduce its offending while the early starters continue at the same level for future transitions.

Table IV: Recidivism Rates

Early and Late Onset Offenders



The present data does not allow for accurate inferences regarding attrition among the late starters but it is speculated that this may a result of combined factors including youth turning 18 years of age and be dealt with in adult court. These findings would support a developmental model of offending and the hypothesis that those youth who begin offending at the earliest ages tend to commit larger number of offences over longer periods of time.

Tables V and VI (pgs. 71-72) show how both individual and mean FSCs varied over the type of contact with age of onset and help to test the final two questions regarding differential specialization for early and late starters.

These tables suggest that offence specialization again varies not only between offence categories but differentially between the two groups of offenders. For example, in Table V the average FSC means of all 20 transitions for early onset group suggest offence specialization to various degrees in all categories. Means for violence, robbery, and other property however, are relatively low and FCS for individual offence transitions are often non-significant. However, the means for delinquency ($\bar{x}$= .2698) and burglary ($\bar{x}$= .2595) indicate more pronounced specialization across the first 20 offence transitions with few non-significant FCS's. The highest individual FSC was again for a Burglary offence at the 18th transition (.5000).

When we look at the late starters we see some similarities to early starters in that again, both violent and robbery offences have very low mean FSCs and the transitional coefficients are rarely significant. However, there are large differences between early and late starters for the other three offence categories. Delinquency offences seem to be less specialized for the late starters ($\bar{x}$=.1684) than for the early starters ($\bar{x}$=.2698) where delinquency was the most specialized offence over the 20 transitions. Again, this is consistent with developmental theories of offending which would see the anti-social disposition of life-course persistent offenders as contributing to a over-representation in this category. In regards to the question whether late-starters will be more likely to specialize in offences to gain status than early-starters, other property offences were significantly more specialized

for the late starters ($\bar{x}$=.3016) than for the early starters ($\bar{x}$=.1318) over the 20 transitions.

Additionally, although burglary was highly specialized among early starters ($\bar{x}$=.2595), the mean FSC for late starters is even larger at .4526 with significantly large FSCs across and up to the 20th offence transition with the uncommon occurrence of perfect specialization (FSC=1.0) at 12th offence. In other words, of the 9 offenders who had a burglary contact on their 12th offence, all 9 had a burglary contact previously on their 11th contact. These comparisons would suggest that age of onset does indeed have an impact, albeit differently for differently offences, on what types of crimes are found to be specialized. Those who begin their careers early tend to specialize more in the diverse category of delinquency while late starters are more likely to specialize in other property and burglary offences.

If we begin to unpack the specialization coefficients over the 20 transitions some interesting patterns begin to emerge. For instance, when we look at the burglary category over all 20 transitions for early onset offenders we see that although there are significant indication of specialization over all 20 transitions, the FSCs tend to be lower for the first 7 transitions and then almost double for the last 13 transitions. The same pattern is found with the late onset offenders for burglary only that the FSCs are all higher than those of the early starters.

These findings may explain more to us about the nature of burglary

than they do about the actual offenders themselves. Recall from the previous discussion regarding the FSC that many individual differences are glossed over in exchange for a broader view of group offending patterns. So while we cannot for sure say that these are the same individuals committing burglary over and over again we can, to a large extent, know that burglary as an offence is often repeated at least once by the same individuals. What would be interesting to know is what the youth themselves state as a reason for either continuing to engage in or desisting from a particular offence. What factors influenced these decisions. We have a suggested that it is peers that have a major influence on these decisions, but exactly what is the nature of this influence. Ideally we would also like to know when these peer influences are at their strongest.

Table V: Forward Specialization Coefficients: SHO[a] (Early Onset: ≤13)

Transition Number		Violence	Robbery	Burglary	Other Property	Delinquency
First Offence						
N=(93)		------- (6)	------- (18)	------- (9)	---------- (21)	------- (39)
1	(92)	0.0769[ns] (7)	0.0683[ns] (20)	0.1597 (13)	-0.0753[ns] (12)	0.3043 (40)
2	(92)	0.2308 (7)	0.2617 (19)	0.1489[ns] (11)	0.3333 (19)	0.3596 (36)
3	(92)	0.2857 (3)	-0.0286[ns] (22)	0.2199 (16)	-0.0236[ns] (16)	0.3427 (35)
4	(90)	0.4736 (2)	0.0909[ns] (23)	0.1667 (23)	0.3333 (11)	0.3122 (31)
5	(90)	-0.0294[ns] (7)	0.1791[ns] (18)	0.2437 (16)	0.1018[ns] (19)	0.2893 (30)
6	(87)	0.1892 (8)	0.0990[ns] (14)	0.2222[ns] (11)	0.1011[ns] (11)	0.1844 (43)
7	(86)	0.1089[ns] (11)	0.0598[ns] (14)	0.1150[ns] (13)	0.2357 (18)	0.2667 (30)
8	(86)	- 0.1538[ns] (9)	0.0256[ns] (14)	0.4444 (17)	0.2771 (21)	0.2638 (25)
9	(82)	0.1358[ns] (9)	0.0604[ns] (18)	0.2701 (17)	0.0083[ns] (16)	0.1667[ns] (22)
10	(81)	0.5556 (5)	0.1667[ns] (17)	0.2857 (23)	0.1447[ns] (19)	0.2742 (17)
11	(80)	0.4595 (4)	0.2308 (13)	0.2562 (17)	0.1447[ns] (20)	0.1707 (26)
12	(79)	-0.0526[ns] (6)	0.0826[ns] (13)	0.2647 (17)	0.2381 (14)	0.2821 (29)
13	(76)	0.1892 (8)	0.1566[ns] (10)	0.3220 (15)	0.4950 (12)	0.1837 (31)
14	(74)	0.2593 (9)	0.1753 (11)	0.1667[ns] (18)	0.0217[ns] (11)	0.3793 (25)
15	(68)	0.7778 (5)	0.1176[ns] (12)	0.2373 (16)	-0.0156[ns] (15)	0.3182 (20)
16	(65)	0.2857 (6)	0.1111[ns] (11)	0.2857 (20)	0.2593 (14)	0.2929 (14)
17	(62)	0.0741[ns] (6)	0.1525[ns] (7)	0.1566[ns] (12)	0.0323[ns] (16)	0.0964[ns] (21)
18	(60)	0.1892[ns] (4)	0.0434[ns] (13)	0.5000 (10)	0.2683 (11)	0.3706 (22)
19	(58)	-0.0811[ns] (4)	0.1429[ns] (9)	0.4444 (13)	0.0152[ns] (16)	0.3137 (16)
20	(57)	0.1891[ns] (4)	0.3421 (9)	0.2793 (14)	0.1860[ns] (12)	0.2248 (18)
Mean (T=20)		0.2082	0.1269	0.2595	0.1318	0.2698

[a] FSCs are calculated for all SHO contacts with an age of onset ≤13 . Values identified as not significant ( ) are statistically insignificant at $p < 0.05$ (based on ASR, one-tailed test).

Table VI. Forward Specialization Coefficients: SHO[a] (Late Onset: >13)

Transition Number		Violence	Robbery	Burglary	Other Property	Delinquency
First Offence						
N=(98)		------ (8)	------ (30)	------ (21)	------ (15)	------ (24)
1	(96)	0.3151 (8)	0.0292[ns] (15)	0.2105 (24)	0.1111 (32)	0.1473[ns] (17)
2	(94)	-0.0084[ns] (13)	0.0678[ns] (14)	0.2771 (22)	0.3617 (21)	0.1371 (24)
3	(94)	-0.0145[ns] (16)	-0.1765[ns] (8)	0.3249 (31)	0.5484 (20)	-0.1348[ns] (19)
4	(93)	0.1453[ns] (14)	0.0625[ns] (7)	0.4444 (27)	0.3642 (22)	0.1803 (23)
5	(91)	0.4253 (10)	-0.0870[ns] (15)	0.5483 (22)	0.2070 (30)	0.3333 (14)
6	(88)	0.0000[ns] (9)	0.0638[ns] (11)	0.5000 (21)	0.3258 (27)	0.1071[ns] (20)
7	(85)	0.0580[ns] (15)	0.1026[ns] (9)	0.4022 (24)	0.0960[ns] (26)	0.0714[ns] (11)
8	(82)	0.1870 (15)	0.1011[ns] (10)	0.3940 (23)	0.5122 (18)	0.0845[ns] (16)
9	(73)	-0.0526[ns] (9)	0.1429[ns] (12)	0.4000 (14)	0.3243 (19)	0.2568 (19)
10	(71)	0.1549[ns] (8)	-0.0169[ns] (7)	0.4118 (17)	0.4409 (22)	0.2800 (17)
11	(66)	0.0323[ns] (7)	0.1667[ns] (4)	0.3010 (25)	0.3805 (17)	0.1346[ns] (13)
12	(57)	0.1358[ns] (9)	0.2105 (8)	1.0000 (9)	0.3069 (14)	0.0511[ns] (17)
13	(53)	0.3103 (7)	0.2307[ns] (6)	0.4505 (11)	0.2857 (13)	0.3913 (16)
14	(49)	0.1358[ns] (9)	0.0741[ns] (6)	0.4286 (9)	0.1262[ns] (14)	-0.0526[ns] (11)
15	(44)	0.6000 (3)	-0.1428[ns] (4)	0.3478 (11)	0.2647[ns] (10)	-0.0236[ns] (16)
16	(40)	0.2727 (6)	0.2105 (4)	0.7143 (9)	0.2381 (14)	0.5238 (7)
17	(37)	0.2857[ns] (5)	-0.1111[ns] (1)	0.2063[ns] (8)	0.2784 (15)	0.1045[ns] (8)
18	(33)	0.2857[ns] (5)	0.4737 (2)	0.3421 (10)	0.4545 (9)	0.2982 (7)
19	(29)	0.2307[ns] (3)	0.4736 (2)	0.6428 (4)	0.2500 (11)	0.1549[ns] (9)
20	(27)	0.3182 (5)	-0.1111[ns] (1)	0.7058 (4)	0.2453[ns] (9)	0.3220 (8)
Mean (T=20)		0.1909	0.0882	0.4526	0.3061	0.1684

[a] FSCs are calculated for all SHO contacts with an age of onset >13. Values identified as not significant ( ) are statistically insignificant at $p < 0.05$ (based on ASR, one-tailed test).

CHAPTER 4

DISCUSSION AND CONCLUSION

4.0 Introduction

This study has looked at the offending patterns of juveniles in the early stages of their lives to see whether they are generally specialized or versatile. The research supports taking a criminal career framework approach when investigating the causes of such behaviour. It is hoped that by studying these patterns of offending behaviour we can better estimate the length and diversification of a delinquent career, the long-run distribution of various offence types of crimes, and the extent of specialization in delinquency. This chapter will discuss the significance of the results found in the present analysis in relation to the conceptual framework which guides the study. This chapter will revisit the conflicting theoretical models previously mentioned and how each model views specialization in the offending career. This will be followed by a discussion of the theoretical implications of the analysis presented in the previous chapters. Finally, recommendations for future research in juvenile offending are suggested.

4.1 Theoretical Overview

Different theories of crime assume different types of causes for antisocial behaviour. General theories of crime, such as those proposed by

Gottfredson and Hirschi (1990), lead to the expectation that the antisocial behaviour of juveniles should be characterised by versatility and diversity. In these general models, both crime and analogous behaviours stem from low self-control. Delinquent behaviour will be engaged in at a relatively high rate by youths with low self-control. As a result, juveniles are likely to engage in a wide range of delinquent acts over their offending careers. However, these persistent-heterogenic models state that youth will have no strong inclination to pursue a specific criminal act or pattern of criminal acts to the exclusion of others (Gottfredson and Hirschi, 1990). On the basis of this theoretical perspective, the offending careers of juveniles should display a primarily random patterning of antisocial behaviour rather than showing evidence of specialization.

Since general theorists assume that there is virtually no evidence of specialization anywhere in the life cycle of ordinary offenders (Gottfredson and Hirschi, 1986:218), and that the causes of crime can be traced to lack of self control, they conclude that no existing policy which has its roots to the positivistic conception of the offender, such as selective incapacitation and modifications in policing, are likely to have much impact on the crime problem. For the general theorist, effective policy must deal with the attractiveness of criminal events to potential offenders and with the child-rearing practices that produce self-control.

In contrast to general theories are those theories which utilize a

criminal career framework in their analysis of offending. Developmental models proposed by Moffitt (1993) utilize the criminal career framework in the creation of their theoretical propositions. Developmental models use a criminal career framework to show that not only are there different types of offenders, but that these offenders may limit themselves to certain types of offences over their careers. These state-dependence models of offending argue that different factors give rise to antisocial behaviour at different points in the life course (Moffitt, 1993). The existence of specialized offenders would lend support to this developmental framework with offenders committing specific types of crimes during certain points in their careers.

Existence of a specialized offender would also lend support to social learning and peer association models of offending such as those presented by Akers (1997) and Warr (1996). Such models are incorporated into Moffitt's developmental theory and argue that deviant behaviour occurs to the extent that it is reinforced over alternative behaviour. The probability that similar acts will be repeated is increased by rewarding outcomes or reactions to it. Specialization, in the eyes of social learning theorists such as Akers, is a realistic possibility assuming the specialized offence gives the offender rewarding outcomes such as money, pleasant feelings, or approval from peers.

Developmental models utilize learning theory in their predictions that

those youth who offend during their adolescence do so to gain approval from their friends and to gain status within their peer group. Although developmental models espouse the causal explanation of propensity to explain early starters, they differ from general models in so far as they believe that these youth are not the majority of offenders and that there is another group of offenders who are much larger in number, commit different types of offences, and who are more greatly influenced by peer association than they are affected by lack of social control.

A developmental approach to understanding offending behaviour would then imply that one set of intervention strategies is needed to prevent persistent antisocial behaviour that begins in childhood, while other sets of strategies are needed to prevent antisocial behaviour which develops in adolescence. Moffitt states;

> "most past studies of deterrence have few implications for my theory of desistance among adolescent-limited delinquents...the availability of alternatives to crime may explain why some adolescent-limited delinquents desist later than others." (1993, pg.691)

In other words, there is no one answer to help reduce crime in the developmental model. Some suggestions can be made, however, on how to reduce criminal activity by reviewing developmental theoretical propositions.

Strategies for preventing antisocial behaviour of early starters should

focus on neurodevelopmental impairments that inhibit the development of verbal abilities and self-control. Such strategies are similar to those proposed by propensity theorists. However, strategies for preventing the anti-social behaviour of late starters would target different influences.

First, many adolescent youth who refrain from committing criminal acts, for some reason, may not sense the maturity gap which can lead to antisocial behaviour and therefore lack the motivation to commit crime. It is suggested then that perhaps by belonging to cultural or religious subgroups in which adolescents are given access to adult privileges and accountability, youth are prevented from feeling left out from adult activities (Moffitt, 1993). Additionally, a possible explanation for why some youth do not commit crimes is that they lack structural opportunities for modelling antisocial peers. For example, Caspi et al., (1993) found that early puberty was associated with delinquency in girls, but only if they had access to boys through attending coed high schools. Girls who were not enrolled in coed high schools did not engage in delinquency. By limiting the environments where the likelihood of learning about delinquency is great, a possible reduction in anti-social behaviour may result. Developmental models seem then to acknowledge the difficulties of utilizing only one model of deterrence in producing public policy. The integration of developmental theory with learning theory and other theories of peer influence could possibly improve more productive intervention.

4.2 Theoretical Implications

The present research clearly supports both criminal career frameworks of offending as well as developmental models of antisocial behaviour. By looking at the career of deviants in the same way as which we study conventional careers we find that we can better understand not only the differences between the two, but the similarities as well. Sociologists such as Hughes (1937) and Goffman (1961) had previously shown the use in studying the deviant careers of individuals. However, over recent years, the value of their work has been, to large extent, ignored. It is hoped that this research will help move the focus back to understanding how the offending patterns of deviants can help us to understand the career patterns of individuals in general, be they deviant or not.

The current study found support for the notion that, like the actions of individuals who engage in conventional careers, some juvenile offenders will vary in the types of nonconventional, deviant behaviour the engage in over their careers. Similarly, we found that other youth will tend to commit the same types of offence, or specialize, in their non-conventional behaviour patterns like a doctor or a lawyer would specialize in their more conventional behaviour patterns. We also found that offenders will vary in the types of offending depending on the age at which they begin their offending behaviour. Such findings generally support a developmental model of antisocial behaviour.

The proposition of developmental theorists that early starters are more likely to commit types of offences as found in the "delinquent" category is supported with a similar finding in the present study. However, the prediction that early-starters would be more likely to commit violent offences was not found. In fact, late starters were more likely to commit violent offences. This may be due to the fact that these are serious habitual offenders, which is to say that even the late-starters have had a substantial number of police contacts.

The propositions of general theorists are also partially supported for early starters in terms of the prediction that *all* youth will be involved in offences like the ones in our delinquent category. Recall from the previous discussion in chapter 1 that the explanation for early and persistent behaviour for developmental theorists is said to be neurodevelopmental impairments which lead to deficient self-control, which disrupts normal socialization and makes youth more prone to antisocial behaviour. However, the persistent-heterogenic approach would also predict that these patterns of offending will not change with age of onset but instead, they will remain stable over time. As a result, the finding that late-starters differ from early starters in the types of crimes they commit appears to contradict a criminal propensity model.

The late-starters in the sample committed substantially more offences than early-starters in the offence categories of other property and burglary. Such a finding again lends support to a developmental model which predicts

that adolescent-limited youth will commit crimes which help them to obtain material belongings and to be regarded as consequential by adults (Moffitt, 1993). In contrast, general models of offending would state that late-starters are no different than early-starters, and therefore would predict that there would be no discernable difference in the offending patterns of either group. Once again, as a result of these propositions, the results of this study do not support a general model of offending.

With regards to the existence of a specialized offender, the results of this study again support the criminal career framework used by developmental theorists. Of the five offence categories, significant levels of specialization were found in three offence categories. Police contacts in burglary, other property, and delinquency were all shown to have significant forward specialization coefficients in at least 15 of 20 offence transitions. Police contacts in violence and robbery exhibited some evidence of specialization later in the careers of youth, but the overall careers did not show significant specialization.

With consideration to age of onset, the finding that there are some major differences in the level of specialization for early and late starters again adds support to developmental theories of offending. Since developmental theory states that early starters will differ in the types of crimes they commit compared to late starters we would expect, and indeed found, that if specialization in offending occurs, it's levels would differ for

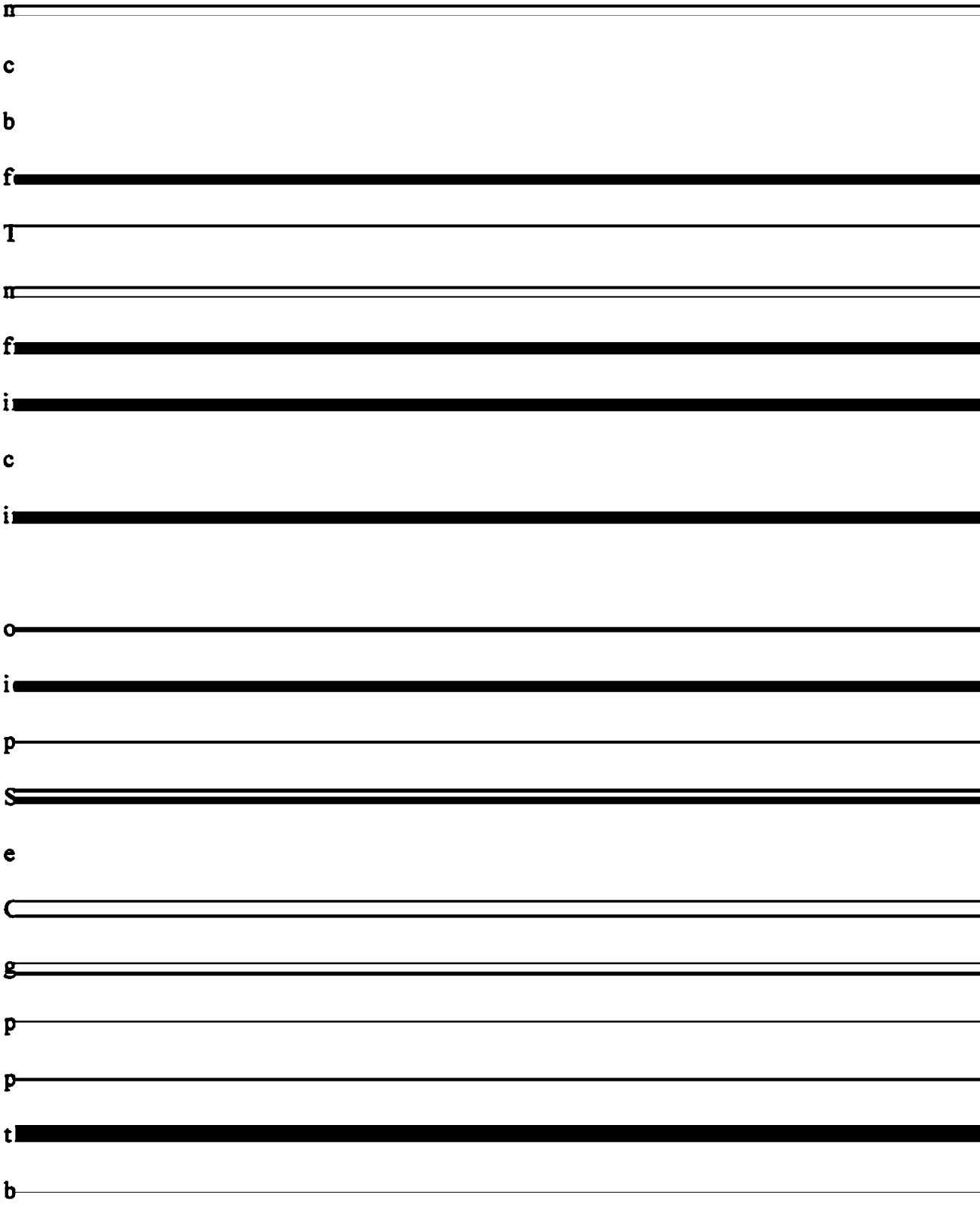
each type of offender group. Since late starters were much more likely to specialize in property and burglary offences than early-starters we can again give further support to a developmental model.

The problems with the use of secondary data to study specialization have previously been mentioned, but it is important to realize that although youth may be committing less serious offences which are versatile in nature, many are consistently repeating more serious crimes of the same type. Additionally, those serious crimes which are repeated differ for offenders who begin their careers at different ages. The theoretical implication of such findings have already been mentioned, however there are also some preventive strategies which also can be suggested from the findings of this research.

4.3 Preventive Strategies

The results of this study do have several implications for programs designed to prevent and treat delinquency. Since the designs of intervention programs goes beyond the inferences that one can draw from these data and requires special expertise of treatment agents, the intent here is simply to identify some issues that potential interventional programs could address.

One prevention strategy already in place is the SHOP program itself. Reviews of the existing SHOP program (Solicitor General's Report, 1994) have concluded that the SHOP program has been successful in collecting,



Of course the most important support for early onset offenders needs to come from the child's own parent or parents. For those who begin their offending careers early, the influence of parents on behaviour is still somewhat substantial. Although many parents are very supportive of measures to help their children, often they are left unsure what measures they can actually take to help alter their child's behaviour. Therefore, educational programs need to be put in place not only for SHOs, but for parents as well. Many parents are not informed how their child's behaviour affects the community as a whole. Parents may also be uniformed how their child's behaviour, if left unattended, may dramatically increase and escalate over time. For example, a parent may view the violent behaviour of their 6-year old as "normal" behaviour, this study would suggest that they should pay special attention to that behaviour since it may be an indicator of more serious future delinquency.

In turn, greater parental involvement may help to reveal potential problems with the program itself. For example, the review mentioned above suggested that many parents believed that it was highly improbable that their children would be able to adhere to certain release conditions being imposed. So while many children did not see themselves as criminals and were attempting to alter their behaviour, many parents still may view some aspects of the program as essentially setting their children up for failure. As a result, education of the parents how the program is set up as well as its successes are

essential. If the parents themselves do not see the use in the program it will be very difficult to help the child see its benefits.

In contrast, this study also adopted theoretical propositions which suggested that the causal impact of the attachment to one's parents on delinquency appear to diminish as these youth enter the teenage years family interventions at later stages may have little to no impact on the youth. Also, it is a reality that many parents simply do not care what types of behaviour their children are engaging in and may at times actually endorse certain types of delinquent behaviour. Being labelled a SHO may have significant psychological impact on youth giving them a sense of rejection and loss of self esteem as well as making them angry at society as a whole. Although these feelings are not completely as result of the SHOP program itself and may in fact stem from other factors, these feelings are counterproductive to rehabilitation and steps need to be taken to help alleviate some of these feelings.

Perhaps other strategies such as peer interventions would work better for those late-starters who have already reached adolescence. These interventions could simply include associations with *non-delinquent* peers such as could be found in sports organizations or other, more formally organized recreational activities. For late onset offenders, activities which give a sense of responsibility and status with adults are important. The present study found that these late-onset offenders were more likely to

engage in behaviours which gave them a sense of status among adults as well as their own peers. Offences such as burglary and property offences were found to be the most common for late-onset offenders. As a result, supplemental programs should not always be run by adults, but by the youth themselves with the guidance of adults. Many youth may see any program set up by adults as just another attempt to control their behaviour, exactly the stimulus which may be causing the delinquent behaviour.

These late-onset offenders may simply be searching for any alternative to the social groups with whom they associate since they are very aware of the negative aspects of their behaviour but simply are unable to find other non-delinquent peer groups do to the complex organization of peer networks. In other words these youth do not want to engage in this delinquent behaviour but in order to keep their friends they have to engage in delinquency to a certain extent, a price worth paying to receive that social support. With a more collaborative effort between police, family, schools, and other community organizations these youth who are looking for an alternative to their current situation can be identified and given the opportunity to engage in more conventional activities with other youth who may be in similar predicaments.

4.4 Conclusion

Traditional theories of criminology (Sutherland and Cressey, 1978;

Shaw and McKay, 1969) have repeatedly hinted at the notion of a specialized offender. Although they never actually did empirical tests to acknowledge its existence, their theories specifically made reference to the notion of an offender who would engage primarily in one specific type of offence. The present data analysis has shown that there is some evidence of a specialized offender. We found that the offending patterns of youth as a whole were more likely to be patterned and specialized than they were to be random and versatile. We also found that many youth in our sample were more likely to specialize in crimes such as burglary, other property, and delinquency throughout their careers. As well, we found that there were differences in the offending patterns of offenders once they are compared by the age at which they begin offending. Those who started their careers early in adolescence had more offences and took longer to desist from crime than those who started the offending at a later age. We found that these early onset offenders were also more likely to specialize in violent and robbery offences, as compared to the late onset offenders who were more likely to engage in patterns of burglary and other property offences.

In the last decade, studies of specialization have consistently found similar results. Just why and how some researchers still deny the existence of specialization is not known. It should be suggested here that criminologists look outside of their own discipline to books and articles written by historians or psychologists to see how other academics view a

similar problem. Once we notice how much of an accepted fact the notion of a specialized offender is outside our own narrow focus perhaps criminologists would be more willing to move studies of juvenile offending beyond the specialization debate.

Although it has been suggested by both developmental theory and learning theory that peer groups may influence specialization, this research could not investigate such propositions fully. Just how peers might reinforce certain behaviours to the point that similar crime types are repeated is not yet known. If these youth are offending in groups, the question arises of whether young offenders who are specializing in certain offences are doing so with the same group of peers. Such research is just beginning to receive attention in the criminological literature (Warr, 1996). This type of information is often incomplete or totally lacking in official report data. As a result, researchers should begin to approach the subjective careers of young offenders in order to better analyse the effect of peer influence on specialization.

Criminal career models have tended to focus on one group of relatively rare high rate offenders who commit multiple crimes at a rather constant level. In contrast, general theories of crime have taken the opposite approach and have looked at those who may, or may not commit crimes in the future. Delinquency is seen as a time-bound event that will only happen in adolescence. By using developmental theory and other theories which use

the life course perspective we can better see how these social events that are called delinquent or criminal are linked to trajectories of a broader significance. Delinquent behaviour may not only have repercussions for future delinquent behaviour, as we found, but it may also effect greater future interaction with non-delinquent social institutions such as family life, schooling, job stability, and peer relations including friends as well as marital attachment.

Since research has now established that specialization exists in the objective careers of youth we should now move toward the analysis of the subjective careers of these youth. The use of interviews and self-reports should help us better understand how these youth view their own transitions through the stages of their offending careers. The time and expense that it will take to collect this data may at first seem overwhelming, but many studies have been long underway and are almost at the point to where they can now better attempt to investigate the social behaviours we call delinquent.

References

Abbott, Andrew, and Andrea Hrycak. "Measuring Resemblance in Sequence Data: An Optimal Matching Analysis of Musicians' Careers." *American Journal of Sociology*, 1990, 45:144-185

Akers, Ronald. *Deviant Behaviour: A Social Learning Approach.* 3rd ed. Belmont, California: Wadsworth. 1985.

Akers, Ronald. *Criminological Theories: Introduction and Evaluation.* 2nd ed. Los Angeles, California, Roxbury Publishing. 1997.

Arnold, Bruce, and John Hagan. "Careers of Misconduct: The Structure of Prosecuted Professional Deviance Among Lawyers." *American Sociological Review*, 1992, 57: 771-780.

Barber, J. "The New Drug Crusade." *Maclean's.* 1986. Sept.29:36-39

Becker, Howard S. *Outsiders: Studies in the Sociology Of Deviance.* New York: Free Press.1963.

Blau, P., and O.D. Duncan. *The American Occupational Structure*. New York: Wiley. 1967.

Blumstein, A., J. Cohen, J. Roth, & C.A. Visher (eds.) *Criminal Careers and "Career Criminals,"* 1986, Vol 1, National Academy Press, Washington D.C., Appendix B.

Blumstein, A., J. Cohen, & D. Farrington. "Criminal Career Research: Its value for Criminology." *Criminology,* 1988a,26: 1-35.

Blumstein, A.J. Cohen, & D. Farrington. "Longitudinal and Criminal Career Research: Further Clarifications." *Criminology,* 1988b, 26: 57-72.

Blumstein, A., J. Cohen, S. Das, and S.D. Moitra. "Specialization and Seriousness During Adult Criminal Careers." *Journal of Quantitative Criminology*. 1988c, 4:303-345.

Braithwaite, John. *Crime, Shame, and Reintegration.* New York:Cambridge University Press. 1989.

Britt, Chester L. "The Measurement of Specialization and Escalation in the Criminal Career: An Alternative Modelling Strategy." *Journal of Quantitative Criminology*, 1996, 12, 193-223.

Bursik, R.J. "The Dynamics of Specialization in Juvenile Offenses." *Social Forces*, 1980, 58: 851-864.

Caspi, A., T. Moffitt, and P.A. Silva. "Unravelling Girl's Delinquency: Biological, Dispositional, and Contextual Contributions to Adolescent Misbehaviour." *Developmental Psychology.* 1993; 29,19-30.

Cohen, J. "Research on Criminal Careers: Individual Frequency Rates and Offence Seriousness." In Blumstein, A., J. Cohen, J. Roth, & C.A. Visher (eds.) *Criminal Careers and "Career Criminals,"* 1986, Vol 1, National Academy Press, Washington D.C., Appendix B.

Datesman, Susan K. And Mikel Aickin. "Offense Specialization and Escalation Among Status Offenders." *Journal of Criminal Law andCriminology*, 1984, 75: 1,246-1,275

Deroches, Frederick John. *Behind the bars: Experiences in Crime*. Toronto: Canadian Scholars Press. 1996.

Elder Jr., Glen. "Age Differentiation and The Life Course." *Annual Review of Sociology*, 1975:165-190.

Elder Jr., Glen. "Perspectives on the Life Course." In Glen Elder Jr., ed., *Life Course Dynamics: Trajectories and Transitions, 1968-1980.* Ithaca, New York: Cornell University Press.

Elder Jr., Glen. "Time, Human Agency, and Social Change: Perspectives on the Life Course."*Social Psychology Quarterly*, 1994, 57: 4-15.

Elliott, Delbert S. "Serious Violent offenders: Onset, Developmental Course, and Termination." *Criminology*, 1994,32:1-21.

Esbensen, Finn and Scott Menard. "Is Longitudinal Research Worth the Price?" *The Criminologist*, 1990: March-April:1-6.

Farrington, David P., Howard Snyder, and Terrence A. Finnegan. "Specialization in Juvenile Court Careers." *Criminology*, 1988, 26: 461-485.

Farrington, David P., Rolf Loeber, Delbert S. Elliott, J. David Hawkins, Denise B. Kandel, Malcolm W. Klein, Joan McCord, David C. Rowe, and Richard E. Tremblay. "Advancing Knowledge About the Onset of Delinquency and Crime." In Benjamin B. Lahey and Alan E. Kazdin (eds.), *Advances in Clinical Child Psychology.* Vol.13. New York. 1990.

Farrington, David P. "Criminal Career Research in the United Kingdom." *British Journal of Criminology*, 1992, 32: 521-535.

Glueck, S., & E.T. Gleuk. *Five Hundred Criminal Careers.* New York: Knopf. 1930.

Gomme, Ian M. *The Shadow Line: Deviance and Crime in Canada.* Toronto: HBJ Canada Ltd. 1993.

Gottfredson, M., & T. Hirschi. "The True Value of Lambda Would Appear to be Zero: An Essay on Career Criminals, Criminal Careers, Selective Incapacitation, Cohort Studies, and Related Topics." *Criminology*, 1986, 24:213-233.

Gottfredson, M., & T. Hirschi. "The Methodological Adequacy of Longitudinal Research on Crime." *Criminology*, 1987, 25: 213-233.

Gottfredson, M., & T. Hirschi. "Science, Public Policy, and the Career Paradigm." *Criminology*, 1988, 26: 37-55.

Gottfredson, M., & T. Hirschi. *A General Theory of Crime.* Stanford: Stanford University Press. 1990.

Goffman, Erving. *Asylums.* Garden City, New York: Doubleday.1961.

Hagan, John and Alberto Palloni. "Crimes as Social Events in the Life Course: Reconceiving a Criminological Contraversy." *Criminology*, 26:87-100.

Hall, Douglas T. "Career Development Theory in Organizations" *in* Duane Brown, Linda Brooks eds. *Career Choice and Development: Applying Contemporary Theories to Practice.* 1991. pgs.422-545.

Hughes, E.C. "Institutional Office and the Person." *American Journal of Sociology*, 1937, 43: 21-25.

Hughes, E.C. *Men and their Work.* New York: Free Press, 1958.

Jeglum Bartusch, D.R., D.R. Lynam, T.E. Moffitt, and P.A. Silva. "Is Age Important? Testing a General Versus a Development Theory of Antisocial Behaviour." *Criminology*, 1997, 35:13-48.

Karp, David. *Speaking of Sadness.* New York: Oxford University Press. 1996.

Lattimore, Pamela K., C.A. Visher, and R.L Linster. "Specialization in Juvenile Careers: Markov Results for a California Cohort." *Journal of Quantitative Criminology*. 1994, 10:291-317.

Loeber, Rolf and M. Leblanc. "Toward a Developmental Criminology." In Michael Tonry and Norval Morris (eds.),*Crime and Justice: An Annual Review of Research*. 1990, Vol.12 Chicago:University Press of Chicago.

Loeber and T.J Dishion. "Antisocial and Delinquent Youths: Methods for Their Early Identification." in J.D. Burchard and Sarah Burchard, (eds.) *Prevention of Delinquent Behaviour*. 1987, Newbury Park, CA: Sage.

Menard, Scott and Delbert S. Elliott. "Longitudinal and Cross-Sectional Data Collection and the Analysis in the Study of Crime and Delinquency." *Justice Quarterly*. 7:11-55.

Moffitt, Terrie E. "Adolescence-limited and Life-course Persistent Antisocial Behaviour: A Developmental Taxonomy." *Psychological Review*. 1993, 100:674-701.

Nagin, Daniel S., and David P. Farrington. "The Onset and Persistence of Offending." *Criminology*, 1992, 30:501- 523.

Patterson, Gerald R. and Karen Yoerger. "Developmental Models for Delinquent Behaviour." In S. Hodgins (ed.), *Mental Disorder and Crime*. Newbury Park: Sage.

Pedhazer, E.J. *Multiple Regression in Behavioural Research: Explanation and Prediction*. (2nd Edition), Fort Worth: Harcourt Brace College Publishers. 1982.

Piquero, Alex, Raymond Paternoster, Paul Mazerolle, and Charles W. Dean. "Onset Age and Specialization in Offending Behaviour." *Paper Presented at the 1998 American Society of Criminology Meetings*, (1998), San Diego, California.

Robertson, Heather. *The Flying Bandit*. Toronto: Lorimer. 1981.

Rojek, D.G., and M.L. Erikson. "Delinquent Careers: A Test of the Career Escalation Model."*Criminology*, 1982, 20:5-28.

Rosenfeld, R.A. "Race and Sex Differences in Career Dynamics." *American Sociological Review*, 1980, 45:583-09.

Sampson, Robert J. and David H. Laub. *Crime in the Making: Pathways and Turning Points Through Life*. Cambridge:Harvard University Press. 1993

Shaw, Clifford R. And Henry McKay. *Juvenile Delinquency and Urban Areas.* Rev. ed. Chicago: University of Chicago Press. 1969

Silverman, R.A., J.J. Teevan, and V.F. Sacco. (eds.) *Crime in Canadian Society.* Toronto:Butterworths. 1991.

Simons, Ronald L., Chyi-in Wu, Rand D. Conger, Frederick O. Lorenz. "Two Routes to Delinquency: Differences Between Early and Late Starters in the Impact of Parenting and Deviant Peers." *Criminology.* 32. 1994.

Smith, D.R. and W.R. Smith. "Patterns of Delinquent Careers: An Assessment of three Perspectives." *Social Science Research,* 1984, 13: 129-158.

Spenner, Kenneth I., Luther B. Otto, and Vaughn R.A. Call. *Career Lines and Careers: Volume III: Entry into Careers Series.* Toronto: Lexington Books. 1982.

Spilerman, Seymour. "Careers, Labor Market Structure, and Socioeconomic Achievement." *American Journal of Sociology,* 1977, 83: 551-593.

Stander, J., D.P. Farrington., G. Hill., and P.M.E. Altham. "Markov Chain Analysis and Specialization in Criminal Careers. *British Journal Of Criminology.* 1989, 29:317-335.

Statistics Canada. *Canadian Crime Statistics, 1995.* Vol 16. No.10.

Stewart, David W. *Secondary Research: Information Sources and Methods.* Newbury Park:Sage Publications. 1984.

Sutherland, Edwin H., and Donald R. Cressey. *Criminology, Tenth Edition.* Lippincott Press. 1978.

Tanner, J.M. *Foetus into Man: Physical Growth from Conception to Maturity.* 1978. Cambridge, Mass.:Harvard University Press.

Tittle, Charles R. "Two Empirical Regularities (Maybe) In Search of an Explanation: Commentary on the Age/Crime Debate." *Criminology,* 1988, 26: 75-85.

Tracy, Paul E., Marvin Wolfgang, and Robert M. Figlio. *Delinquency Careers in Two Birth Cohorts.* New York:Plenum Press. 1990.

Yarrow, Marion R., John D Campbell, and Roger V. Burton. "Recollections of Childhood: A Study of the Retrospective Method". *Monographs of the Society for Research in Child Development.* 1970.

Warr, Mark. "Organization and Instigation in Delinquent Groups." *Criminology*. 34: 1996.

Wolfgang, M.E., R.M. Figlio, & T. Sellin. *Delinquency in a Birth Cohort*. Chicago: University of Chicago Press. 1972.

APPENDIX A: SUMMARY OF RECENT SPECIALIZATION RESEARCH

Author(s)	Date	Specialized Offender?
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
Farrington et al.	1988	runaway, liquor, burglary, incorrigibility, theft, drugs
Farrington	1989	sexual offences
Blumstein et al.	1988	drugs, fraud, auto theft
Stander et al.	1989	violent
Brennan et al.	1989	violence, property
Tracey et al.	1990	burglary, violence, robbery
Lattimore et al.	1994	burglary, violent
Elliott	1994	violent
Britt	1996	assault, burglary, drugs, larceny, auto theft, weapons, fraud, robbery

* Shaded studies consist of studies leading to the conclusion that a specialized offender does not exist.

APPENDIX B: DESIGNATION OF SERIOUS HABITUAL OFFENDERS (SHOS)*

A point system is used to aid in identifying young offenders who may be candidates for admission to the SHO program. Offenders accumulate points for offences as follows:

- Class I - 7 points for serious offences such as murder, kidnapping, sexual/aggravated assault,extortion, robbery, arson, trafficking (narcotics),possession/use of weapons, etc.;

- Class II - 4 points for less serious offences such ascareless use of firearms, obstruction of justice,living form avails, assault, theft over $1,000,housebreaking, possession of controlled/restricted drugs, forgery, etc.;

- Class III - 2 points for other offences such as public mischief, resisting arrest, failure to appear, breach of condition, obscenity, threats, trespassing, prostitution, gambling, impaired driving, theft under $1,000, etc.

Specific criteria for being designated a SHO are as follows:

" A young offender shall be the subject of the efforts of the SHOCAP program (i.e. SHOP) who:

Has a record of at least three or more convictions including at least one conviction in the preceding 12 months, and

(a) has a criminal history of prosecutor validated charges which total 51 or more points, or

(b) has a criminal history of prosecutor validated charges which totals 60 or more points, if the offences occurred in one criminal episode and involved no Class I offences."

* cited from Solicitor General Canada Report, *A Review of SHOP: The Serious Habitual Offender Program of the ****** Police Service.*

APPENDIX C: CRIME CATEGORIZATION

The original crime codes in the arrest histories were grouped into the 12 major crime types shown below. These were then aggregated further to form 5 crime-type categories for the purpose of this study. The crime-types in these 5 categories are shown below.

Major Crime Type		Crime-Type Category
1.	Violent	1. Violent
2.	Shoplifting	2. Robbery
3.	Theft & PSP	2. Robbery
4.	House/Shop/Other B&E	3. Burglary
5.	Car Prowling	4. Other Property
6.	Theft Vehicle	4. Other Property
7.	Damage & Arson	4. Other Property
8.	Drugs	4. Other Property
9.	Soliciting	5. Delinquency
10.	Statues	5. Delinquency
11.	Traffic	5. Delinquency
12.	All Other Offences	5. Delinquency

Original Police Categorization:

1) **VIOLENT** N=456

1. VIOLENT (n=456)

100101 First Degree Murder
100102 Second Degree Murder
100103 Manslaughter
100104 Infanticide
100105 Euthanasia
100201 Rape
100202 Indecent Assault
100203 Indecent Acts
100204 Gross Idecency
100205 Bestiality
100206 Incest
100207 Seduction
100208 Buggery
100209 Sexual Intercourse
100210 Veneral Disease
100211 Indecent Phone Call
100301 Assault (level 2)
100302 Assault (level 1)
100303 Assault on Peace Officer
100305 Discharge Firearm W/Intent
100307 Sex Assault (Weapon or OBH)
100308 Sexual Assault
100309 Unlawfully Causing Bodily Harm
100310 Assault/Peace-Public Officer
100311 Assaults-Other
100312 Aggravated Sexual Assault
100313 Aggravated Assault (level 3)
100401 Armed Robbery
100402 Robbery With Violence
100403 Assault With Intent to Rob
100411 Robbery-Financial Institution
100412 Robbery-Commercial Enterprise
100413 Other Robbery
100601 Kidnapping

600101 Unregistered Weapon
600102 Possession Prohibited Weapon
600103 Carry Concealed Weapon
600104 Dangerous Use of Weapon
600105 Weapon in a Motor Vehicle
600106 Restricted Weapon
600703 Assault to Overcome Resistance
600732 Possession of Explosive

2) **ROBBERY** N=792

2. SHOPLIFTING (n=412)

200216 Shoplifting Under
200217 Shoplifting Over

4. THEFT & PSP (n=380)

200201 Theft Over
200202 Theft Under
200203 Possession Stolen Property
200212 Theft Bicycles Over
200213 Theft Bicylces Under

3) **BURGLARY** N=977

3. HOUSE/SHOP/OTHER B&E (n=977)

200701 Other B&E With Commit
200702 Other B&E With Intent
200703 Other Break-Out

4) **OTHER PROPERTY** N=991

5. CAR PROWLING (n=182)

200214 Theft From Vehicle Over
200215 Theft From Vehicle Under

6. THEFT-VEHICLE (n=582)

200205 Theft Autos
200206 Theft Trucks/Tract
200207 Theft of Buses
200208 Theft Motorcycles
200209 Theft Motorized Recreation
200210 Theft Recreation Trailers
200211 Theft Over Vehicles

7. DAMAGE & ARSON (n=191)

200301 Damage Over
200302 Damage Under
200303 Damage by Explosives
200304 Damage by Fire - Arson

200305 Vehicle Damage by Fire - Arson
200306 Damage to Vehicle Over
200307 Damage to Vehicle Under
800109 Damage by Fire - Not Arson

8. DRUGS (n=36)

400101 Possession for Traffick Drugs NCA
400102 Possession Drugs NCA
400103 Trafficking Drugs NCA
400104 Importing Drugs NCA
400105 Cultivating Drugs NCA
400106 Double Doctoring Drugs NCA
400201 Possession for Traffick Drugs FDAC
400202 Possession Drugs FDA C
400203 Trafficking Drugs FDA C
400301 Possession For Traffic Drugs FDA R
400302 Possession Drugs FDA R
400303 Trafficking Drugs FDA R
400304 Importing Drugs FDA R
400401 Advertising Drugs CD
400401 Deception Drugs CD
400403 Sale of Drugs CD
400501 Self Administered
400502 Assisting Others
400503 Glue Sniffing
400601 Administer Drugs to Human

5) DELINQUENCY N=1527

9. OTHER (n=1365)

100501 Suicide
100502 Drowning
100503 Industrial Deaths
100504 Death by Natural Causes
100505 Accidental Death
100602 Abortion
100603 Missing
100701 Abduction-Person Under 14-16
100702 Abduction-Custody Order
100703 Abduction-No Custody Order
200401 Trespass by Night
200501 Unlawfully in Dwelling
300101 FP by Cheques
300102 FP by Money Order
300103 FP by Certificate/Document
300104 FP by Grain Ticket
300105 FP by Counterfeiting
300106 FP by Credit Slip
300107 FP by Credit Card
300108 FP by Personation
300201 Forged Cheques
300202 Forged Money Order
300203 Forged Certificate/Document
300204 Forged Grain Ticket
300205 Forged Bank Note
300206 Forged Trade Mark
300301 Uttering Cheques
300302 Uttering Money Order
300303 Uttering Certificate/Document
300304 Uttering Grain Ticket
300305 Uttering Bank Note
300306 Prescription
300401 Lodgings by Fraud
300402 Meal by Fraud
300403 Transportation by Fraud
300404 Obtain Credit by Fraud
300405 Misc Frauds
300406 ATM - Fraud Use of Card
300407 ATM - Fraudulent Debiting Acct
300408 Unauthorized Use of Computer
500101 Bawdy House
500102 Procuring Prostitute
500201 Bookmaking
500202 Cheating
500203 Gaming House
500204 Slot Machine
500205 Gaming in Public Conveyance
500206 Lotteries (Games of Chance)
600201 Use Mail to Defraud
600202 Obscene Matter in Mail
600203 Stopping Mail With Intent
600301 Bigamy
600302 Polygamy
600303 Pretend to Solemnize Marriage
600304 Marriage Contrary to Law
600401 Blasphemous Libel
600402 Defamatory Libel

600403 Extortion
600501 Bribe Peace Officer
600502 Bribe Witness
600503 Bribe Judiciary
600504 Bribe Governemnt Employee
600505 Bribe Member of Parliment
600601 Killing Animal/Bird
600602 Cruelty Animal/Bird
600603 Drugging Animal/Bird
600604 Mishief to Animal/Bird
600605 Keeping Wild Animal
600701 Abandon Children Under 10
600702 Accessory After Fact
600704 Compounding Indictable Offence
600705 Not Burying Dead
600706 False Fire Alarm
600707 Common Nuisance
600708 Conspiracy
600709 Counsel Offence
600710 Criminal Negligence (Not Traffic)
600711 Traps
600712 Disorderly Conduct
600713 Breach of Court Order
600714 Escape Custody
600715 Escape Custody Aiding/Abetting
600716 Forcible Confinement
600717 Neglect in Childbirth
600718 Non-Support
600719 Obstruct Peace Officer
600720 Obstructing Justice
600721 Obstructing Clergyman
600722 Personating Peace Officer
600723 Disguised With Intent
600724 Fail to Appear in Court
600725 Threats
600726 Trading Stamps
600727 treason
600728 Unlawful Assembly
600729 Intimidation
600730 Corrupting Children
600731 Sex Offence Near School
600733 Public Mischief
600734 Communication Offences
600735 False Affidavit
600736 Perjury
600737 Indecent/Harassing Phone Calls
600738 Obsene Matter
600739 Peace Bond
600740 Fail to Appear for F.P.
600741 Immoral Performance
600742 Transport Facility Interference
600743 Copyright Fraud
600744 Misc Criminal Code- Other
600745 C.R.A.S.H. Unit Investigation
800101 Lost Property
800102 Found
800103 Industrial Accident
800104 Injury Accident
800105 Information
800106 Possible Code 300
800107 Recovered Property
800108 Suspicious Person
800110 Outside warrent (City)
800111 Outside Warrent (RCMP)
800112 Recovered Outside Stolen Auto
800113 Comm Crime Investigation
800114 Information - Crisis Branch
800115 Vehicle Fire Damage - Not Arson
800116 Firearm Offences
900299 Traffic Information
999998 Cancelled Case File

10. SOLICITING (n=8)

500103 Soliciting Prostitute

11. STATUES (n=77)

700101 Indian Act
700102 Lord's Day Act
700103 Young Offender's Act
700104 Immigration Act
700105 Canada Election Act
700106 Railway Act
700107 Partnership Act
700108 Tobacco Restraint Act
700109 Unemployment Insurance Act
700110 Aeronautics Act
700111 Defence Establish trespass Act
700112 Bankruptcy Act
700113 Excise Act
700114 Post Office Act
700115 Canada Shipping Act
700116 Customs Act

700117 Firearm Application Refusal
700201 Liquor Act
700202 Mental Health Act 1972
700203 Collection Agency Act
700204 Mortgage Brokers Act
700205 Medical Professions Act
700206 Seizures Act
700207 Amusements Act
700208 Public Welfare Act
700209 Public Health Act
700210 Securities Act
700211 Pharmaceutical Act
701212 Billiard Room & Bowling Alley Act
700213 Companies Act
700214 Child Welfare Act
700215 Alberta Phone Act
700216 Fuel Oil Tax Act
700217 Wildlife Act
700218 Public Contributions Act
700219 Alberta Labor Act
700220 Registered Nurses Act
700221 Vicious Dog Act
700222 Legal Professions Act
700223 Worker's Compensation Act
700224 School Act
700225 Licensing Act
700226 Homeowner's Tax Discount Act
700227 Opthalmic Dispensers Act
700228 Private Invest/Sec Goods Act
700229 Broadcasting Act
700230 Engineer Related Prof Act
700231 Landlord & Tenant Act
700232 Welfare Homes Act
700233 Petty Trespass Act
700234 Credit Loans Agrmnts Act
700235 Pawnbroakers Act
700236 Court Order

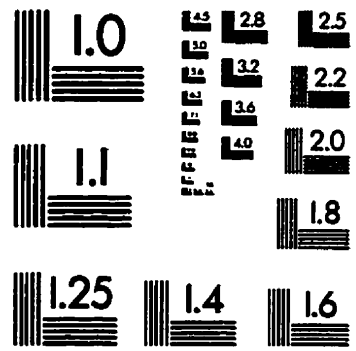
12. TRAFFIC (n=77)

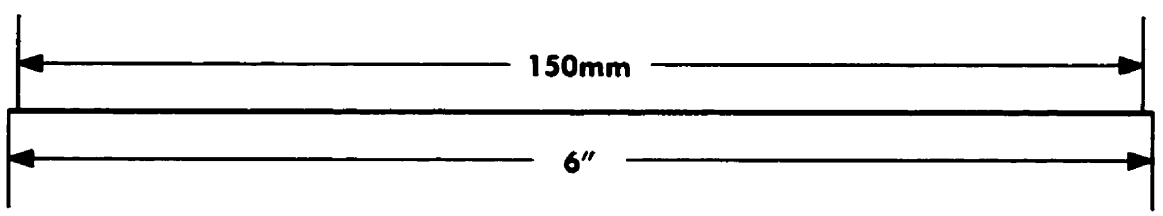
900101 Fatal Traffic Accident
900102 Injury - Traffic Accident
900103 Property Damage - Traffic Accident
900104 Hit and Run - Traffic Accident
900105 Police Vehicle Accident
900106 Property Damage Under - Traffic
900107 Property Damage Over - Traffic
900108 Hit & Run -Property Damage Under
900109 Hit & Run -Property Damage Over
900110 Hit & Run - Fatal
900111 Hit & Run - Injury
900112 Dangerous Op-Causing Death
900113 Dangerous Op-Bodily Harm
900114 Impaired Op-Causing Death
900115 Impaired Op-Bodily Harm
900116 Dangerous Op MV/Damage Under
900117 Dangerous Op MV/Damage Over
900118 Impaired Op MV/Damage Under
900119 Impaired Op MV/Damage Over
900120 Causing Death-Criminal Negligence
900121 Causing Bodily Harm by Crim Neg.
900201 Federal Offence - Traffic
900202 Provincial Offence - Traffic
900203 Municipal Offence - Traffic
900204 Danger Op- Motor Vehicle
900205 Operation Motor Vehicle - Impaired
900206 Impaired Op Motor Vehicle Over .08
900207 Fail/Refuse Provide Breath Sample
900208 Fail/Refuse Provide Blood Sample
900209 Fail to Provide Roadside Sample
900210 Driving MV While Prohibited -CC
900211 Dangerous Driving -HTA
900212 Driving While Disqualified
900213 Other Provincial Statute - Traffic
900214 Municipal Traffic Reg/Bylaws

APPENDIX D: DESCRIPTIVE STATISTICS OF ORIGINAL SAMPLE (N=386)

	OFFENDER TYPE					
OFFENCE TYPE	**TOTAL N=386**	$\bar{X}$	**SHO N=191**	$\bar{X}$	**NON-SHO N=195**	$\bar{X}$
VIOLENT	10% (456)	1.181	9.4% (387)	2.026	11.3% (69)	.354
ROBBERY	17% (792)	2.052	[illegible] (590)	3.089	[illegible] (202)	1.036
BURGLARY	20% (972)	2.531	22.1% (909)	4.759	11% (63)	.349
OTHER PROPERTY	21% (991)	2.567	21.3% (882)	4.618	17.8% (109)	.559
DELINQUENCY	32% (1527)	3.956	33% (1362)	7.131	26.9% (165)	.846
TOTAL	100% (4743)		100% (4130)		100% (613)	

TEST TARGET (QA-3)





APPLIED IMAGE, Inc
1653 East Main Street
Rochester, NY 14609 USA
Phone: 716/482-0300
Fax: 716/288-5989