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Self-Control and Criminal Career Dimensions

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The criminal career paradigm parcels offenders' careers into multiple dimensions, including participation, frequency, persistence, seriousness, career length, and desistance, and each dimension may have different causes. In a forceful critique of this perspective, Gottfredson and Hirschi claim that low self-control equally predicts all dimensions of criminal behavior and that its effect holds steady across types of people, including both men and women. This study examines the link between low self-control and the career dimensions of participation, frequency, persistence, and desistance from crime. Analyses also investigate whether self-control distinguishes between persistence and desistance. Using data from 985 participants in the Dunedin Multidisciplinary Health and Human Development Study, the authors found overall support for Gottfredson and Hirschi's position.

Keywords: *criminal careers; self-control; participation; persistence; desistance*

The criminal career paradigm focuses on the "dimensions of active criminal careers" (Blumstein, Cohen, Roth, & Visher, 1986, p. 55), including prevalence, frequency, persistence, seriousness, career duration, and desistance. According to this approach, correlates of one dimension may differ from those of other dimensions (Blumstein et al., 1986). In stark contrast, Gottfredson and Hirschi's (1990) general theory of crime "assumes that the causes of criminal acts are the same regardless of the number of such acts. It also assumes that the stable characteristics of individuals

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that 'cause' crime do not thereby produce 'stable' or 'consistent' criminal behavior" (p. 241). In short, although Gottfredson and Hirschi hypothesize that low self-control is similarly and equally related to all criminal career parameters, the criminal career paradigm stipulates that this is not a requirement and that the causes and correlates of the various criminal career parameters are not necessarily the same (though they may be; see Blumstein, Cohen, & Farrington, 1988, p. 5).

The debate between Gottfredson and Hirschi and Blumstein and collaborators has, according to Osgood (2005), "stimulated the growth of research on crime and the life course by highlighting critical intellectual challenges and suggesting a variety of approaches for addressing them" (p. 197). In fact, criminological theory has witnessed much theoretical and empirical research attention, informed by these competing hypotheses (Piquero, Farrington, & Blumstein, 2003). For instance, Sampson and Laub's (1993) informal social control theory and Moffitt's (1993) developmental taxonomy were developed amidst this debate, which has also prompted methodological innovations (see Nagin & Land, 1993). Although empirical studies having focused on this debate have examined various correlates of criminal career parameters, they remain limited in regard to self-control. In this article, a heretofore unexamined hypothesis is tested, namely whether self-control is equally related to various criminal career dimensions and, in particular, whether self-control distinguishes between persistence and desistance.

The Criminal Career Debate

Much of the debate between the criminal careerists and their protagonists concerns their explication and interpretation of the aggregate age-crime curve. Hirschi and Gottfredson (1983) contend that the shape of the aggregate age-crime relationship remains essentially the same for all offenders, in all times and places, and that it is largely unaffected by life events that occur after childhood. They argue that involvement in crime (and other analogous behaviors) is sufficiently stable over the life course to obviate the need for longitudinal data, which the criminal career paradigm holds as necessary. Gottfredson and Hirschi deny the need to distinguish prevalence, frequency, and desistance of crime because these, like all dimensions of criminal careers, simply reflect underlying levels of self-control.

In their review of the criminal career model, Gottfredson and Hirschi do not deny that some offenders offend at much higher rates than others but argue that offenders differ in degree and not in kind. In other words, offenders can be arrayed on a continuum of criminal propensity (low self-control) with individuals at the higher end of the continuum evidencing higher criminal activity and vice versa. This is a key point because Gottfredson and Hirschi do not anticipate the existence of qualitatively distinct groups of offenders.

More generally, Gottfredson and Hirschi (1988, p. 39) question the need of the career concept for the study of crime, pointing to a lack of empirical evidence in

support of this concept and its related terminology. Using data from the Richmond Youth Project, a cross-sectional study including police records and self-report data for more than 2,500 males and females, Gottfredson and Hirschi go on to critique the participation-frequency distinction. They compared seven common correlates of crime and their relation to 12 measures of crime—including incidence, participation, and frequency—contained in official and self-reported data, and they reached two conclusions. First, although the magnitude of the correlation coefficients somewhat varies, "substantive conclusions about the causes and correlates of crime . . . do not depend on career distinctions" (p. 245). Second, as the analyses progressed from participation to lambda for serious offenses, the resulting correlations decreased in size, approaching nonsignificance as the sample sizes became smaller. Gottfredson and Hirschi concluded that distinguishing between career dimensions yields little insight regarding the causes and correlates of offending. Unfortunately, however, because they did not have a measure of self-control, they could not specifically examine its effect on criminal career parameters.

Blumstein et al. (1988, p. 4) responded to these critiques and argued that the construct of a criminal career is not a theory in itself but rather a way of structuring and organizing empirical knowledge about some key features of individual offending patterns. As such, the criminal career paradigm investigates variations in criminal career parameters. Thus, unlike Gottfredson and Hirschi, the criminal career paradigm suggests that the predictors and correlates of one criminal career parameter may differ from the predictors and correlates of others.

Prior Research

Although research has not directly investigated the link between self-control and various criminal career dimensions (especially regarding persistence or desistance), extant research has generally assessed the more general issue of whether various criminal career dimensions share the same causes. This line of research is briefly reviewed in this section.

Paternoster and Triplett (1988) used data from a sample of high school students in South Carolina to study differences in participation and frequency in marijuana use, petty theft, vandalism, and alcohol use. Using independent variables from four criminological perspectives (social learning, strain, deterrence, and social control), their analysis indicated that the same sets of variables tended to explain both participation and frequency. Using the same data, Paternoster (1989) examined how an array of criminological constructs related to the criminal career dimensions of onset, persistence or desistance, and frequency and found many similarities with one important distinction: Peer delinquency was related to continuation but not initiation.

Nagin and Smith (1990) used data from the National Youth Survey (NYS) to study the determinants of participation and frequency and found that although there

were some unique relationships, the majority of variables were related to both criminal career dimensions. In another study using the NYS, Smith, Visher, and Jarjoura (1991) studied the correlates of participation, frequency, and persistence in delinquency and found that although some variables were related to specific dimensions of delinquency, a core of variables was related to multiple dimensions of delinquency. In a third study with the NYS, Smith and Brame (1994) found that although many variables were similarly related to initial and continued delinquency, other variables predicted only one of these dimensions (e.g., moral beliefs was related only to initiation and not continuation). Loeber, Stouthamer-Loeber, Van Kammen, and Farrington (1991) used 2 years of data from the Pittsburgh Youth Study to investigate the correlates of initiation, escalation, and desistance in juvenile offending and found that the correlates of initiation were distinct from the processes explaining escalation, but were similar to those of desistance.

Using data from the Cambridge Study in Delinquent Development, Farrington and Hawkins (1991) investigated whether several variables were similarly related to participation, early onset, and persistence and found that the three crime outcomes were predicted by different variables measured in childhood. Moreover, when they contrasted persisters against desisters (defined as having no convictions between ages 21 to 32 following a conviction before age 21), they found that certain variables (i.e., low paternal involvement, low commitment to school, low verbal IQ) acted as significant discriminators between the two dimensions. Nagin and Farrington (1992) examined the correlates of initiation and persistence with the Cambridge data and found that low IQ, having criminal parents, a "daring" or risk-taking disposition, and poor child rearing were associated with an initial and subsequent conviction or convictions. Using data from the Seattle Social Development Project, Ayers et al. (1999) examined the correlates of onset, escalation, de-escalation, and desistance from age 12 to 15 and found that several variables distinguished those juveniles who persisted compared to those who de-escalated or desisted. In addition, these authors were among the few researchers to assess sex differences across the criminal career dimensions and found mixed results regarding how the correlates were related to the offending dimensions across sex.

Piquero (2000) used data from the Philadelphia Perinatal Project and found that neuropsychological risk was related to early onset, chronic offending, and crime seriousness through age 17. Britt (1994) used data from the Bail Decision-making Study, the Seattle Youth Study, and the NYS to test the hypothesis of different causes for participation and frequency of crime or deviance. As a sensitivity analysis, Britt also used two different cutpoints for frequency (1+/5+). Using the official record-based Bail Study, he found that the statistically significant effects predicting participation were identical to the statistically significant effects predicting the frequency of rearrest (p. 210). Using the two self-report studies, he observed much similarity in the correlates of participation and frequency in the Seattle Youth Survey and with the NYS he found a pattern of results consistent with the "stability of the causes of

participation and frequency of delinquency, regardless of the operationalization of frequency of illegal activity" (p. 210).

The evidence summarized above indicates that although some variables exert unique effects on some–but not other–dimensions, a set of core variables appears related to multiple dimensions. These results tend to suggest, then, that a claim of a general propensity to delinquency is inconsistent with the data, as is a claim that different theories are needed for different criminal career dimensions. Most studies report small differences in coefficients, while at the same time finding no differences when the distribution is dichotomized as suggested by the career paradigm (Greenberg, 1991; Rowe, Osgood, & Nicewander, 1990). These mixed results suggest that on one hand, the claim of a single, general propensity to delinquency is not entirely supported by the data, but on the other hand, unique explanations may not be required for each dimension of criminal careers. To date however, researchers have not specifically examined whether self-control relates, as Gottfredson and Hirschi suspect, in a similar manner across criminal career dimensions, and even fewer studies have attempted to distinguish persistence and desistance (Farrington & Hawkins, 1991).

Current Focus

This study focuses on the link between self-control and several dimensions of criminal careers: participation, frequency, persistence, and desistance. In particular, we test (a) if individuals who are convicted of any crime differ from those who are not (participation), (b) if those who are convicted at high rates differ from those convicted of fewer crimes (frequency), (c) and if those who are not convicted again after adolescence differ from those who are convicted again (desistance vs. persistence). Our efforts here move beyond prior research in at least two important ways. First, many prior studies emphasizing the causes of criminal careers employ samples that began data collection in the teenage years, thus making it difficult to establish causal order. Second, no prior studies have specifically tested the extent to which self-control operates as Gottfredson and Hirschi would expect in predicting participation, frequency, and desistance.[1]

More generally, the issues addressed in this article have broad implications for the study and reaction to crime. Evidence on the extent to which the causes of one criminal career dimension (e.g., onset) are the same as the causes of another dimension (e.g., desistance) is important for theory and policy. Theoretically, if different dimensions of criminal careers share similar causal processes, specific theories of participation, frequency, and desistance may be irrelevant, and more general theories of crime would be in order. However, if the causal processes are unique, then dimension-specific and typological theories may be more relevant. Methodologically, if different causal processes underlie the various dimensions of criminal careers, then each dimension should be measured separately, suggesting the need for more sophisticated

and expensive longitudinal data; however, if this is not the case, cross-sectional measurements of any dimension of crime may suffice. From a policy viewpoint, if the causes of various criminal career dimensions are similar, then policy proscriptions do not need to be as specific as they would need to be otherwise.

Data

Data for this project come from 1,037 participants in the Dunedin Multidisciplinary Health and Human Development Study (Moffitt, Caspi, Rutter, & Silva, 2001; Silva & Stanton, 1996). The members of this study are children born from April 1972 through March 1973 in Dunedin, New Zealand, a city of approximately 120,000 people. A total of 1,037 study members (91% of eligible births) participated in the first follow-up assessment at age 3. These study members formed the base sample for a longitudinal study that has since been followed up, with levels of participation, at ages 5 (n = 991), 7 (n = 954), 9 (n = 955), 11 (n = 925), 13 (n = 850), 15 (n = 976), 18 (n = 993), 21 (n = 992), and 26 (n = 980, 499 males, 96% of living cohort members). At each assessment, the study members were given a diverse battery of psychological, medical, and sociological tests. Study members are brought into a research unit within 60 days of their birthday for a full day of data collection. They are given, in private, standardized modules regarding various research topics, which are administered by trained examiners. In addition to the self-reported data, data were collected about the study members from parents, teachers, informants, and trained observers. Various reports have documented the comparability of the Dunedin data with other studies in the United States and United Kingdom (Moffitt et al., 2001).

Dependent Variables

Records of convictions at all courts in New Zealand and Australia were searched, with the informed consent of the study members, using the computer system of the New Zealand police. Records included convictions in Children's and Young Persons' Court from age 13 to age 16 years (court convictions for criminal offenses are not made before age 13 in New Zealand's justice system), inclusive, and convictions in adult Criminal Court from age 17 years until the time of the age-26 interview. Study members had been convicted of nonviolent offenses (e.g., possession or sale of illegal substances, theft, burglary, shoplifting, vandalism) and violent offenses (e.g., disorderly behavior likely to cause violence, using an attack dog on a person, assault with intent to injure, rape, aggravated robbery, manslaughter). Among the 1,037 Dunedin Study members, conviction data were available for 985 of them. A total of 816 study members were not convicted by age 26, whereas 169 were convicted by age 26.[2] From the conviction data, we created four dependent variables.

Participation. We measure participation by whether the participant was convicted by age 26 (1 = yes, 0 = otherwise).

Frequency. We measure frequency by the number of convictions incurred by each participant by age 26. Because of the large skew evident in the data, the log of the number of convictions was taken to better normalize the distribution.

Persistence. We measure persistence, in the truncated regression model, as evidence of two or more convictions by age 26. We also measure persistence in subsequent analyses as evidence of a conviction in both the juvenile and adult periods.

Desistance. We measure desistance as a conviction during the juvenile period (prior to age 18) but no conviction between ages 18 and 26.[3]

Independent Variables

The key independent variable in this study is self-control. Recognizing the measurement issues associated with self-control (Hirschi & Gottfredson, 1993; Longshore, Turner, & Stein, 1996; Piquero, MacIntosh, & Hickman, 2000; Piquero & Rosay, 1998), Tittle, Ward, and Grasmick (2003) recently showed that both attitudinal and behavioral self-control measures equally relate to deviant or criminal activity. Here, we report measures of self-control for which item content, variable construction, reliability, and construct validity have been previously described in detail by Wright, Caspi, Moffitt, and Silva (1999, pp. 510-513). Specifically, two measures of self-control, one collected during childhood and another collected during adolescence, are used. It is important to note that the self-control measures nicely fit within Gottfredson and Hirschi's six-pronged characterization of self-control. In addition, the measures of self-control are highly intercorrelated, both within and across developmental periods (Wright et al., 1999, p. 489). The reliability of the childhood self-control measures is .86, whereas the reliability of the adolescent self-control measures is .64. Higher values for both self-control measures indicate lower self-control. The use of two self-control measures collected from two different periods allows for a sensitivity analysis.

Self-control (ages 3-11). The self-control variables measured in childhood include lack of control-irritability-distractibility, impulsivity I, impulsivity II, lack of persistence, inattention I, hyperactivity I, hyperactivity II, hyperactivity III, and antisocial behavior. These nine variables compose more than 150 separate test items in the Dunedin study. These items were collected from eight sources—study members' parents, two trained observers, and four teachers—at five ages—ages 3, 5, 7, 9, and 11. More information on the scale may be found in Wright et al. (1999).

Table 1
Descriptive Statistics

	Full Sample				Females[a]				Males[b]			
Variable	*M*	*SD*	Min	Max	*M*	*SD*	Min	Max	*M*	*SD*	Min	Max
Sex (1 = female, 2 = male)	1.515	0.499	1	2								
Low self-control 3-11	–0.000	1.00	–1.533	5.035	–0.258	0.825	–1.53	4.82	0.242	1.086	–1.45	5.04
Low self-control 15-18	–0.000	1.00	–2.036	4.716	–0.278	0.890	–2.04	2.63	0.265	1.026	–1.75	4.72
Conviction (0 = n, 1 = y)	0.171	0.377	0	1	0.07	0.236	0	1	0.26	0.441	0	1
Number of Convictions	1.349	6.211	0	91	0.42	2.54	0	34	2.23	8.227	0	91
Log (Number Convictions)	0.271	0.721	0	4.521	0.109	0.451	0	3.56	0.425	0.880	0	4.52

Note: N = 1,037 observations, 985 after missing data. Means-difference tests across sex for: low self-control (ages 3-11 and ages 15-18), conviction, number of convictions, and log number of convictions were statistically significant ($p < .05$).
a. n = 481.
b. n = 504.

Self-control (ages 15-18). The self-control variables measured in adolescence include impulsivity III, impulsivity IV, hyperactivity IV, inattention II, inattention III, physical response to conflict, and risk taking. These seven variables compose more than 50 separate test items from three sources—study members, parents, and informants—at two ages—15 and 18.

Table 1 presents descriptive statistics for all variables of interest for the full, male, and female samples. Sex is coded 1 for females and 2 for males.

Method

Several analyses are conducted to examine whether self-control relates to several criminal career dimensions in similar ways among the Dunedin Study members. First, we estimate a probit model for the participation criminal career dimension. Second, we estimate a Tobit model for the frequency criminal career dimension. We also recognize that some of the key assumptions of the Tobit model may not hold with censored data (Smith & Brame, 2003, p. 366).[4] Cragg (1971) proposed a model in which the probability of a limit observation is independent of the regression model for the nonlimit data, thereby combining a decision equation, modeled as a probit, and a regression equation for nonlimit observations, modeled as a truncated

regression (e.g., Greene, 1997, p. 970). The truncated regression model, for the present investigation of persistence, is one where some set of observations is truncated; in this study, those with zero and one convictions are truncated, and the model is estimated on those participants with two or more convictions. Following this set of analyses, we estimate a bivariate probit model, which examines the effect of self-control on two simultaneous outcomes, juvenile participation and adult participation. Finally, we compare the extent to which self-control discriminates between those who persist in crime (i.e., are convicted in both the juvenile and adult periods) and those who desist from crime (i.e., are convicted as a juvenile but not as an adult).

Results

Our first question relates to whether self-control shares the same type of association with participation and persistence, while controlling for sex (see Table 2). In the first column, Tobit results indicate that both sex and low self-control (ages 3-11) are positively and significantly related to the (log) number of convictions by age 26, indicating that males and participants with lower self-control were more likely to accumulate many convictions by age 26. The second column of Table 2 displays the Probit results for the participation question, and results here show that both sex and low self-control are positively related to participation, indicating that males and individuals with low self-control are likely to be convicted by age 26. The final column displays the truncated regression results, which limit the sample to the persisters (those with two or more convictions by age 26).

As is the case in previous criminal career research (Blumstein et al., 1986), sex is not a significant correlate of persistence in crime (unlike its previous significant effect on participation). Most notably in the truncated regression results, low self-control is positively and significantly related to persistence indicating that those with low self-control are likely to incur many convictions by age 26. In short, findings observed in Table 2 provide evidence in favor of Gottfredson and Hirschi's hypothesis that self-control is similarly related to participation and persistence. At the same time, results also replicate Blumstein et al.'s (1986) finding that sex is related to some dimensions of crime but not others. As a sensitivity analysis, we performed the analyses shown in Table 2 with the measure of low self-control measured in adolescence (ages 15-18) instead of the childhood measure, and similar results were observed.

Table 3 presents the bivariate probit estimates, which examine how sex and low self-control jointly relate to juvenile and adult crime participation, while considering the shared covariation between juvenile and adult crime participation. The results show that sex has a positive and significant effect on both juvenile and adult crime participation, indicating that males are more likely than females to participate in crime. In addition, the results show that low self-control is positively and significantly related to juvenile and adult participation, and the magnitude of the low self-control

Table 2
Prediction of Frequency, Participation, and Persistence

	Tobit[a]				Probit[a]				Truncated Regression[b]			
	Est	(*SE*)	Est	(*SE*)	Est	(*SE*)	Est	(*SE*)	Est	(*SE*)	Est	(*SE*)
Sex	2.027	(0.280)*	1.532	(0.262)*	0.809	(0.103)*	0.670	(0.108)*	0.757	(0.965)	0.087	(0.714)
Low self-control (3-11)			0.765	(0.112)*			0.308	(0.048)*			0.703	(0.293)*
Constant	–5.660	(0.582)	–4.805	(0.534)	–2.249	(0.180)	–2.073	(0.185)	–1.446	(2.610)	–0.134	(1.659)
Tobit ancillary parameter	2.574	(0.168)	2.397	(0.156)								
Truncated regression sigma									1.779	(0.468)	1.514	(0.318)
LL	–653.350		–628.702		–418.793		–398.829		–113.723		–108.940	

Note: The Tobit model refers to frequency of offending, the Probit model refers to participation, and the Truncated Regression model refers to persistence (i.e., two or more convictions). Tobit and Truncated Regression employ log of the number of convictions.

a. $n = 985$.

b. $n = 107$.

*$p < .05$, one-tailed.

Table 3
Bivariate Probit Results Predicting Juvenile and Adult Participation

	Estimate	*SE*
Juvenile participation		
Low self-control (3-11)	0.287	0.055*
Sex	0.418	0.128*
Constant	–2.111	0.219
Adult participation		
Low self-control (3-11)	0.314	0.050*
Sex	0.724	0.115*
Constant	–2.289	0.201
Rho (ρ)	0.731	0.047
LL	–562.215	

Note: $n = 985$. Juvenile participation refers to a conviction during juvenile years; adult participation refers to a conviction during adult years.
*$p < .05$.

coefficient estimates is similar for both juvenile and adult participation.[5] These results were replicated using the self-control measure at ages 15 to 18 as well, and results were similar.

Drawing on Farrington and Hawkins's (1991) work, our final analysis compares the extent to which low self-control successfully distinguishes between individuals who persist in crime between the juvenile and adult periods and those who desist in adulthood (through age 26) after having been convicted as a juvenile.[6] In this regard, we test Blumstein and Graddy's (1982) claim "that a different set of factors distinguishes those who persist in crime once involved, from those who discontinue criminality at an early stage" (p. 255). Of the 83 individuals in this comparison ($n = 62$ males), 58 were classified as persisters ($n = 46$ males) and 25 as desisters ($n = 16$).[7] Logistic regression results, using the self-control measure at ages 3 to 11, are presented in Table 4. Findings indicate that, as Gottfredson and Hirschi would suspect, low self-control is associated with a lower likelihood of desistance and a higher likelihood of persistence. This finding was also replicated using the self-control measure at ages 15 to 18.

Discussion

This article used birth cohort data from Dunedin to examine the relationship between low self-control and four dimensions of criminal careers: participation, frequency, persistence, and desistance. Gottfredson and Hirschi's (1990) model was tested. More specifically, analyses assessed whether criminal career features are

Table 4
Logistic Regression Results Distinguishing Between Persisters and Desisters

	Estimate	*SE*
Low self-control (3-11)	–0.562	0.260*
Sex	–0.518	0.550
Constant	0.336	0.956
χ^2	$7.55_{(2)}$	

Note: $n = 83$. Persister is coded 0; desister is coded 1.
*$p < .5$.

interrelated and whether low self-control exerts the same predictive impact on all career dimensions or alternatively, as stipulated in the criminal career paradigm, different criminal career features have distinct correlates and are not necessarily interrelated (e.g., Blumstein et al., 1988, p. 5).

Our results yielded two key conclusions. First, sex was related to participation but not persistence. Thus, although males are more likely than females to participate in criminal activity, they do not differ in degrees of persistence in crime once initiated to crime. Second, consistent with Gottfredson and Hirschi's (1990) arguments, self-control was significantly associated with participation (total, juvenile, and adult), frequency, and persistence, thus providing important confirmation for a key part of their theory. In addition, self-control was able to distinguish between persisters and desisters, with desisters evincing higher (more) self-control. In short, our findings support a key element of Gottfredson and Hirschi's theory that self-control equally predicts distinct criminal career parameters.

At the same time, our effort is not the last word on this issue, for a number of important questions remain unanswered. First, our efforts only focused on a limited subset of career dimensions. Whether self-control relates similarly to other career dimensions, such as career length and seriousness, remains unanswered. On this score, it should also be noted that only a select few potential parameters of a criminal career were examined. Gottfredson and Hirschi (1990) would argue that this is not problematic, namely because any one or two criminal career parameters can stand in for the whole lot of them. However, criminal careerists would argue that even if results revealed that participation and persistence have the same correlates, this does not rule out the possibility that other outcome parameters, such as age of onset and duration, do not share this same correlation with self-control.

Second, although we used two strong measures of self-control—collected in childhood and adolescence from multiple sources and each measuring different aspects of low self-control—subsequent research should consider adopting measures that are more behavioral in nature, as suggested by Hirschi and Gottfredson (1993).

Third, we examined criminal convictions as our principal outcome variable. Although past studies have drawn substantively similar conclusions using self-reported or official measures of crime (Moffitt et al., 2001), future work should replicate our analyses using self-reported data.[8]

Fourth, we did not focus on different types of offending, and it could be that careers in different types of crime (e.g., violence versus property crimes) relate differently to antecedents of crime, such as low self-control.

Fifth, some may raise the question as to whether the Dunedin participants are a select group. Thus, it is important to note how the Dunedin data fit with other cross-national data and related comparisons. A sample's location in time and place is critical if the research aims to count national prevalence rates or to evaluate a government's policies because such information is specific to time and place. In contrast, our research aims to uncover basic developmental processes leading to criminal activity, and it is reasonable to expect that these processes can transcend the relatively minor differences among New Zealand, the United States, and the United Kingdom. Furthermore, police, court, and prison practices vary notably across time and place, constraining the generalizability of information from clinical samples. However, our research does not rely on official agencies for sampling (although we did use conviction data in this study to measure offending). In a previous publication, Wright et al. (1999) have shown that self-control predicts self-reported offending.

Contrary to popular opinion, New Zealand today is not "like Britain or America in the fifties". Since being excluded from European Union trade structures in the early eighties (when this cohort was beginning high school), New Zealand has recreated itself as a technologically advanced Pacific Rim nation, having all the attending economic and social malaise. New Zealand, the United States and the United Kingdom share similar proportions of population living in urban areas (84%) and employed in the service and manufacturing sectors (95%). On the United Nations's Human Development Index, New Zealand and the United Kingdom rank similarly among nations (at 9th and 15th), with the United States in the middle. When compared to the United Kingdom, New Zealand is characterized by the same types of social inequalities as the United Kingdom in terms of health care and has higher rates of ex-nuptial teen pregnancy, infant mortality, criminal assault, and victimization. When compared to the United States, New Zealand has higher rates of alcoholism and youth suicide. New Zealand had one of the highest youth unemployment rates of all Organisation for Economic Co-operation and Development countries during the youth of this Dunedin cohort (18%), and 9% of individuals younger than 25 years of age were registered as long-term unemployed (more than a year). Illicit drug availability differs from the United Kingdom and United States, namely because of trafficking patterns (more New Zealanders use opiates and cannabis, fewer use cocaine).

There have been replication efforts in previous publications, in which developmental findings from Dunedin have been compared against reports from U.K. and U.S. samples. Points of comparison included prevalence of delinquent offenders,

gender differences in abuse, childhood risks for violence, personality links to antisocial behavior, etiological distinctions between life-course-persistent and adolescence-limited behavior (six countries including the United Kingdom), consequences of assortative mating, childhood depression versus adult-onset depression, childhood origins of schizophrenia, and gender-related pattern of drug use. An unavoidable limit to generalizing from New Zealand to the United Kingdom or the United States is the sample's lack of British or American ethnic minority groups. However, although ethnic groups often differ in base rates of disorders, research shows that such groups seldom differ in developmental processes leading to disorders, which are the focus of this research program. Many Dunedin findings have been replicated using the Pittsburgh Youth Study of poor inner-city African Americans. Nonetheless, it will be vital to replicate the findings reported here to U.K. and U.S. samples with longitudinal data on large numbers of ethnic minority participants.

Finally, the main objective of this article was to test Gottfredson and Hirschi's hypothesis that self-control predicts various criminal career dimensions. As such, controls for variables that are central to other theories (e.g., childhood risk, or social bonds) were not introduced, namely because self-control theory does not emphasize them. Of course, we realize that no account of desistance and persistence can be complete without these measures; that criminal careerists would argue that there are many other potential determinants of crime apart from self-control; and that our study has not ruled out the possibility that some of these measures are differentially related to participation, persistence, and desistance. Clearly, future studies should further examine the relationship between these other measures and dimensions of criminal careers.

It should be noted here that Wright et al. (1999) have already pitted the measures of self-control in this cohort against a comprehensive set of later social bond measures relating to parents, peers, school, job, and partner (to age 21). The authors found that social bonds can add to the prediction of self-reported crime over and above the childhood and adolescent measures of self-control, but also that self-control predicted offending over and above controls for social bonds (albeit only modestly). This prior finding, coupled with the modest amount of variance in conviction explained by self-control in the current article, suggests that other variables may be important.[9]

The differences between Wright et al.'s (1999) study and the current article should be noted. For instance, Wright et al. used self-reported offending as the outcome (as opposed to convictions), and the authors did not separate participation from persistence (which has been done in the current study). Despite these differences, Wright et al. primarily showed that the distal effects of self-control on crime are mediated through social bonds that are more proximal to the criminal event. Although controlling for social bonds to investigate whether self-control maintains residual significant effects on crime is worthy, it does not explore separate effects for participation and desistance or persistence with a more long-term, life-course

approach. Based on the argument that low self-control leads to weak social bonds, Wright et al. suggest an interesting hypothesis, namely that mediational models should be tested to assess whether both participation and persistence are related to self-control. Does this mediation only apply to participation or only to desistance and persistence? Such a research question converts Gottfredson and Hirschi's simplistic self-control theory to a more nuanced life-course explanation.

In closing, our findings provide empirical support for Gottfredson and Hirschi's hypothesis that self-control relates to various criminal career parameters in a similar fashion. This finding speaks to the generality of self-control in understanding the decision to enter, maintain, or desist from criminal activity. This conclusion also offers evidence that the causes of crime, and its associated career parameters, appear to be more similar than different. Although extant criminological theory would do well to pay attention to these findings, it would be premature to reject the criminal career position without further subsequent and replicative work using different determinants of crime and different parameters of the criminal career.

Notes

1. As Britt (1994) surmised of his own analysis, "While it would have been nice to test directly Gottfredson and Hirschi's (1990) substantive model of self-control and criminal behavior, none of the data sets was collected with the idea of measuring a concept such as self-control" (p. 211).

2. As shown in Table 1, the overall conviction prevalence by age 26 is 17%, with a male prevalence of 26%. The male figure is comparable to the age 26 prevalence from the Cambridge Study in Delinquent Development of 35%. The higher Cambridge estimate is likely because of the sample being composed of low- or working-class males living in South London, whereas the Dunedin participants are a birth cohort. Recidivist females are rare in the Dunedin conviction data (see Piquero, Brame, & Moffitt, 2005).

3. We recognize that the use of an 8-year crime-free period to assess desistance is somewhat arbitrary, especially because a small subset of individuals may reoffend after a long hiatus (Barnett et al., 1987). Nevertheless, the fact that offenders who once offended during the juvenile years and have not been arrested for close to 7 years resemble nonoffenders in terms of offending probability provides some support for the use of an 8-year crime-free period as evidence of desistance (Kurlychek, Brame, & Bushway, 2006).

4. The Tobit estimator assumes that the dependent variable is a normally distributed but incompletely observed outcome and that the process generating variation in the censoring outcome (i.e., whether one's score on the true outcome exceeds the censoring threshold) is the same as the process that generates variation in the dependent variable, conditional on being able to observe the outcome (Smith & Brame, 2003, p. 366). According to Smith and Brame (2003, p. 366), it is possible that some of the factors that influence binary decisions are different from the factors that influence length decisions given that the binary decision occurred.

5. It is also worth noting that the prevalence of juvenile and adult convictions occupy much common ground as evidenced by the rho parameter estimates.

6. The attempt to define desistance in this study is limiting, namely because the sample is only observed up to age 26, using conviction data.

7. The association between sex and the persister or desister comparison was not significant, $\chi^2(1) = 2.167$, $p > .05$.

8. Although the Dunedin Study includes self-reported data, such information is limited because it is not collected in each calendar year. When this information is collected, it typically only refers to offending in the previous calendar year. In this regard, the use of the conviction data offers a more accurate

assessment of the research questions addressed. These data also provide a relevant comparison to Farrington and Hawkins's (1991) analysis of somewhat similar questions with the conviction records of the Cambridge males.

9. Of course, even Wright, Caspi, Moffitt, and Silva's (1999) finding cannot be decisive, namely because it may be that the operational measures of self-control do not represent the construct in a perfect manner. To carry out an exhaustive study on this topic, one would need a perfect measure of self-control and measures of virtually every other known risk factor for crime. These are numerous, and no single data set includes them all. In the end, only further and more comprehensive research can begin to answer these and related questions.

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