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Criminal achievement and offender self-efficacy

par

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Résumé

La notion de réussite criminelle a essentiellement été définie au moyen de l'indicateur objectif des gains monétaires. Si l'idée selon laquelle l'argent est au cœur de la réussite professionnelle fait l'objet d'un large consensus social, il semble improbable que les gains monétaires permettent à eux seuls d'appréhender la réussite. Pour mieux comprendre certaines dimensions des carrières criminelles telles que la persistance et le désistement, il paraît utile de se pencher sur la manière dont les criminels définissent leur propre réussite. Il a été établi que l'auto-efficacité, soit la croyance que possède un individu en sa capacité à accomplir une tâche, permet de prédire plusieurs dimensions des carrières légitimes. À partir de la théorie sur l'auto-efficacité, ce mémoire examine de quelle manière se forme l'auto-efficacité criminelle. Nous soutenons que les perceptions relatives à la réussite criminelle sont affectées par des facteurs semblables à ceux qui jouent dans le développement de l'auto-efficacité légitime. Nous partons de l'hypothèse que les criminels forgent leur auto-efficacité à partir de quatre sources d'expérience : les réussites personnelles, l'apprentissage vicariant, la persuasion sociale et les états physiologiques. Il est également avancé que certaines caractéristiques individuelles et environnementales ont un impact significatif sur le développement de l'auto-efficacité criminelle. Sur la base d'entrevues auprès de 212 délinquants, nos résultats indiquent que l'auto-efficacité criminelle est une construction complexe fondée sur les caractéristiques individuelles et environnementales, ainsi que sur les expériences criminelles personnelles. Nous discutons de l'impact éventuel de ces conclusions sur l'appréhension de la persévérance et du désistement dans les carrières criminelles.

Mots-clés : criminologie, auto-efficacité, évaluations cognitives des délinquants, persévérance, désistement, agentivité.

Abstract

The study of success in crime has been primarily restricted to a single objective indicator: earnings. While there is broad cultural agreement that money is a central component of career success, it is unlikely that earnings are the sole factor equated with achievement. Understanding how offenders subjectively define success for themselves might prove informative in understanding criminal career outcomes such as persistence and desistance. Self-efficacy – the belief that one can successfully perform a behavior leading to desired types of performance – has been shown to predict various legitimate occupational outcomes. Drawing from the self-efficacy and social cognitive career theories, this thesis explores how criminal self-efficacy beliefs are formed. It is argued that factors akin to the ones leading to the development of legitimate self-efficacy also serve as a basis for perceptions of success in crime. More specifically, it is hypothesized that criminal self-efficacy is forged as offenders interpret information from four experiential sources: personal performance accomplishments, vicarious learning, social persuasion, and physiological states and reactions. Because cognitive self-appraisals are not formed in a vacuum, it is also argued that individual and environmental characteristics exert a significant impact on the development of criminal self-efficacy. Based on interviews with 212 incarcerated offenders, our results suggest that criminal self-efficacy is complexly built from individual and environmental characteristics, as well as from personal experiences with crime. The potential repercussion of these findings on the understanding of criminal persistence and desistance are discussed.

Keywords: criminology, self-efficacy, offenders' cognitive appraisals, persistence, desistance, human agency.

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***Attorney Levy**: You are amoral, are you not? You are feeding off the violence and the despair of the drug trade. You are stealing from those who themselves are stealing the lifeblood from our city. You are a parasite who leeches off the culture of drugs…*

***Omar Little** (interrupting): Just like you, man.*

***Attorney Levy**: …Excuse me? What?*

***Omar Little**: I got the shotgun, you got the briefcase. It's all in the game though, right?*

The Wire.

Season two, Episode six.

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Même si elles ne pourront jamais refléter l'ampleur de l'estime que j'ai pour vous, je vous dédie ces quelques lignes. Parce que sans vous, ce manuscrit ne ferait aucun sens.

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Introduction

Several theories of crime consider illegal activity as a self-defeating process, thereby making irrelevant the task of distinguishing between fully committed offenders and those that are not. This view on illicit activities has been facilitated by Gottfredson and Hirschi's (1990) idea that criminals are individuals lacking self-control, who are impulsive and devoid of organizational skills, and who are simply unable to resist when faced with criminal opportunities. Despite this mainstream trend, more recent work on criminal careers has suggested that a non-negligible portion of offenders is able to reap important benefits from their criminal endeavors, and that important variations in monetary gains exist between them (McCarthy and Hagan, 2001; Reuter et al., 1990; Tremblay and Morselli, 2000; Uggen and Thompson, 2003). This innovative take on crime favored the emergence of studies on criminal achievement in which the impact of various factors such as networks, competence, risk taking, drug use, mobility and social class on the attainment of illicit earnings are explored (McCarthy and Hagan, 2001; Morselli and Tremblay, 2004; Charest, 2007; Morselli and Royer, 2008; Thompson and Uggen, 2012).

The study of success in crime has been primarily restricted to a single objective indicator: earnings. While there seems to be broad cultural agreement that money is a central component of career success, it is unlikely that earnings are the sole or main factor equated with achievement. Although objective assessments are easily and often made, success truly lies in the eyes of the beholder. As such, a comprehensive understanding of the notion of success requires considering its inherently subjective part, in conjunction with its objective component. Research on legitimate careers has suggested that success is a complex concept

and that individual perceptions of success – self-efficacy – is based on a complex interplay of experiential, personal and environmental factors, some of which are objective and others subjective in nature (Bandura, 1997; Lent, Brown, and Hackett, 1994). Conventional career research has repeatedly found self-efficacy to be an important determinant of career development and outcomes such as career choices, goals and performance (Lent, Brown, and Hackett, 1994). The underlying logic behind this line of research is fairly straightforward: the more individuals perceive themselves to be successful in a given domain, the more likely they are to embrace activities related to that domain, and to voluntarily pursue their involvement. A small but growing body of contemporary criminology literature has started to show interest in the self-efficacy notion, and to acknowledge that offenders' cognitive processes and self-perceptions, while potentially being faulty and self-defeating, may bare crucial consequences on their behaviors (Brezina and Topalli, 2012). Understanding how offenders come to perceive themselves as successful in their criminal pursuits is growingly believed to be central in comprehending criminal career outcomes such as persistence and desistance.

In this thesis, we seek to build on this growing body of literature on criminal self-efficacy by providing a more comprehensive understanding of the development of success perceptions among offenders. Rooted in social cognitive theory, we intend to suggest a more complete application of self-efficacy theory whereby cognitive processes are important determinants of illegal behaviors. The theoretical and empirical elements of this study will be unveiled in the four following chapters. In the first chapter, a review of the criminal achievement literature will be offered, highlighting its main findings and exploring how researchers have thus far defined the "criminal success" concept. Social cognitive career theory (Lent, Brown, and Hackett, 1994), a complex career development theoretical

framework centered on self-efficacy (Bandura, 1997), will then be described. A special emphasis on its potential appeal for criminological theory will be proposed, leading to our research question and hypothesis. In chapter 2, the data used to achieve our research goals will be described and operationalization issues will be discussed. A description of the statistical procedure favored for handling missing data will also be provided. The third chapter will present the results of this thesis in the form of an article that was submitted to a criminology journal. Because this chapter is not presented in its classical format, but rather as a fully independent piece, some overlap with the other three chapters will be noted. Finally, the fourth and final chapter will offer a review of the main findings of this thesis along with an exploration of their potential repercussions on criminological theory. The relevance of self-efficacy in understanding persistence in crime will be discussed.

Chapter 1

Criminal success: between objectivity and subjectivity
A literature review of criminal achievement and self-efficacy

In this opening chapter, we undertake a thorough review of the literature pertinent for the development of the theoretical framework proposed in the present thesis. The criminal achievement research agenda will first be presented, with an emphasis on the underlying conceptualization of the "criminal success" concept. Drawing on the self-efficacy literature, it will then be argued that success – whether pertaining to legal or illicit pursuits – is a complex concept that can be more fully comprehended when its inherent subjective dimension is taken into account. Innovative and recent research on *criminal* self-efficacy will be presented. Combining findings from this contemporary line of research with classical self-efficacy theory, it will be argued that understanding how offenders develop perceptions of their own criminal success is an interesting avenue for understanding their persistence in criminal ventures despite unavoidable risks and obstacles, and for understanding their eventual desistance from crime.

Criminal Achievement

The rational choice perspective (Becker, 1968) has generated increased interest in the associated benefits and costs of crime among criminal career researchers (Ehrlich, 1973; McPheters, 1976; Wilson and Abrahamse, 1992; Tremblay and Morselli, 2000; McCarthy and Hagan, 2001). Whereas the first few studies aimed at understanding an offender's rationality by conducting cost-benefit analyses (Ehrlich, 1973; McPhethers, 1976), later researchers grew increasingly interested in assessing whether crime is economically beneficial. In an attempt at answering this question, Wilson and Abrahamse (1992) assumed that criminals were likely victims of temporal inconsistency, displaying exaggerated beliefs about the profitability of crime, and found that net benefits from crime decreased as rates of crime commission

increased. Questioning Wilson and Abrahamse's (1992) methodology and finding that crime does not pay, Tremblay and Morselli (2000) revisited the same underlying question concerning crime profitability, this time assuming that offenders were legitimate judges of their own criminal earnings. Results from their study suggest that differential patterns of criminal achievement exist between offenders, some of them being able to reap great benefits from crimes, others less so.

These studies led to the development of the criminal achievement research agenda. Acknowledging the idea put forth by Tremblay and Morselli (2000) that important variations in criminal monetary achievement exist between offenders, researchers aimed at uncovering the characteristics differentiating "successful" from "unsuccessful" offenders. Contemporary criminal achievement literature suggests that various factors such as crime commission rates (Morselli and Tremblay, 2004; Robitaille, 2004), specialization (McCarthy and Hagan, 2001; Robitaille, 2004), competence (McCarthy and Hagan, 2001), openness to collaboration (McCarthy and Hagan, 2001), desire for wealth (McCarthy and Hagan, 2001), ambition (Charest and Tremblay, 2009), mentorship (Morselli, Tremblay and McCarthy, 2006; Charest and Tremblay, 2009), participation in entrepreneurial offending (Charest and Tremblay, 2009), knowing "successful" offenders (Tremblay and Morselli, 2000), brokerage-like criminal networks (Morselli and Tremblay, 2004), low self-control (Morselli and Tremblay, 2004), experience (Nguyen and Bouchard, 2011), drug use (Thompson and Uggen, 2012; Uggen and Thompson, 2003), and criminal mobility (Morselli and Royer, 2008) influence the attainment of criminal incomes. Illegal earnings have also been found to influence offenders' perceptions, such as the perceived prestige of their criminal occupations (Charette, 2010). Some criminal achievement researchers have also demonstrated interest in the objective costs associated with

criminal activities and differential levels of cost avoidance (Morselli, Tremblay, and McCarthy, 2006; Bouchard and Nguyen, 2010).

Subjectivity in Criminal Achievement

While there seems to be broad cultural agreement that money is a central component of achievement, it is unlikely that success can simply be equated with earnings, particularly when success is individually and subjectively evaluated (see McCarthy and Hagan, 2001; Morselli and Tremblay 2004). Although focusing on offenders' beliefs about their own criminal success has only recently started to make its way in the literature, Tremblay and Morselli (2000) offer an interesting insight on how such self-referent perceptions are only imperfectly linked to criminal earnings. Whereas this was not the focal point of their study, the authors found that, on average, offenders reaping high monetary benefits from crime were more likely to define themselves as successful in their criminal ventures than low earners. However, their analysis also suggests that for a non-negligible portion of offenders, individuals perceptions of success do not equate with illegally earned revenues: 18 percent of high earners perceived themselves as unsuccessful in crime and 54 percent of low earners perceived themselves as successful in their illegal ventures. In explaining why low earners may come to define themselves as successful, the authors developed the "bragging effect" (2000: 648) hypothesis. These self-serving cognitive distortions in the form of "bragging" were hypothesized to help unsuccessful offenders preserve a positive self-image by bolstering past criminal performance (for a discussion on self-serving distortions, see Barriga et al., 2000). No particular hypothesis was formulated concerning high earners who viewed themselves as unsuccessful. While the cognitive distortions hypothesis is highly plausible, an alternative explanation is that offenders do not rely exclusively on past monetary attainment when forming judgments about their own

success in crime. Individual cognitive processes are highly complex, and properly understanding how they come about requires a thorough consideration of all potential correlates, some of which can be objectively assessed, such as earnings and incarcerations, others which are subjective in nature, such as emotional states and individual reactions.

Self-Efficacy

Bandura (1977) introduced the influential notion of self-efficacy in social cognitive theory. Defined as "the conviction that one can successfully execute a behavior required to produce an outcome" (1977: 193), it was argued that, given adequate skills and appropriate incentives, self-efficacy perceptions affect both initiation and persistence of action, and influence the determination of one's environment. Whereas some authors conceptualize self-efficacy as a stable personality or dispositional trait (see, for example: Rosenbaum, Reynolds, and Deluca, 2002), the original theory stipulates that: "the efficacy belief system is […] a differentiated set of self-beliefs linked to distinct realms of functioning" (Bandura, 2006: 307). The predictive power of this concept over behaviors from a wide range of activity realms has been repeatedly demonstrated since its introduction in the psychology literature. Domain specific self-efficacy has been shown to significantly predict behavioral changes in therapy with phobic patients (Bandura, 1997), academic achievement and performance (Caprara et al., 2004; Pajares and Urdan, 2006), and problem behaviors (Caprara et al., 2004). To this date, however, research has mostly focused on legal domains of performance.

Social Cognitive Career Theory and the Development of Self-Efficacy

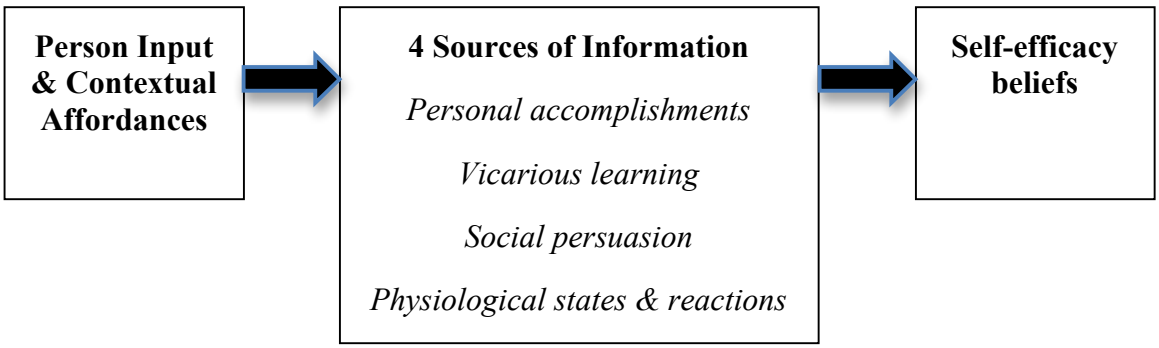
Borrowing from the social cognitive theory legacy, Hackett and Betz (1981) carried the self-efficacy concept into the legitimate career literature as a key component for understanding

women's career development. The appeal of the newly introduced concept, along with its growingly undeniable impact on the development of careers (Betz and Hackett, 1981; Betz and Voyten, 1997; Lent, Lopez, and Bieschke, 1991), favored the emergence of an integrative theoretical framework aiming to explain and understand career development. Centered on Bandura's self-efficacy notion, social cognitive career theory (SCCT) proposes theoretical pathways through which career related interests, choices, and performance come about (Lent, Brown, and Hackett, 1994). Empirical examinations of the SCCT hypotheses have been quite steady in their results: domain specific self-efficacy beliefs significantly predict the development of career interests (average weighted correlation = .53, $p < .001$), career choices (average weighted correlation = .40, $p < .01$), and vocational/academic performance (average weighted correlation = .38, $p < .001$) (Lent, Brown, and Hackett, 1994). These findings are highly informative as they point to theoretical pathways through which cognitive processes - in this case individual perceptions of success - can directly impact behavioral trajectories.

Considering the central role of self-efficacy not only on behavioral courses of action, but also on the unraveling of individual careers, both self-efficacy and social cognitive career theorists have acknowledged the importance of comprehending how such self-related perceptions are determined. In his original formulation of the theory, Bandura (1997) argued that self-efficacy perceptions are developed as individuals interpret information emanating from four distinct sources: *personal performance accomplishments*, *vicarious learning*, *social persuasion*, and *physiological states and reactions*. Adding to these four hypothesized informational sources, Lent, Brown, and Hackett (1994) argued that self-defined efficacy was also influenced by individual and environmental characteristics, which they termed *person input* and *background contextual affordances*. The impact of these two factors on the

formation of self-efficacy beliefs is hypothesized to be mediated by the four sources of personal experience. Figure 1 displays the theoretical pathway through which self-efficacy beliefs are formed. Each factor will be described in the following section.

Figure 1. Model of Self-Efficacy Development, as Proposed by Social Cognitive Career Theory (Lent, Brown, and Hackett, 1994)



Self-efficacy theorists originally hypothesized that *personal performance accomplishments* were the most potent source of information in the development of self-referent efficacy, and this has largely been supported empirically (Bandura, Adams, and Beyer, 1977; Britner and Pajares, 2006; Lent, Lopez, and Bieschke, 1991; Lopez and Lent, 1992; Matsui, Matsui, and Ohnishi, 1990). Enactive experiences are thought to be the most influential in self-efficacy formation "because this experience contains the most authentic evidence as to whether [one] can master subsequent tasks in related domains" (Usher and Pajares, 2008: 772). Individuals who evaluate the results of their involvement in a given domain as having been successful will be more likely to experience a raise in their self-efficacy beliefs in comparison to individuals who interpret past performance as a failure.

The second source informing the development of self-efficacy percepts, *vicarious learning*, refers to experiences of observing others' behavior. Vicarious experiences are hypothesized to engender a greater impact on self-efficacy when the observed others are felt to display similar attributes (Usher and Pajares, 2008). Two alternative pathways connecting this informational source to self-efficacy beliefs have been proposed in the literature. The first, modeling, stipulates that observing others succeed in a given activity realm might increase one's perceived ability to perform successfully by providing examples of achievement (Bandura and Adams, 1977; Lent, Brown, and Hackett, 1994). Second, it has been suggested that individuals might *compare* themselves to a normative comparison group. In such a case, others' behaviors and performances serve as a gauge upon which personal behavior can be evaluated. Perceiving oneself as attaining higher performance levels might increase self-efficacy beliefs, while perceiving lower accomplishment levels might decrease them (Usher and Pajares, 2008).

Social persuasion, in the form of encouragements or discouragements from significant others, can bolster or diminish self-referent efficacy. This informational source is thought to be particularly important in the development of efficacy beliefs when individuals have not yet perfected the skills required to build accurate self-appraisals. In such situations, feedback and judgments from individuals' social niche become an important source upon which efficacy relevant information can be drawn (Bandura, 1997).

The fourth source of efficacy information, *physiological states and reactions*, refers to the particular emotional and physical conditions, such as fatigue, angst, joy, and euphoria, under which an individual is when doing a particular activity. In legitimate endeavors,

people's sense of self-efficacy is hypothetically strengthened by physical and emotional well-being, while being reduced by negative affectivity (Bandura, 1997; Lent, Brown, and Hackett, 1994; Usher and Pajares, 2008).

As displayed in figure 1, a second analytical layer comprised of two distinct factors, *person input* and *background contextual affordances*, is hypothetically required to fully account for self-efficacy formation (Lent, Brown, and Hackett, 1994). The first factor, *person input* refers to any individual characteristics that may have an impact on exposure to the four informational sources. An important number of individual factors potentially relevant in the development of self-efficacy have been proposed in the literature, such as age, gender, and ethnicity (Lent, Brown, and Hackett, 1994; Super, 1990). As stated by social cognitive career theorists: "much of their relevance to career development derives not from their physical presence per se, but rather from the characteristic reactions they may evoke from the social/cultural environment" (Lent, Brown, and Hackett, 1994: 104). Although very little research has been conducted on the influence of person input on the development of self-efficacy beliefs, these individual factors are theoretically relevant because they results in a "selective exposure to career-relevant experiences" (Lent, Brown, and Hackett, 1994: 105), which in turn shape self-referent efficacy.

The *background contextual affordances* notion introduced by Lent, Brown, and Hackett (1994) in SCCT was influenced by Astin's (1984) structure of opportunity and by Vondracek, Lerner, and Schulenberg's (1986) contextual affordance concepts. Through their impact on the four informational sources, both objective and perceived environmental features play a distal role in the formation of self-referent efficacy. SCCT acknowledges the

importance of person-environment interactions, whereby personal volition in career development can be overridden by limited contextual affordances and opportunities – whether they are objectively true or perceived as such. Conversely, opportunity structures can also serve as career development facilitators.

Cognitive construction. The notion of interpretation is of central importance in both social cognitive theory and SCCT (Bandura, 1997; Lent, Brown, and Hackett, 1994). Both frameworks contrast sharply with operant conditioning views of human action, whereby past behavior predicts future behavior in a causal sequence. They instead posit that:

> "the effects of learning experiences on future career behavior are largely mediated cognitively […]. People differentially recall, weight, and integrate past performance information in arriving at efficacy appraisals; thus such appraisals are not likely to be isomorphic with, or mechanically implanted by, past performance indicators" (Lent, Brown, and Hackett, 1994: 87).

This "cognitive construction" (Bandura, 1997: 81) argument offers an explanation as to why objective indicators of success do not equate perfectly with self-defined success. According to social cognitive theory and SCCT, the specific hypothesis concerning the link between the informational sources and self-efficacy is thus that self-efficacy beliefs will be influenced by *perceived* personal performance accomplishments, vicarious experiences, social persuasion, physiological states and reactions, and contextual affordances.

Criminal Self-Efficacy

Although several fundamental differences between involvement in legal and illegal careers have been noted (see Luckenbill and Best, 1981), the motivation behind the decision to engage in lucrative crimes is thought to resemble the motivation behind the search for legitimate employment (Becker, 1968). Based on occupational and organizational research,

criminologists have thus tried to evaluate whether parallels could be drawn between conventional and criminal trajectories (see Holzman, 1982; McCarthy and Hagan, 2001). Inspired from the self-efficacy and social cognitive career theories, we similarly argue that understanding if and how offenders come to perceive themselves as successful in their criminal pursuits can be extremely valuable in explaining criminal career outcomes such as persistence and desistance. Akin to self-efficacy in conventional settings, criminal self-efficacy theory might suggest cognitive pathways through which offenders eventually choose particular "activities and behavioral settings, how much effort they expend, and how long they will persist in the face of obstacles and aversive experiences" (Bandura and Adams, 1977: 288). Perceiving themselves as successful in their illicit ventures may incite offenders to pursue their criminal involvement, whereas perceiving themselves as lacking the required abilities might force them to revise their willingness to continue their offending trajectory.

Several studies on self-efficacy offer some insight concerning the link between ability self-perceptions and criminal or delinquent behaviors. Although there is no consensus concerning its conceptualization and measurement, researchers in this domain predominantly consider self-efficacy as a preventive factor in the avoidance of negative outcomes (Ludwig and Pittman, 1999). For example, Sharkey (2006) defined street efficacy as: "the perceived ability to avoid violent confrontations and find ways to be safe in one's neighborhood" (2006: 827). The author found that higher levels of perceived street efficacy among adolescents lead to a decreased likelihood of associating with delinquent peers and of resorting to violence. Similarly, prosocial self-efficacy was found to decrease involvement in drug dealing and violence, and to decrease the probability of having trouble with the police among youths aged 9 to 19 (Ahlin, 2010). Adolescents' prosocially-defined self-efficacy has also been found to be

associated with increased abilities to avoid antisocial behavior, peer pressure to become involved in delinquency, risky sex and drug use (Bandura et al., 2003; Ludwig and Pittman, 1999; Stouthamer-Loeber et al., 2002). In an empirical test of strain theory, Agnew and White (1992) found that strain was most likely to lead to general delinquency in adolescents with low levels of self-efficacy, which was defined by the authors as the "perceived personal control of the environment" (1992: 488). Although none of these studies focused on the perceptions of success *in* crime, they nonetheless suggest that efficacy self-perceptions exert a significant impact on delinquent behaviors.

In addition to these initial insights, qualitative research in criminology also provides clues suggesting that individual perceptions of success in crime influence offending courses of action. Several ethnographies refer to interviewees' sense of success when they are active in crime, and how such perceptions become central to their identity and allow them to pursue their illicit ventures (see Anderson, 1999; Geiger and Fisher, 2005; Shover, 1996; Steffensmeier, 1986; Steffensmeier and Ulmer, 2005). In his ethnographic study on a Puerto Rican ghetto in East Harlem, Bourgois (1995) refers to young residents' quest for success. Economic, structural and cultural pressures greatly limit access to satisfying legitimate employment, thus preventing them from developing any sense of conventional success. Interviewees come to develop an oppositional culture – a street culture – in which criminally successful peers are highly respected and viewed as models. The development of this criminally "successful" identity is crucial in giving individuals a sense of purpose in life, particularly in the face of intense environmental adversity. These success perceptions encourage youths to pursue activities for which they believe to have the necessary and

sufficient abilities – illegal ones. This idea permeates several qualitative theses that have been developed in criminology (Anderson, 1999; Bourgois, 1995; Maruna, 2000; Shover, 1996).

With the publication of a recent and innovative multimethod study, Brezina and Topalli (2012) provided a thorough exploration of offenders' perceptions of success *in* their criminal ventures. While not incorporating the entire SCCT framework of self-efficacy development, the authors assessed the correlates and consequences of *criminal self-efficacy*. In a sample of nearly 500 male offenders drawn from a survey of Nebraska prison inmates, they found that almost half (48 percent) of the sample perceived themselves as having been "somewhat successful" or "very successful" in crime during the three years preceding their current incarceration. In an additional analysis based on interviews conducted with 46 active street offenders, the authors found that perceptions of success were even higher among non-incarcerated individuals, the vast majority of interviewees (80 percent) regarding "themselves as highly effective at crime" (2012: 1058). Focusing specifically on one of the four hypothesized sources of information directly leading to the development of self-efficacy – *personal performance accomplishments* – their quantitative analysis suggests that criminal income and the ability to "beat the system" (i.e. not being arrested when committing crimes, 2012: 1046) both influence criminal self-efficacy perceptions. However, an additional analysis based on a restricted subsample of 298 inmates suggests that criminal earnings no longer influence self-referent efficacy when the level of criminal planning is taken into account. Of particular interest in this study is the finding that criminal self-efficacy significantly predicted inmates' intentions to "go straight" (2012: 1051) after their release from prison, thereby suggesting that self-perceptions have an impact on future criminal behavior.

Although Brezina and Topalli (2012) focused on only one of the four informational sources linked to the development of self-efficacy, the authors argue that results from their qualitative analysis suggest that, similarly to what has been found in the legitimate career literature (Lent, Lopez, and Bieschke, 1991; Lopez and Lent, 1992; Matsui, Matsui, and Ohnishi, 1990), other factors might also be important in the formation of offenders' criminal self-efficacy.

The Development of Criminal Self-Efficacy

In accordance with Brezina and Topalli (2012), we believe that all factors hypothesized to influence conventional self-efficacy should be evaluated for a comprehensive study of the development of criminal self-efficacy. It is argued that this subjectively constructed perception is also complexly built from an array of objective and subjective factors. Although these correlates remain to be assessed in a systematic fashion, the criminology literature is abundant with hints suggesting that the criminal counterparts of the determinants found to influence the formation of conventional self-efficacy might also serve as a basis for offenders' criminal success perceptions.

Personal Performance Accomplishments

Akin to Bandura's (1997) original contention, Brezina and Topalli (2012) argued that: "like conventional efficacy, [criminal self-efficacy] is formed to a large degree in relation to past performance" (2012: 1045). In their study, three indicators of offenders' mastery experiences were assessed: criminal earnings, ability to avoid arrests when committing crimes, and criminal skills and expertise. In addition to these indicators of personal accomplishments,

we argue that being in a position of authority is also an important factor upon which criminal self-efficacy rests.

In studying persistent thieves' biographical accounts, Shover (1996) notes a pervasive underlying theme in their discourse centered on money as an incentive to engage in crime. The author further argues that: "using the metric of thieves and hustlers, those who earn well from crime […] are successful" (1992: 90). Similarly, Akerström (1985) notes that money is an important signal of status and prestige in the illicit realm of activity. Bourgois (1995) likewise highlights the fact that money is one of the most important indicators of success in the street culture, as he portrays most youths in his study as dreaming about possessing luxury cars and jewelry. This suggests that the ability to reap monetary benefits from crime affect offenders' views of their success in crime. In addition to qualitative accounts, criminal achievement researchers have repeatedly noted the central role embodied by money in criminal endeavors. With their finding that higher criminal earnings lead to higher perceptions of criminal success, Tremblay and Morselli (2000) offered one of the first quantitative suggestions that money is central in the development of criminal self-efficacy.

Another correlate of criminal involvement that has been given some attention as a measure of success in illicit trajectories is the ability to commit crimes while avoiding its inherent costs (Bouchard and Nguyen, 2010; Morselli, Tremblay, and McCarthy, 2006). Following this line of research, we argue that perceptions of success in crime depend not only on criminal activity levels, but also on avoidance of detection and arrest. No counterpart to this factor exists in the conventional self-efficacy literature as legitimate careers, by being legal in nature, do not entail any kind of apprehension or sanctioning risk (Luckenbill and Best, 1981). However, it is argued that being able to avoid these negative outcomes when

pursuing criminal endeavors does play an important role in the formation of criminal self-efficacy. Brezina and Topalli (2012) effectively found that offenders with low arrest ratios were more likely to subjectively perceive themselves as successful in their criminal endeavors that those with high arrest rates. In their qualitative analysis, the same authors were able to shed further light on the potential relationship between respondents' ability to avoid arrests and their criminal self-efficacy. Although avoiding trouble with the law was quantitatively predictive of higher self-efficacy, most interviewees reported believing to have good criminal success despite having been previously arrested and incarcerated. The authors noted that this seemingly counterintuitive finding might be explained by offenders' view of their past arrests and incarcerations as mistakes that they will be able to avoid in the future. One of interviewee in their study, an experienced robber, stated it unequivocally: "You learn from your mistakes. As I got older and everything, I got better" (2012: 1056). Another way by which offenders were hypothesized to develop high criminal self-efficacy despite having been previously apprehended by the criminal justice system was by refining their criminal repertoire, limiting their activities to the ones they could do without being detected. Notwithstanding the precise pathway through which crime rates and arrests affect criminal self-efficacy, the literature suggests that their role cannot be ignored.

Although several fundamental differences between deviant and legal careers have been noted, it is generally believed that they nevertheless share important resemblances. For instance, Luckenbill and Best (1981) argue that, akin to entering a "respectable career" (1981: 197), entering a deviant one requires acquiring the knowledge and skills necessary to adequately perform the central tasks and roles associated with criminal activities. Adding on this theoretical line of research, Shover (1996) stated that the most economically "attractive

criminal opportunities" (1996: 49) are the ones requiring the most advanced technical qualifications. In a similar fashion, Brezina and Topalli (2012) argued that: "offenders also appear to gauge their performance at crime in terms of their ability to meet the emotional and technical challenges of crime" (2012: 1046). The authors found that criminal skills and expertise, measured by levels of participants' criminal planning, are significantly predictive of criminal self-efficacy: the more offenders plan their criminal activities, the higher their self-efficacy beliefs are. Their qualitative analysis concurred with this finding, as highlighted by an interviewee's discourse: "Look… I'm good 'cuz and I plan 'cuz I'm good. The more you plan the better you are. It's not magic man. You got to plan. You got to develop yourself, your skills." (2012: 1057). These findings suggest that feelings of personal mastery in illegal ventures lead to a higher sense of personal success in crime.

Unlike legitimate careers, deviant ones unravel within unstructured settings in which occupational positions are typically not well defined and not formalized by official codes of conduct (Luckenbill and Best, 1981). Relationships and hierarchical positions are thus often left ambiguous. This does not mean, however, that no one can claim authority in criminal settings and endeavors. Individuals in positions of authority within criminal ventures tend to be informally so, and authority is thought to: "reside in the person, not the office" (Luckenbill and Best, 1981: 199). Although the impact of authority in illegal activities on offenders' perception of success in crime has not yet been formally evaluated, research on legitimate employment suggests that authority is an important indicator of occupational prestige (Chambaz, Maurin, and Torelli, 1998). Building on this line of research, authority in crime, as measured by the number of individuals to which an offender gives order during crime commission, has been found to favorably influence perceptions of prestige in illegal

occupations (Charette, 2010). However, the author found that authority in legal careers did not have the same impact on perceptions of prestige in legal occupations, suggesting that different factors have a different impact on perceptions related to legitimate and illegitimate careers. In addition to research on perceptions of prestige, research on legal career success has repeatedly shown that authority might also play a non-negligible role in the formation of subjective views of personal career success (Gattiker and Larwood, 1986; Sturges, 1999; Nabi, 2001). The impact of authority on perceptions of success in illegal ventures remains to be more fully explored.

Vicarious Learning

In the qualitative analysis of their multimethod study, Brezina and Topalli (2012) underscored hints suggesting that another informational source hypothesized to be central in the development of self-efficacy – vicarious experiences – also influences criminal self-efficacy beliefs. As an active offender stated:

> "I know there's always a way […] to succeed at crime. Let me tell ya, my partner, he told me he was gonna get away. He went in [to rob] a hotel… a fucking hotel! You know how many witnesses and cameras and all that [he was up against]? And he never got caught" (2012: 1057).

As originally acknowledged by Bandura (1997), observing similar others perform successfully might increase personal perceptions of self-efficacy. Whereas this interpretation is plausible, an alternative way by which the observation of others' performance might come to exert an influence on success self-perceptions has been proposed in the self-efficacy literature. Instead of being viewed as models, similar others can come to be perceived as a forming a normative comparison group against which performance is gauged (Usher and Pajares, 2008). In a study inspired by the "friendship paradox", an idea originally introduced in the social network

literature by Feld (1991), Grund (in press) evaluated the impact of social embeddedness on self-evaluations. His results suggest that individuals' self-perceptions are highly dependent on what they *think* the social world looks like – and that social world is highly determined by their own social networks. In comparing themselves with others, people may thus come to view themselves as unsuccessful if they believe themselves to be lower achievers, and to view themselves as successful if they believe themselves to be higher achievers. Notwithstanding the precise process by which the presence and performance levels of criminal peers actually influence criminal self-efficacy, the literature suggests that vicarious experiences might also be central in the development of offenders' subjective views of their own success in crime.

When defining vicarious learning, Bandura (1997) stipulated that, in addition to being encouraged (or relatively discouraged) by similar others' performances, people may also: "seek out a model competent at tasks at which they aspire – particularly ones with status, power and prestige" (1997: 101). In the criminological literature, mentors have been found to fulfill this modeling role, as they provide offenders-to-be with information, guidance and support pertaining to criminal involvement (Cloward and Ohlin, 1960; Shaw, 1930; Sutherland, 1947). Observing mentors succeed in their criminal endeavors might provide offenders with a bolstered confidence that they too can succeed in crime. The specific impact of the presence of significant criminal peers or mentors on the formation of criminal self-efficacy remains to be more thoroughly explored.

Social Persuasion

The criminology literature also suggests pathways through which the third theoretical informational source - social persuasion - might come to influence offenders' subjective

perceptions of success in crime. Encouragements towards criminal involvement are likely to come from criminally oriented peers embedded in an offender's social network. In differential association theory, Sutherland (1947) argues that individuals not only learn the motives and the techniques required to perform criminal acts, but also the required attitudes and rationalizations. This suggests that the presence of criminally oriented individuals in one's network might influence individual perceptions of criminal success by providing readily accessible and prominent pro-criminal values/encouragements.

Physiological States and Reactions

Experiencing agreeable sensations when performing an activity is hypothesized to strengthen self-efficacy beliefs (Bandura, 1997). Whereas agreeableness in legitimate occupations and activities are mostly defined in terms of composure, stamina, and general well being, the inherent and undisputable risks associated with crime make these sensations rather unlikely to be experienced during crime commission. Instead, physiological states and reactions akin to thrills and excitement will more probably be experienced. In their general theory of crime, Gottfredson and Hirschi (1990) argued that individuals plagued with low levels of self-control display a clear preference for actions that are adventurous and that they are more likely to engage in crime because such activities are: "exciting, risky, or thrilling" (1990: 89). Whereas the authors originally argued that all offenders have, by definition, low levels of self-control, more recent research generally acknowledges that offenders possess varying levels of self-control, and that this can differentially help or hinder criminal involvement and its outcomes (Morselli and Tremblay, 2004; Piquero and Tibbetts, 1996). Gottfredson and Hirschi's (1990) theoretical assertion, coupled with the contention that differential levels of self-control exist among offenders suggests that individuals with low self-

control tendencies will be more likely to perceive emotional states during crime commission as agreeable than individuals with high self-control. Following Bandura's (1997) hypothesized link between emotional states during performance and self-efficacy, low levels of self-control may thus influence offenders' perceptions of success in crime by making them more likely to enjoy the thrills and risk associated with illegal activities.

Person Input and Background Contextual Affordances

Individual attributes are hypothesized to lead to selective exposure to career-relevant experiences, and thus indirectly influence the development of self-efficacy beliefs (Lent, Brown, and Hackett, 1994). Criminologists generally agree that one of the most potent person-related characteristic associated with criminal involvement is age. Indeed, one of the most consistent findings in the criminology literature is that, as they age, most offenders diminish their rates of offending (Glueck and Glueck, 1940; Hirschi and Gottfredson, 1983; Shover and Thompson, 1992). Notwithstanding the various theoretical explanations that have been proposed to account for this pervasive result (see Glueck and Glueck, 1937; Shover, 1985; Walsh, 1986), the likely diminished criminal involvement of aging offenders necessarily reduces their personal exposure to the relevant sources of information leading to the development of self-efficacy (personal performance, vicarious experiences, social persuasion, physiological states and reactions). Following SCCT's hypothesis concerning the impact of individual characteristics on the development of self-referent efficacy beliefs (Lent, Brown, and Hackett, 1994), offenders should thus come to perceive themselves as being less successful in crime as they age.

Several qualitative inquiries in the criminology literature have noted that people with limited legitimate opportunities come to develop more positive criminal self-perceptions than

individuals without such barriers. One of the persistent thieves interviewed by Shover (1996: 25) unambiguously states: "Well, at this stage of my life, I think that's the only thing left open to me, that I can really profit from. I'm not going to be successful working." Based on his study on a poor black inner-city ghetto in Philadelphia, Anderson (1999) similarly argues that:

> "the economic unraveling in so many of these communities puts people up against the wall and encourages them to do things that they would otherwise be reluctant to do. A boy who can't get a job in the regular economy becomes a drug dealer not all at once, but by increments. These boys make a whole set of choices and decisions *based on what they are able to do successfully*. A boy who grows up on the street world – knowing how to deal coolly with people, how to move, how to look, act, dress – is a form of capital, not a form middle-class people would respect, but capital that can nonetheless be cashed in" (1999: 134, italics added).

Not perceiving themselves as having the possibility of developing a sense of success in the conventional realm, they are more likely to develop positive views of personal success in the illegal underworld.

Hard drug use can further limit potential legitimate opportunities and lead to increased rates of offending by engendering a strong need for money, which is hardly attainable through legitimate means (Uggen and Thompson, 2003). Whether it be due to structural forces, social dislocation, alienation or merely because of individually-related impediments such as lack of education, these interviewees all have something in common: they come to feel victimized and perceive their chances of acquiring satisfactory legal employment as almost inexistent. As noted by Brezina and Topalli (2012), there seems to be an inverted relationship between legitimate and criminal self-efficacy.

Classic strain theorists have posited that individuals who cannot achieve monetary success through legal ventures tend to develop feelings of frustration (i.e., strain), and are thus more likely to engage in crime (Cloward and Ohlin, 1960; Merton, 1968). Whereas most

empirical tests of strain theory have generally failed to support this claim, Agnew et al., (1996) suggested that, when appropriately measured, strain could be an important concept in understanding criminal involvement. Based on data from a survey of the general population living in a midwestern urban area, the authors found low legitimate earnings and low levels of education to be significant predictors of strain (measured as dissatisfaction with monetary status). Feelings of strain subsequently predicted involvement in income-generating crimes. Incorporating findings from qualitative and quantitative research along with strain theory, it is possible to hypothesize that limited satisfactory employment perspectives might lead to low levels of legitimate self-efficacy[1] and to strain. When combined, these two self-defined perceptions increase the likelihood of engaging in crime, which in turn is likely to increase criminal self-efficacy beliefs.[2] This hypothesis thus suggests that limited legitimate opportunities might increase the likelihood of developing positive criminal self-perceptions.

The main aim of the present study is to build on the small body of research on criminal self-efficacy, and to develop a more comprehensive understanding of how offenders come to perceive themselves as successful in their criminal pursuits. By identifying the various sources that contribute to the development of criminal self-efficacy, we seek to unveil its complexity and to highlight the relevance of self-efficacy theory to crime. Akin to conventional self-efficacy, offenders' criminal self-efficacy beliefs may explain why offenders do what they do, particularly why they persist in crime or eventually desist from it. Based on self-efficacy theory (Bandura, 1997) and SCCT (Lent, Brown, and Hackett, 1994), it is hypothesized that the factors central in the formation of conventional self-efficacy are also central in the

[1] Limited exposure to experience with legitimate employment leads to decreased legitimate self-efficacy beliefs (Bandura, 1997).
[2] Through feedback from direct experience with crime.

development of criminal self-efficacy. More specifically, rewarding personal criminal accomplishments, social persuasion favoring criminal involvement, vicarious experiences with successful co-offenders and mentors, and personal tendencies to enjoy activities that are thrilling and exciting will lead to high levels of criminal self-efficacy. In addition, increasing age and favorable contextual opportunities will lead to decreases in self-efficacy among offenders. Operationalization of the concepts that were presented in this chapter will be described in detail in chapter 2, along with a description of the analytical strategy chosen to evaluate our research hypotheses.

Chapter 2

Methodology:

Operationalizing criminal self-efficacy using offenders self-report data

The hypothesis concerning the formation of criminal self-efficacy proposed in the present thesis will be evaluated with an existing dataset that was collected over a decade ago. In order to present how this task will be undertaken, the following sections will first provide a thorough description of the study that led to a rich data collection endeavor, as well as a description of the sample that will serve as the basis of the exploration of offenders' self-perceptions. Second, operationalization issues will be discussed, with a particular emphasis on validity of concept measurement. The third section will describe the procedure chosen to handle missing data in the present thesis, along with its accompanying theoretical justifications. Finally, the chosen multivariate analytical procedure will be described.

Data

The data used in this thesis are drawn from a study conducted in the province of Quebec between the summers of 2000 and 2001. The research project's original focus was on offenders' earnings gathered through criminal activities, and aimed at demystifying why certain offenders reap greater monetary benefits from illegal endeavors than others (Morselli and Tremblay, 2010).

Access to five Quebec-based penitentiaries was granted to the research team after proper authorizations were obtained from Canadian correctional services. Of these five sites, two were of minimum-security level and two of medium-security level. The last site to which access was granted was the federal correctional services' reception center, but it was abandoned after completion of 15 interviews due to administrative burden placed on inmates

incarcerated at this site.[1] No major problems were experienced at any of the other four sites, and all members of the research team were treated respectfully.

Participant Recruitment

Due to the complex and sometimes lengthy nature of some of the survey's sections and in order to ensure high quality data, all interviews were conducted in face-to-face sessions with interviewers. Twelve interviewers[2], undergraduate and graduate students at the Université de Montréal's School of Criminology, participated in data gathering. For each site, a list of names of the entire inmate population was provided by correctional services, and each interviewer was provided with a random list comprising 20 names. In medium-security penitentiaries, interviewers were given access to a telephone and they were responsible for either calling a guard designated to assist with the research data-gathering process or the caseload manager of the inmate she or he wanted to solicit for participation. Because of greater freedom of movement in minimum-security establishments, potential participants were contacted mostly through a central intercom. In both cases, no specific details were provided on the nature of the research project at first contact. Potential participants were simply informed that they had been selected to take part in a university-based research project investigating the financial situation of inmates prior to their current incarceration. In a few

[1] Inmates at the reception center are newly sentenced to incarceration and await referral to minimum-, medium- or maximum-security penitentiaries across the country. An intensive series of evaluations is imposed on them by the correctional services' practitioners and by various university-based research teams. The voluntary nature of the present study incited most inmates to refuse participation, as their testing burden was already heavy enough.

[2] Eight of them were women and five were men.

cases (n=23), participants were informally recruited, through inmates who had already participated or through correctional services' personnel.[3]

Upon arrival in the interview room, participants were assured that all information divulged during the interview would remain strictly confidential, that the survey and the research team were in no way connected to the correctional services, and that participants were free to cease participation at any point if they so wished. Details on the survey were purposively kept vague, but the title of the project – *Financial situation of inmates prior to their current incarceration* – did point to the fact that questions concerning legal and illegal revenues would be asked. When inmates agreed to take part in the study, a participation consent form was dutifully signed. The overall participation acceptance rate was 76 percent (Morselli and Tremblay, 2010).

The Questionnaire Design

Interviews were conducted immediately after inmates agreed to participate. They were allowed to decide whether they wished to complete the questionnaire either in French or in English. Depending on the amount of information provided by respondents, the interview lasted between one hour and a half and two hours, with an average of 170 minutes. The survey questionnaire contained nearly 200 questions, but the lengthiest sections were the one devoted to describing criminal and non-criminal patterns during a three-year window period and the one reserved to exploring the set of core criminal contacts. These two sections were purposefully placed in the middle of the questionnaire, following a series of questions on socio-demographic and personal background characteristics, and preceding inquiries on more

[3] Staff members were subsequently politely requested to refrain from soliciting inmates for study participation.

general experiences, as well as a few self-perception and Likert-scale type questionnaires. This particular ordering of questions ensured that participants felt comfortable with the interviewer before entering the more sensitive information disclosure portion of the survey. As the study progressed, each interviewer developed and perfected personal interviewing style. This facilitated data gathering and allowed for the development of trust and rapport between research assistants and respondents.

The Window Period and Calendar Format

After the introductory phase of the questionnaire, interviewers established a three-year window period with respondents, on which following questions would specifically focus. The first month of participants' current incarceration was targeted, and the window period was defined as the 36 preceding months. Following the second Rand inmate survey, responses were gathered on a three-year monthly calendar format (Chaiken and Chaiken, 1982; Peterson and Braiker, 1981). The inclusion of this data gathering procedure was favored in order to facilitate respondents' recall of past events and activities during the window period. The sample selection was restricted to inmates who had been incarcerated for less than seven years at the time of interview in order to avoid forcing respondents to recall events from over ten years in their pasts. This inclusion criterion has most likely not highly affected the resulting sample, as 90 percent of survey participants had been incarcerated for less than five years, and 75 percent for less than three years at the time of interview.

The reliability of three-year recall data was enhanced with the use of Freedman et al.'s (1988) strategy, which relies on detailed life-course calendars in order to bound and situate specific criminal activities. Once the three-year window period was established with respondents, the first details to be positioned on the monthly calendar were incarceration

spells. These events were thought to be quite memorable, and it was believed that inmates could give relatively precise indications concerning them. These expectations were confirmed, as most interviewees could easily and precisely situate bouts of incarceration during the window period (Charest, 2007; Morselli and Tremblay, 2010). In addition to imprisonment sequences, respondents were asked to reconstruct their more general criminal justice trajectories by specifying months in which they had been arrested, months under conditional discharge or probation, and months in which they were placed in transition homes. Interviewers subsequently inquired participants to temporally situate key life events such as family members' or friends' deaths, births, hospitalizations, therapy stays, suicide attempts, separations and divorces, significant losses of jobs or amounts of money, and moving. Respondents were subsequently asked about their legitimate work experiences, being first required to pinpoint the three most significant legal occupations held during the window period. For each of these, inmates were asked to indicate the months during which these jobs were held and monthly earnings for each month worked. At the end of this interview portion, a detailed monthly reconstruction of respondents' experiences with criminal justice, as well as key life events and occupational trajectories was laid.

The last portion of this questionnaire section concerned criminal activities and earnings. A crime-by-crime method was favored to structure respondents' recall for the three-year window period. Rather than asking participants to freely enumerate the crimes they had committed and the months in which they had been active, the questionnaire was designed so that interviewers would guide remembrance for past predatory and market crimes. Participants were thus asked is they had participated in a series of predatory offenses (armed robbery, burglary, theft, vehicle theft, and fraud), and in a series of market offenses (drug sale, drug

distribution, fencing, smuggling, loansharking, procuring, illegal gambling operating, and other supply-related offenses). They also had the option of adding any other predatory of market crime in which they had been involved during the window period. For each crime for which participation was admitted, inmates were asked a series of details concerning their particular offending experiences. These details included perceived status and prestige assigned to this activity, number of crimes committed when active, time dedicated to planning and executing crimes, types and scope of accomplices/co-offenders that were turned to for this type of offense, most frequent targets, and an estimate of average monetary gains per crime (unitary earnings). Following this series of precise questions, inmates were asked to specify the months or sequence of months for which they were active for each type of offense. After reconstructing the specific crime commission sequences of all crimes committed, respondents were asked to report average monthly earnings generated through their criminal activities.

Sample

Attrition. Although 284 inmates were interviewed in the present study, a total of 57 respondents were excluded from the final analyses. These participants were not incarcerated for money-oriented crimes, and did not report any participation in such activity during the 3-year window period. Since we hypothesize that criminal earnings play a role in the formation of criminal self-efficacy, their exclusion from the present study was warranted. This left us with 227 respondents. An additional fifteen participants had to be eliminated because their

questionnaires were judged to be too highly incomplete.[4] The following analyses are based on a restricted sample of 212 respondents.

Portrait. Table 1 presents basic sociodemographic information pertaining to the study sample. Of the 212 respondents, 192 were native French, and 7 were native English speakers. Nearly half of the sample was in a relationship[5] when they were incarcerated. The majority of study respondents were incarcerated at the time of the interview for property offenses.[6] This crime category includes theft, breaking and entering, shoplifting, and misdemeanor. A non negligible portion of participants (27.8 percent) were incarcerated for market offenses, which include drug selling and distribution, loansharking, smuggling, fencing, and other supply-related offenses. Violent offenses were at the origin of the current sentence for 9 percent of the study sample. This crime category includes homicide, assault, and armed robbery. Other types of crime such as traffic violations and offenses related to the administration of justice were at the origin of current sentence for almost 5 percent of the study sample. The average length of incarceration was 5 years.[7] At the time of interview, participants were 34 years old, on average. They had committed their first crime at 16, were first arrested at 19, and first convicted at 20 years of age.

[4] Although missing data in the present thesis were handle with the use of multiple imputations, the extent of incompleteness of these fifteen questionnaires led to the decision to withdraw these cases from the dataset altogether. The most complete of these questionnaires included only sociodemographic information. The reason for the incompleteness of survey questionnaires was interruption of interviews.
[5] Being "in a relationship" includes both civil union and marriage.
[6] This refers to the main crime for which respondents were incarcerated. Some were incarcerated for more than one offense.
[7] Minimum incarceration length in Canadian federal correctional services is two years. Sentences of less than two years are served in provincially overseen prisons.

Table 1. Sociodemographic Characteristics of the Study Sample (N = 212)

Variable	N	%
Native language		
French	192	90.6
English	7	3.3
Other	13	6.1
Civil status		
Single	112	52.8
In a relationship	100	47.2
Crime category at origin of current sentence		
Violent	19	9.0
Property	124	58.5
Market	59	27.8
Others	10	4.7
	Mean	**(SD)**
Age at time of interview	33.59	(9.29)
Age at first crime	15.86	(7.49)
Age at first arrest	18.88	(6.88)
Age at first conviction	19.93	(6.81)
Length of current sentence (months)	59.92	(49.42)

ABBREVIATION: SD = standard deviation.

Operationalization

The data used in the present thesis was gathered nearly 13 years ago with a research focus greatly different from the one presented herein. Whereas the original variable of interest was inmates' crime-related financial status, a dramatic shift is proposed, whereby inmates' subjective views of their own criminal success – criminal self-efficacy – become the focal point of analysis. This state of affairs cannot be understated as it implies that the data collected were not intended to measure the relevant concepts suggested by SCCT (Lent, Brown, and Hackett, 1994), which constitute the heart of this thesis' theoretical framework. A thorough review of the self-efficacy and SCCT literatures allowed for a close examination of how the concepts leading to the development of self-efficacy, and self-efficacy itself are empirically operationalized and measured. Whereas we cannot pretend to tap into these theoretical ideas as

precisely as self-efficacy research does, we believe that the data from the *Financial Situation of Inmates Prior to their Current Incarceration* study can be adequately used to operationalize the concepts of interest as they pertain to the criminal activity realm. The following sections offer details on how each concept was operationalized, as well as information on how data were collected and how variables were measured and transformed for inclusion in the analysis model.

Assessing Criminal Self-Efficacy

In order to evaluate whether self-efficacy beliefs pertaining to criminal endeavors are influenced by factors akin to those impacting legitimate self-efficacy, the *person input and background contextual affordances* concept, as well as the four informational sources proposed by SCCT (*physiological states and reactions*, *social persuasion*, *vicarious learning*, and *personal performance accomplishments)* were operationalized with the available data. The order of presentation of these concepts in the subsequent section follows their order of entry in the analysis model. Because the impact of *person input and background contextual affordances* on self-efficacy beliefs is hypothetically mediated by the four sources of information, they are presented first.[8] Of these four informational sources, direct *personal performance accomplishments* are hypothesized to account for greater variance in self-efficacy beliefs, no specific claims having been made concerning the relative potency of the remaining three sources of efficacy information (Bandura, 1997). To properly evaluate the impact of *personal performance accomplishments* on self-efficacy and on other informational sources, it was thus entered last in the multivariate model. The order of entry in the analysis model of the

[8] The reader can refer to figure 1 on p.10 of chapter 1 for a visual representation of the theoretical pathways leading to the development of self-efficacy.

other three sources of information is as follows: *physiological states and reactions*, *social persuasion*, and *vicarious learning*.

Person Input and Background Contextual Affordances

Age. The *person input* concept suggested in SCCT is generally operationalized with gender and ethnicity variables. Since the *Financial Situation of Inmates Prior to their Current Incarceration* study focused solely on male offenders, the gender indicator of person input could not be evaluated in the present thesis. Extremely limited variability in ethnicity within the study sample[9] also prevented the inclusion of this variable in the analysis model. The *person input* concept was operationalized with age of respondent at time of interview. As seen in table 1, respondents were, on average, 34 years old at the time of interview.

The *background contextual affordances* concept proposed by SCCT has received very little empirical attention, owing in part to the inexistence of theory-driven measures (Lent, Brown, and Hackett, 2000). Research on career barriers, a concept closely linked to contextual opportunities, has been conducted with greater vigor, but measures have been mostly idiosyncratic to each study's particular interests (Swanson, Daniels, and Tokar, 1996). Operationalization of *background contextual affordances* in the present thesis thus rests purely on theoretical grounds, and comprises three distinct indicators: education, noncriminal earnings, and hard drug use.

Education. For education, participants were asked to report the age at which they had quit school and the education level attained at that time. They were then asked whether they later had an opportunity to pursue their studies, and if so, whether they had successfully

[9] Almost 89 percent of the sample were Canadian; 3 percent Italian; 1 percent Latin-American; 1 percent Haitian; 1 percent native-American; 1 percent of Scottish. The remaining 4 percent comprised respondents from various ethnic origins.

completed a higher-level diploma. The highest level of education attained at the time of interview was dichotomized, yielding a variable that distinguishes individuals who had completed high school from those who had not. Approximately 37 percent of the study sample had completed high school at the time of interview.

Noncriminal earnings. Two different measures of noncriminal earnings were included in the study questionnaire, both of which were recorded on the monthly calendar pertaining to the three-year window period. Respondents were first asked to divulge their hourly rate for each month worked in the last three occupations held during the window period, along with the corresponding average number of hours worked per week. In addition to this measure of noncriminal earnings, participants were asked to estimate their monthly salaries for each of these occupations. In order to remain consistent with the criminal earnings variables, the latter measure of noncriminal earnings was used as the second indicator of *background contextual affordances*. Because information was precisely gathered on a monthly basis, it was possible to compute total legitimate revenues by adding all monthly earnings reported. The decision to rely on total legal revenues was warranted by the specificity level of our dependent variable, criminal self-efficacy, which pertains to the entire three-year window period.

The median noncriminal earnings in the study sample over the three-year window period were $7,997.16.[10] Because the variable distribution is highly skewed (mean = $30,449.62; S.D. = $55,739.76) this indicator was logged.[11] This procedure has been successfully used in past research on both licit and illicit earnings (Chambaz, Maurin, and

[10] A total of 79 study participants reported no legally earned revenues during the window period. When these 79 individuals are removed from measures of central tendency calculation, the median noncriminal earnings for the window period is $26,400 (mean = $47,972.90, SD = $64,264.11).
[11] A logarithmic transformation, base 10 was performed.

Torelli, 1998; Matsueda et al., 1992; McCarthy and Hagan, 2001; Tremblay and Morselli, 2000). The decision to apply a logarithmic transformation to non-normally distributed earning variables is supported by the law of decreasing marginal utility: modest differences in income may be highly significant at the lower end of the distribution, but much less so at the higher end. The importance of $100.00 decreases in a logarithmic fashion as the base rate increases (Charest, 2007). Logarithmic transformations keep the proportional scale in place by disproportionately compressing higher values while not completely discarding them (Morselli and Tremblay, 2004). Moreover, the decision of logging the earnings distribution is preferable to other methods such as truncation or deletion of extreme values (Tabachnick and Fidell, 2007).[12]

Hard drug use. The third indicator of *background contextual affordances* was hard drug use during the window period. Participants were asked to report the extent to which they used each of these seven types of drugs: cocaine, crack/freebase, heroin/methadone, barbiturates/depressants, hallucinogenic, amphetamines, and valium/tranquilizers. Responses were given on a 1 to 5 Likert scale (1 = never; 2 = a few times per month; 3 = a few times per week; 4 = daily; 5 = more than once a day). Hard drug use was considered present when any of these drugs had been consumed a few times per month or more (response values 2 and over). The dichotomized hard drug use variable was included in the analysis model. Approximately 55 percent of the study sample reported using hard drugs at least a few times per month over the window period.

[12] The same argument has been made concerning rates of offending, and researchers have successfully used logarithmic transformation of such variables in the past (Longshore, Turner, and Stein, 1996; Morselli and Tremblay, 2004).

Informational Sources of Self-Efficacy

The four sources on which self-efficacy is thought to be based have been measured in markedly different ways in the self-efficacy literature. What is common among researchers, however, is that most use scales comprising several self-report items intended to assess individuals' appraisal of their experience with efficacy information (Anderson and Betz, 2001; Britner and Pajares, 2006; Lent, Lopez, and Bieschke, 1991; Matsui, Matsui, and Ohnishi, 1990). The self-reported nature of the items found in these scales is crucial in the measurement of informational sources as "information becomes instructive only through cognitive processing of efficacy information and through reflective thought. Therefore, a distinction must be drawn between information conveyed by experienced events and information as selected, weighted, and integrated into self-efficacy judgments" (Bandura, 1997, p.79). Although the data used in this thesis was not intended to measure the concepts presented, the self-report nature of the questionnaire taps directly into the cognitive construction notion that is central in the development of self-efficacy beliefs. Even the "objective" measures[13] that will be presented as indicators of informational sources in the following subsections are "subjective" in the sense that they were re-constructed by respondents. Moreover, self-efficacy research suggests that correlations exist not only between efficacy beliefs and sources of information, but also between the different indicators of informational sources. In order to lend further support to the validity of the indicators predictive of our outcome variables, a correlation matrix can be found in appendix A.[14]

[13] Examples of "objective" measures include number of contacts, relative criminal earnings, rates of offending, number of arrests, authority, and criminal earnings.

[14] Stata 12's multiple imputation estimation commands cannot validly estimate correlation coefficients. As suggested by Truxillo (2005), the correlation matrix was derived using maximum likelihood with

Physiological States and Reactions

Low self-control. Scores on the twenty-four-item Grasmick, Tittle, Bursik, and Arneklev's (1993) low self-control scale were used in order to evaluate the impact of *physiological states and reactions* on self-efficacy beliefs. This scale contains six subscales, intended to measure low self-control as defined by Gottfredson and Hirschi (1990). Two slight modifications had to be made to the original instrument during the survey. First, in order to remain consistent with the scaling of most other scales presented in the interview questionnaire, the original four-point Likert scale was modified to a six-point Likert scale (1 = strongly agree; 2 = agree; 3 = agree somewhat; 4 = disagree somewhat; 5 = disagree; and 6 = strongly disagree). As with the scaling of origin, higher scores represent higher self-control propensities. In order to ease interpretation of results, these scores were reverse coded so that high scores represent low self-control tendencies. Following Grasmick et al. (1993), the total score for low self-control was computed as the linear composite of z-scores transformation of the 24 items. This mathematical procedure ensures equal weights to every item's variance in the variance of the total composite score. The second modification that had to be imposed on the original scale concerns language. In order to ensure good comprehension of the items, the low self-control scale had to be translated in French for a majority of survey respondents. Nonetheless, reliability between all 24-four items remained acceptable (alpha = 0.80).[15] This alpha level is consistent with the respectable reliability that has been associated with this scale

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the expectation-maximization (EM) algorithm. Comparison of results obtained between this procedure and the use of single imputations following the MICE procedure revealed highly similar correlation coefficients.

[15] Stata 12's multiple imputations estimation commands do not validly support combination of imputations to derive Cronbach's alpha. Unsupported estimation commands can be forced, but this procedure is not recommended, as validity of results cannot be ensured (StataCorp, 2011a). The alpha level presented is thus based on a single imputation of the data.

in past research (Delisi, Hochstetler, and Murphy, 2003; Grasmick et al., 1993; Longshore, Turner, and Stein, 1996; Morselli and Tremblay, 2004; Nagin and Paternoster, 1993; Piquero and Tibbetts, 1996). The average z-score on the Grasmick et al. scale (1993) for study respondents was 0.01. Scores ranged from approximately -23 to 25.

Social Persuasion

Criminal contacts. In order to evaluate the impact of *social persuasion* informational source on the development of criminal self-efficacy, a computation of the total number of contacts with whom the respondents committed criminal activities during the window period was performed. Based on a modified version of Burt's social capital questionnaire (Burt, 1992), participants were asked to divulge their main crime-oriented contacts during the three-year window period. These contacts were generated through a series of questions concerning regular partners, suppliers, clients, mentors and other useful individuals in criminal endeavors. The maximum number of contacts per respondent was limited to fifteen per respondent, thereby defining their *core* criminal network. Study participants reported committing crimes with an average of 5 contacts.

Vicarious Learning

Mentorship. The *vicarious learning* theoretical source of information for self-efficacy beliefs was operationalized with two distinct indicators: mentorship and relative criminal earnings. Mentorship was assessed by asking the following question: "Amongst the people that influenced you throughout your life, was there one person that introduced you to a criminal milieu and that you consider to be your mentor?" A dichotomous indicator was constructed based on participants' responses indicator whether someone had effectively introduced them in the realm of illegal activities or not. Approximately 37 percent of the study

sample admitted having been introduced in the criminal milieu by someone they considered to be their mentor.

Relative criminal earnings. The relative criminal earnings indicator of *vicarious learning* was evaluated within the social capital questionnaire. A series of specific questions was asked to respondents concerning every criminal contact divulged. Participants were asked to assess whether these contacts' criminal earnings were superior, inferior, or equal to their own criminal earnings. The proportion of contacts reaping higher criminal earnings than the participants (which was termed relative earnings) was computed by dividing the total number of contacts making higher criminal revenues by the total number of contacts. The relative earnings scores range from 0 to 1, the former indicating that no criminal contacts in the respondent's core network made more criminally earned money, and the latter indicating that all contacts reaped higher criminal monetary benefits. On average, respondents reported that nearly 32 percent of their contacts reaped higher criminal benefits than themselves.

Personal Performance Accomplishments

Rates of offending. Having repeatedly been found to be the most influential predictor of self-efficacy beliefs, the *personal performance accomplishments* informational source encompasses several indicators. Individual rates of offending (lambda) during the three-year window period were firstly computed. Participants were asked to enumerate all money-oriented crimes in which they had been implicated during the window period. For each of the offenses mentioned, they were requested to report their average rate of offending. Crime specific lambdas could thus be computed from participants' responses. Whereas the precision contained in these crime-specific measures is informative, more comprehensive rates of offending had to be computed. The criminal self-efficacy variable used in the present thesis

pertains to crime in general, not to specific illegal activities such as theft or drug distribution. Since: "the sources of self-efficacy […] function best at appropriate levels of specificity, and when they correspond with the self-efficacy outcome they are designed to predict" (Usher and Pajares, 2008: 763), it was decided to compute global lambda indicators.

Following previous research on criminal involvement, rather than relying on an all-inclusive lambda, rates of offending were divided in two categories, distinguishing between predatory and market offenses (Morselli and Tremblay, 2004). Offending rates have been shown to not only vary between individuals, but also between types of offenses. The nature of market crimes generally leads to markedly higher rates of offending than most predatory crimes (Chaiken and Chaiken, 1982; Morselli and Tremblay, 2004; Peterson and Braiker, 1981; Tremblay and Morselli, 2000). Predatory offenses are appropriative in nature and include armed robbery, burglary, theft, vehicle theft, and fraud. Market offenses are typically victimless and imply consensual exchange between customers or between sellers and buyers (Morselli and Tremblay, 2004). This offense category consists of drug selling, drug distribution, fencing, smuggling, loansharking, procuring, illegal gambling operating, and other supply-related offenses. In order to respect the specificity level of the outcome variable, which pertains to the entire window period, crime specific lambdas pertaining to these two categories over the three years preceding current incarceration were summed to produce a total predatory lambda and a total market lambda. Because of high variations in levels of commitment for both predatory and market offenses, the overall distribution of the two variables is highly skewed (predatory lambda: mean = 164.20, S.D. = 494.44; market lambda: mean = 5,569.58, S.D. = 27,510.92). High skewness was adjusted for by applying the

logarithmic transformation, base 10 (Longshore, Turner, and Stein, 1996; Morselli and Tremblay, 2004).

Number of arrests. Number of arrests during the window period serves as the second indicator of *personal performance accomplishments*. For each month of the window period, respondents were asked to report those in which they had been arrested and the corresponding number of arrests. To respect the specificity level of the criminal self-efficacy variable, reported responses were summed to generate the total number of arrests for the entire window period. Initial data screening procedures suggested that some values were atypically high compared to the rest of the distribution. Following Tabachnick and Fidell's (2007) suggested method for detecting potential outliers, these cases proved to have extremely high z scores on the number of arrests variable (z scores were highly superior to 3.29, $p < .001$, two-tailed test). In order not to lose cases, it was decided to change the raw scores of these two outlying cases from their original value to one unit larger than the next most extreme score in the distribution (value = 45). On average, study participants reported having been arrested nearly 3 times during the three-year window period.

Qualifications. The third indicator of personal mastery experiences in the present thesis was perceived level of qualifications required to successfully perform committed crimes. For all offenses in which they had been involved during the three-year window period, respondents were asked the following question: "To what extent does one need to be qualified to perform this activity successfully?" Responses were given on a 1 to 7 Likert scale, ratings of 1 indicating that no qualifications were required at all, while ratings of 7 indicated that a high level of qualification was required. This variable is not intended to measure offenders'

view of their personal qualification levels for specific criminal activities. Rather, it assesses qualification at the crime level. Although this is not a self-referent evaluation, varying levels of perceived crime-related qualifications are nonetheless hypothesized to influence offenders' subjective perceptions of success. For instance, being involved in a crime he believes to require high qualifications, an offender might feel successful when completing it, even if he doesn't necessarily perceive himself as generally possessing that qualification level. In order to ensure concurrence with the criminal self-efficacy specificity level, perceptions of required qualifications were averaged over all types of crimes committed during the window period. On average, respondents believed the crimes in which they were involved to necessitate a qualification level of nearly four out of seven.

Authority. Authority was assessed from respondents' questionnaires and constitutes the fourth indicator of *personal performance accomplishments*. For all criminal activities in which participants were involved during the window period, they were asked the following question: "In this activity, were there people to whom you gave orders?" As previously stated, the dependent variable's specificity level was respected by creating a dichotomous variable of authority in crime commission, indicating whether the respondent gave orders to others in his criminal practice or not. Nearly 45 percent of the study sample reported giving orders to others during crime commission over the three-year window period.

Criminal earnings. Criminal earnings constitute the final indicator of *personal performance accomplishment* included in the analysis model. Akin to noncriminal earnings, two distinct measures of criminal revenues were included in the survey questionnaire. First, for each type of crime they had committed during the three-year window period, participants

were asked to estimate their average unitary earnings. Multiplying crime specific lambdas by unitary earnings allows for an estimation of criminal revenues over the window period. The second measure of illegal earnings was gathered with the use of the three-year monthly calendar. Respondents were asked to divulge monthly earnings for all reported types of criminal activity. Adding all reported monthly revenues also yields a total criminal earnings estimate. Previous research suggests that both measures lead to slightly different evaluations, and that the correlation between the two measures is imperfect (Charest, 2007). One hypothesis that has been formulated to explain this discrepancy is that different cognitive capacities may be required from respondents in computation, the first measure requiring analytical abilities and the second requiring synthesis abilities. Charest (2004) notes that the criminal earnings measure based on monthly revenues is more conservative and argues that it is therefore more likely to closely approximate real criminal earnings. Based on these findings, the second measure of criminal earnings – computed from self-reported monthly earnings – was used in the analysis model. Whereas criminal achievement researchers have been concerned about offenders' self-reported criminal revenues (Charest, 2004; Morselli and Tremblay, 2004; Tremblay and Morselli, 2000; Wilson and Abrahamse, 1992), we are less concerned with accuracy of their self-reports because our main interest is on offenders' cognitive constructions of their own performance. Even if their self-reported illegal earnings depart from what they actually reaped from their criminal involvement during the window period, this measure still taps into their individual self-appraisal.

Because the variable distribution is highly skewed (mean = $823,283.40, S.D. = $2,164,379.00) we proceeded to the same logarithmic transformation (base 10) as for

legitimate earnings (Charest, 2004; Matsueda et al., 1992; McCarthy and Hagan, 2001; Tremblay and Morselli, 2000).

Criminal Self-Efficacy

The criminal self-efficacy variable included in the present thesis' analysis model was assessed with the following question: "During the three-year period, how successful do you think you were in doing crime?" Responses were recorded on a 1 to 4 Likert scale with the following scaling: 1 = very successful, 2 = somewhat successful, 3 = somewhat unsuccessful, 4 = very unsuccessful. In order to ease interpretation of results, this scaling was reverse coded so that low scores represent low self-efficacy beliefs and high scores represent high self-efficacy beliefs. Preliminary data screening revealed that categories 1 and 2 of the dependent variable contained the fewest respondents (17.70 percent and 16.35 percent, respectively). This result, along with specific indicators from the ordered logistic regression that was performed[16], suggested that categories 1 and 2 needed to be merged in order for coefficient estimates to be valid. This transformation yielded a trichotomous dependent variable, ranging from low to high criminal self-efficacy. The distribution of responses across the various levels of the dependent variable was fairly equal: 34 percent of respondent perceived themselves as having low criminal self-efficacy, 28 percent moderate criminal self-efficacy, and nearly 38 percent high criminal self-efficacy.

The issue of proper measurement is central in the self-efficacy literature, and researchers have dedicated considerable efforts in the construction of valid scales tapping into

[16] The non-significance of the second category's cutpoint coefficient estimate in the main regression analysis suggested that that category and the one above (category 1) have the exact same cutpoint. Because of the proportional odds assumption, this result indicates that both levels have the exact same equation. In such cases, it is suggested to combine categories of the dependent variable (Garson, 2012).

this central concept. Although the measure of criminal self-efficacy investigated in the present thesis has been successfully used in previous research (Brezina and Topalli, 2012; Tremblay and Morselli, 2000), it bares certain limitations that need to be acknowledged. Some studies on legitimate self-efficacy have successfully resorted to single-item measures (Raudenbush, Rowan, and Cheong, 1992; Ross, Cousins, and Gadalla, 1996), but multiple items scales are more frequently used as they are thought to more precisely assess all aspects of domain-specific efficacy beliefs (Betz and Hackett, 1983; Enochs and Riggs, 1990; Lent, Brown, and Larkin, 1984; Pearlin et al., 1981). Moreover, as recognized by Brezina and Topalli (2012), this criminal self-efficacy measure assesses participants' efficacy pertaining to crime at large, thereby disregarding crime specific efficacy beliefs. Self-efficacy theorists have pointed out that the predictive utility of self-efficacy is diminished when these self-beliefs are assessed at broad levels of specificity (Bandura, 1997; Bandura, 2006; Betz and Hackett, 2006; Pajares, 1997; Usher and Pajares, 2008). This does not imply, however, that largely specified self-efficacy are of no theoretical and empirical interest (Bandura, 1997). Being one of the first studies to focus on the notion of criminal self-efficacy, we believe this broadly defined measure contains crucial information of offenders' self-perceptions.

Our confidence in the validity of this measure of criminal self-efficacy is also increased by the fact that is has been shown to have an impact on behavioral intentions (Brezina and Topalli, 2012). Moreover, our self-efficacy variable was related in the expected direction to other self-perception items. Specifically, it was negatively correlated with the "I want a stable legal occupation" ($r = -.20$, $p < .01$), and the "I want work security for the rest of my life" items ($r = -.16$, $p < .05$) and positively correlated with the "I want to make a lot of

money" item ($r = .18$, $p < .05$). Correlations between the criminal self-efficacy item and the various predictor variables can be found in appendix A.

Missing Data

The vast majority of researchers conducting quantitative analyses are confronted with missing data frequently throughout their career. The main issue concerning this state of affairs is that the most widely used statistical procedures were conceived to be conducted with complete data (Graham, 2009). Whereas several approaches to handling missing data, such as listwise deletion and mean substitution have long been used, tremendous progress have been made in the realm of missing data handling and theory following the publication of Little and Rubin's (1987) book called Statistical Analysis with Missing Data. Sophisticated methods for dealing with missing data have since been developed and the great accessibility of powerful statistical software has facilitated access to such procedures. The following section presents in detail how missing data were handled in the current study.

Evaluating Missing Data

Although a total of 212 participants were eligible for inclusion in the present study's multivariate analyses, missing values on several variables of interest led to a non-negligible reduction in sample size. Whereas age, hard drug use and number of contacts did not have any missing values, 1 (0.5%) case had missing data on education, 5 (2.4%) on legitimate earnings, 15 (7.1%) on the low self-control Grasmick scale, 9 (4.2%) on mentorship, 12 (5.7%) on relative earnings, 11 (5.2%) on predatory lambda, 21 (9.9%) on market lambda, 26 (12.3%) on number of arrests, 2 (0.9%) on qualifications, 6 (2.8%) on authority in crime commission, 19 (9.0%) on criminal earnings, and 3 (1.4%) on criminal self-efficacy. The reasons for the

failure to obtain complete data for all participants are varied, and include lack of time to adequately complete questionnaires, refusal of participants to respond to specific questions for personal or distrust reasons, memory problems, and trouble with situating time constrained information. At first glance, missingness on individual variables doesn't seem particularly problematic, the highest level of missingness being 12 percent of cases. However, several types of analyses, such as regressions, can only be conducted on complete data, eliminating cases with missing values on any variable of interest. Listwise deletion of nonoverlapping incomplete cases in the present study led to a restricted sample size of 134 participants, discarding nearly 37 percent of the original sample. Whereas complete case analysis is the most easily and commonly applied methodological procedure to handle missing data, it is known to lead to significant reduction in statistical power in hypothesis testing, and to serious bias in parameter estimates (Azur et al., 2011; Graham, 2012a). Results provided in table 2 suggest that no major differences existed between participants included and excluded from complete case analysis on any of the variables of interest.[17]

[17] One set of imputed data was used to replace missing values for excluded participants.

Table 2. Comparison of Variables in Criminal Self-Efficacy Development Analysis Model by Completeness of Data

Independent variables	Respondents included in complete case analysis (n=134)	Respondents excluded from complete case analysis (n=78)	*p* value
Age in years (SD)	34.16 (9.36)	32.60 (9.16)	.239
High school completed (%)	38.06	35.90	.754
Noncriminal earnings (SD)	31,811.53 (63,683.38)	27,150.37 (38,662.37)	.887*
Hard drug use (%)	56.72	52.56	.558
Low self-control (SD)	-0.55 (10.03)	1.13 (10.66)	.253
Number of contacts (SD)	5.34 (4.37)	4.95 (4.00)	.747
Presence of mentor (%)	39.55	34.62	.475
Relative criminal earnings (%)	29.57	34.89	.322
Predatory lambda (SD)	128.58 (417.83)	199.99 (604.24)	.472*
Market lambda (SD)	6,011.97 (25,202.82)	7,030.72 (31,243.73)	.817*
Number of arrests (SD)	2.28 (5.33)	3.13 (8.55)	.372
Qualifications (SD)	3.90 (2.05)	4.04 (2.11)	.599
Authority (%)	42.54	48.72	.385
Criminal earnings (SD)	621,224.40 (1,449,008.00)	1,059,002.00 (3,014,550.00)	.669*
Dependent variable			
Criminal self-efficacy (%)			.909
Low	34.33	33.33	
Moderate	27.61	28.21	
High	38.06	38.46	

ABBREVIATION: SD = standard deviation
*Wilcoxon-Mann-Whitney test

Handling Missing Data

Whereas complete case analysis is admittedly the most easily and commonly applied methodological procedure to handle missing data, it is known to lead to significant reduction in statistical power in hypothesis testing (Azur et al., 2011). More importantly complete case analysis can lead to serious bias in parameter estimates (Graham, 2012a). Parameter estimate bias is thought to be tolerable when observed data form an entirely random subsample of the sample as a whole, a missingness mechanism also referred to as data missing completely at random (MCAR: Graham, 2012b). However, social science data seldom fulfill the MCAR

assumption – data in these domains being more frequently described as missing at random (MAR). The MAR mechanism refers to datasets in which: "any systematic difference between the missing values can be explained by differences in observed data" (Sterne et al., 2009: p. 1). In other words, the missing data mechanism can be resolved with measured variables. Several ad hoc methods have been developed to deal with problems engendered by missing data, including complete case analysis, mean substitution, and averaging available variables. All of these approaches have been shown to induce bias in parameter estimates and none of them are statistically valid (Graham, 2012a; Sterne et al., 2009; Azur et al., 2011). Regression-based single imputation is a conceptually more valid method to deal with missing values, as it takes into account available information from cases to predict missing data. However, single imputation treats values as true rather than imputed, and as such fails to consider uncertainty in imputations and leads to inappropriately small standard errors, inducing bias in parameter estimates (Azur et al., 2011; Sterne, 2009). The small standard errors produced by single imputation leads to overly liberal hypothesis testing.

The preferred and most sophisticated approach to handling missing data is multiple imputations (Azur et al., 2011). This three-step procedure considers uncertainty of imputed values by generating several plausible datasets. In the first step, *m* copies of the filled-in dataset are generated. Missing values are replaced with imputed values using regression models specified by the user. Uncertainty is accounted for since variability is appropriately injected in the varying datasets. The second step involves fitting the analysis model of central interest by analyzing each dataset separately, thereby generating desired parameter estimates and standard errors. In the final stage, results of the *m* analyses are combined using Rubin's

rules (Rubin, 1987), which takes both within- and between-imputation variability into consideration.

Missing data in the present study were handled using multiple imputation chained equations (MICE), one of the various available forms of multiple imputation. This procedure has advantages over several multiple imputation techniques. First, it uses a sequential approach for imputation, and as such does not assume a joint normal distribution (Azur et al., 2011). MICE is also highly flexible, allowing for custom built regression models for each variable to be imputed conditional upon other variables in the data. Moreover, imputed variables can be modeled according to their own distribution (linear, logistic, multinomial, ordinal). To be correctly specified, all variables of the analysis model must be incorporated in the imputation model, including the dependent variable. Failure to do so could lead to biased estimates in subsequent analyses (Schafer, 1997). In addition to central variables, additional variables – called auxiliary variables – can be added to the imputation model. These include all variables that are thought to be predictive of missingness or that are highly or moderately correlated with central variables. Their inclusion can significantly improve imputation quality. The MICE procedure is based on the assumption that missing data are MAR. Whereas no formal test determines whether the MAR assumption holds true, finding correlations between variables' missingness and other variables in the dataset is consistent with the assumption. Including these variables most highly correlated with missingness in the ensuing imputation models makes the assumption more likely (Potthoff et al., 2006; UCLA, 2013a). Correlations between missingness and other variables in the dataset were of modest magnitude, ranging from .01 to .21 for education; .01 to .20 for legitimate earnings; .01 to 0.16 for low self-control; .01 to .33 for mentorship; .01 to .23 for relative earnings; .01 to .23 for predatory

lambda; .01 to .17 for market lambda; .01 to .27 for number of arrests; .01 to .18 for qualifications; .01 to .20 for authority; .01 to .33 for criminal earnings; and 0.01 to 0.20 for criminal self-efficacy. Since reasons to suspect that data are not missing at random were not detected, the MAR assumption was posited. In other words, it was assumed that cases with missing data are a random subsample of the target population.

Multiple Imputation by Chained Equation

Multiple imputations were performed with the use of the Stata/SE for Mac, version 12 software (StataCorp., 2011b). To avoid bias in the analysis model, all variables included in the analysis model were incorporated in the 12 imputation models that were built: age, education, legal earnings, hard drug use, low self-control, number of contacts, mentorship, relative earnings; predatory lambda, market lambda, number of arrests; qualifications; authority; criminal earnings; and criminal self-efficacy. In order to make the MAR assumption more plausible, the variables most highly related to imputed variables were also included after examination of bivariate and partial correlations. Additional auxiliary variables were: types of money-oriented crimes committed during the three-year window period (armed robbery, burglary, theft, vehicle theft., drug sale, drug distribution, fencing, smuggling, procuring, fraud, loansharking, illegal gambling operating, and other supply related offenses); total length of current incarceration (in months); number of sentences other than incarceration during window period (alternative sentences); alcohol use during window period; marijuana use during window period; average perceived prestige of criminal activities committed during the window period; number of months criminally active during the window period; number of months free of any criminal justice supervision (including incarceration, probation and parole); age at first crime; age at first arrest; age at first conviction; number of legal

occupations held during window period; number of months worked legally during window period; average perceived prestige of legal occupations held during window period; average perceived required qualifications for legal occupations held during window period; legitimate self-efficacy; and number of legal occupations in which participants were in an authority position during window period. The auxiliary variables included in each imputation model can be found in appendix B. Justifications concerning the specific imputation methods used are presented in the following section.

Imputation Model

The three imputed dichotomous variables included in the analysis model (education, mentorship, and authority) were imputed using logistic regression. The ordinal nature of the dependent variable warranted the use of ordinal regression for imputation. The low self-control variable was imputed using linear regression. Being non-normally distributed, noncriminal and criminal earnings, as well as predatory and market lambdas could not simply be imputed with the use of linear regression, as this method assumes a normal distribution of the dependent (imputed) variable. One alternative is to transform non-normally distributed variables and impute these transformed variables under a normal model. However, such a method has been shown to lead to bias and is not recommended (von Hippel, 2013). The MICE procedure implemented in Stata12 offers an alternative method to impute non-normally distributed variables: predictive mean matching (PMM). PMM imputes continuous variables' missing values in such a way that imputed values are sampled only from observed values (Royston and White, 2011). When the observed values are not normally distributed, PMM has the advantage over linear regression of producing a distribution of imputed values that closely matches observed data. This procedure has been shown to be a better method of handling non-

normal distributions than imputation of transformed variables (White, Royston, and Wood, 2010). The four non-normally distributed variables were therefore imputed using PMM. Since it predicts missing values using only observed values, PMM also has the advantage of naturally honoring the upper and lower bounds of variables. The analysis model presented in this paper includes three bounded variables: relative earnings (ranging from 0 to 1), number of arrests (lower limit of 0), and qualifications (ranging from 0 to 7). In order to ensure that imputed values would remain within the natural limits of these variables, PMM was used to impute missing data on these variables.

Original missing data theorists have posited that the appropriate number of imputations needed to obtain valid coefficient estimates, was fairly small, ranging from 3 to 5 (Rubin, 1987; Schafer, 1997). However, recent research suggests that higher numbers of imputations are actually needed, especially if statistical power is the main consideration surrounding the imputation process (Graham, Olchowski, and Gilreath, 2007). With the advent of new and more powerful statistical software, increasing the number of imputations requires little extra work. Theorists now recommend performing as much as 20-40 imputations (StataCorp, 2011a). Based on these recommendations, a total of 30 copies of the baseline dataset were created.

Imputation Results

Table 3 compares means of variables included in the analysis model between participants that would be included in complete case analysis (n=134) and complete data after multiple imputations (n=212). Averages are highly similar between the two groups, suggesting the imputation model was correctly specified. In order to further assess whether the imputation model was properly specified, sensitivity of the results to both the number of imputations and

the specific imputation used was tested. Such an evaluation assesses whether results change depending on the number of imputations or on the subset of imputations used (UCLA, 2013b). The analysis model was tested using the first 3, 10, and 20 imputations. The coefficient estimates were very similar between different numbers of imputations used (which is to be expected), and the same variables remained significantly predictive of the dependent variable, suggesting that the analysis model is not too sensitive to the number of imputations. Similarly, the model was tested with a random subset of imputations (imputations 1, 5, 9, 14, 17, 22, and 29). Results remained highly similar to those obtained with the complete set of imputations, further suggesting the adequacy of the imputation model.

Table 3. Comparison of Variables in Criminal Self-Efficacy Development Analysis Model Between Complete Cases and Multiply Imputed Data

Independent variables	Respondents included in complete case analysis (n=134)	Multiply imputed data (n=212)
Age	34.16	33.59
High school completed (%)	38.06	37.28
Noncriminal earnings	31,811.53	30,449.62
Logged noncriminal earnings	2.78	2.80
(Geometric mean)	(595.91)	(626.75)
Hard drug use (%)	56.72	55.19
Low self-control	-0.55	0.01
Number of contacts	5.34	5.19
Presence of mentor (%)	39.55	37.44
Relative criminal earnings (%)	29.57	31.92
Predatory lambda	128.58	164.20
Logged predatory lambda	0.80	0.90
(Geometric mean)	(6.36)	(7.93)
Market lambda	6,011.97	5569.58
Logged market lambda	1.66	1.66
(Geometric mean)	(45.39)	(45.87)
Number of arrests	2.28	2.51
Qualifications	3.89	3.97
Authority position (%)	42.54	44.92
Criminal earnings	621,224.40	823,283.40
Logged criminal earnings	4.41	4.43
(Geometric mean)	(25,969.58)	(27,003.99)
Dependent variable		
Criminal self-efficacy (%)		
Low	34.33	34.06
Moderate	27.61	28.26
High	38.06	37.69

When multiple imputations are performed repeatedly, different sets of imputations are obtained with each imputation due to the randomness of the imputation step. A good model should therefore aim to keep simulation error as minimal as possible in order to ensure statistical reproducibility of results (StataCorp, 2011a). According to White, Royston, and Wood (2010), the level of simulation error can be evaluated by assessing Monte Carlo error estimates of the multiple imputation results, including parameter estimates, *p*-values, variance,

and odds ratios. Monte Carlo error estimates were computed to assess statistical reproducibility of results. Consistent with recommended guidelines, Monte Carlo error estimates of coefficients were equal to or less than 10 percent of their associated standard error. Monte Carlo error estimates of *t* statistics were all close to or below 0.1, and approximated 0.01 when the true *p*-value was 0.05 and 0.02 when the true *p*-value was 0.1. These results suggest that imputation model was correctly specified. The impact of multiple imputations on the analysis model will be discussed in the results section.

Data Analysis

In addition to the various means tests that were performed to compare respondents included and excluded from complete case analysis and to the multiple imputation model that was built for conducting the final analysis model, ordered logistic regression models will be presented to test the main hypothesis of the present thesis. The following section presents the major characteristics of ordered logistic regression, along with the major assumption to be respected and the correct interpretation of coefficients and proportional odds ratios.

Ordered Logistic Regression

Because the aim of the present paper is to uncover on what factors rests the development of criminal self-efficacy, and because this variable is ordinal in nature, ordered logistic regression was favored. As opposed to multinomial logistic regression, ordinal regression keeps the information contained in the ordering of the variable, yielding greater statistical power (Garson, 2012). Whereas some authors perform OLS regression with ordinal dependent variables, this procedure is not recommended as it can easily lead to major

assumption violations, particularly when the dependent variable has fewer than 5 categories (Garson, 2012).

Proportional odds assumption. Ordered logistic regression is a multi-equation model, in which k-1 equations are derived. Each of these equations is assumed to have the same coefficients, but different cutpoints (ancillary parameters)[18] separate the adjacent levels (categories) of the dependent variable (UCLA, 2013c). The key assumption in the ordered logit model, called the proportional odds assumption[19], is that the effects of all independent variables are proportional across the thresholds of the outcome variable. Resorting to a less restrictive model is warranted if this assumption cannot be considered tenable according to appropriate statistical tests. The Brant test, which is included in the Stata spost add-on, verifies whether this assumption holds true for each ordered logistic analysis model. A non-significant test statistic provides evidence that the assumption has not been violated, and that the regression results can be confidently interpreted. Tests of proportional odds revealed that this assumption was respected in all multivariate models that will be presented in the results chapter ($p > .05$).[20]

Coefficients and proportional odds ratios. In ordered logistic regression, a logit transformation of the dependent variable is carried out. This specific type of link function is recommended when the ordinal dependent variable has relatively equal categories, as is the case with the criminal self-efficacy variable (low = 34.06 percent; moderate = 28.26 percent;

[18] Cutpoints are also called thresholds in other statistical softwares.
[19] The proportional odds assumption is sometimes referred to as the parallel regression/lines assumption.
[20] The Brant test, also known as the proportional odds test, is not validly supported with multiply imputed data in Stata/SE 12. Results of the test of proportional odds are thus based on complete case analysis (n=148).

high = 37.69 percent). Moreover, it has the advantage of offering more easily interpretable regression coefficients than other link functions (O'Connell, 2006; Yay, and Akinci, 2009; Garson, 2012). Coefficients estimated for each independent variable in ordinal logistic regression are ordered log odds regression coefficients. Whereas these coefficients are informative in terms of the direction of the relationship between predictor variables and the outcome variables, their precise interpretation can be quite complex. Their correct interpretation should be as follows: for a one unit increase in the predictor variable, the dependent variable level changes by its respective coefficient in the ordered log odds scale, while other predictors are held constant.

Another advantage of ordered logistic regression is that ordered logistic regression coefficients can be converted to proportional odds ratios[21], which can be interpreted to evaluate individual predictor variables' effect size (O'Connell, 2006). They are calculated by exponentiating ordered logistic coefficients (e^b). Their interpretation is slightly more intuitive than the interpretation of regression coefficients: for a one-unit change in the predictor variable, the odds of being in the highest level of the dependent variable (high self-efficacy), compared to being in all lower categories (moderate and low self-efficacy) are larger by the proportional odds. Since the regression equation is the same for all levels of the outcome variable, being differentiated only by their specific cutpoints, the interpretation of proportional odds ratios also applies to the other levels of the dependent variable: the odds of being in the high and moderate level of the dependent variable, compared to being in the low level are larger by the proportional odds.

[21] Other statistical software compute cumulative odds ratios. Their interpretation is slightly different.

Predicting Criminal Self-Efficacy with Ordered Logistic Regression

Nested ordered logistic regression models were constructed to predict criminal self-efficacy beliefs from person input and background contextual affordances, as well as from the four major sources of information predictive of self-efficacy in legitimate careers: physiological states and reactions, social persuasion, vicarious learning and past personal accomplishments. In order to evaluate the individual impact of each of these theoretical concepts, and their potential mediation role, they were entered in distinct steps, yielding six distinct models. The order of entry of the different factors was motivated by their theoretical importance on the development self-efficacy belief. Since person input and background contextual affordances theoretically have an indirect impact on self-efficacy through their influence on the four sources of information, they were entered first in the ordinal regression model. No order of importance of impact on the development of self-efficacy is given to the physiological states and reactions, social persuasion, and vicarious learning concepts, so they were hierarchically entered in the second, third, and fourth models respectively. Since the personal performance accomplishment source of information theoretically accounts for the highest levels of variance in self-efficacy beliefs, indicators of this concept were entered in the fifth ordinal regression model. Finally, because of the central role criminal earnings are thought to play in criminal success, and in order to test its specific impact on the development of criminal self-efficacy, this indicator was entered in the final sixth model. All analyses were performed using Stata/SE for Mac, version 12 software (StataCorp., 2011b).

Chapter 3

Criminal achievement and offender self-efficacy

An article by
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Student's Contribution to the Article

As first author of the following article, I conducted all of the statistical analyses and performed the multiple imputations to handle missing data. I also wrote the entire manuscript.

Evidently, I did not develop this entire project on my own. My research director, Carlo Morselli, first presented me with the central variable of this thesis' theoretical framework: criminal self-efficacy. Pierre Tremblay and Mathieu Charest, along with my research director had previously shown interest in this concept and as such, had started to pave the way for future studies on offenders' sense of success in crime. Although I chose to study criminal self-efficacy from a social cognitive point of view, their previous work has been extremely inspiring in the development of the theoretical framework presented herein.

As my research supervisor, Carlo Morselli provided precious advice through the entire development of this project and gave some extremely insightful and knowledgeable comments regarding the article. His role as a second author led him to revise and edit the final version of the following article.

Choices concerning the statistical procedures presented were greatly motivated by insightful discussions with Claire Durand, Erika Braithwaite and Yanick Charette.

Introduction

Recent work on criminal careers suggests that a non-negligible portion of offenders is able to reap important benefits from their criminal endeavors, and that important variations in monetary gains exist between them (McCarthy and Hagan, 2001; Reuter et al., 1990; Tremblay and Morselli, 2000; Uggen and Thompson, 2003). This innovative take on crime, which contrasts sharply with the mainstream trend assuming that offending is a losing proposition by definition, favored the emergence of studies on criminal achievement in which the impact of various crime- and individual-level factors on the attainment of illicit earnings is explored (McCarthy and Hagan, 2001; Morselli and Tremblay, 2004; Charest, 2007; Morselli and Royer, 2008; Thompson and Uggen, 2012).

However, the study of success in crime has been primarily restricted to a single objective indicator: earnings. While there seems to be broad cultural agreement that money is a central component of career success, it is unlikely that earnings are the sole or main factor equated with achievement. Although objective assessments are easily and often made, success truly lies in the eyes of the beholder. As such, a comprehensive understanding of the notion of success requires considering its inherently subjective part, in conjunction with its objective component. Research on conventional careers has suggested that success is a multidimensional concept and that individual perceptions of success – self-efficacy – is based on a complex interplay of experiential, personal and environmental factors (Bandura, 1997; Lent, Brown, and Hackett, 1994). Legitimate career research has repeatedly found self-efficacy to be an important determinant of career development and outcomes such as career choices, goals and performance (Lent, Brown, and Hackett, 1994). The underlying logic behind this line of

research is fairly straightforward: the more individuals perceive themselves to be successful in a given domain, the more likely they are to embrace activities related to that domain, and to voluntarily pursue their involvement. A small but growing body of contemporary criminology literature has started to show interest in the self-efficacy notion and to acknowledge that offenders' cognitive processes and self-perceptions, while being potentially faulty and self-defeating, may have crucial consequences on their behaviors (Brezina and Topalli, 2012). Understanding how offenders come to perceive themselves as successful in their criminal pursuits is growingly believed to be central in comprehending criminal career outcomes such as persistence and desistance.

In this article, we seek to build on this growing body of literature on criminal self-efficacy by providing a more comprehensive understanding of the development of success self-perceptions among offenders. Rooted in social cognitive theory, we intend to suggest a more complete application of self-efficacy theory whereby cognitive processes are viewed as important determinants of illegal behaviors.

Objectivity and Subjectivity in Criminal Achievement

The rational choice perspective (Becker, 1968) has generated increased interest in the associated objective benefits and costs of crime among criminal career researchers (Ehrlich, 1973; McPheters, 1976; Wilson and Abrahamse, 1992; Tremblay and Morselli, 2000; McCarthy and Hagan, 2001). Whereas the first few studies aimed at understanding an offender's rationality by conducting cost-benefit analyses (Ehrlich, 1973; McPhethers, 1976), later researchers grew increasingly interested in assessing whether crime is economically beneficial. It is now generally acknowledged that differential patterns of criminal monetary

attainments exist between offenders (Tremblay and Morselli, 2000), and the contemporary criminal achievement research agenda now aims at uncovering the characteristics differentiating objectively "successful" from "unsuccessful" offenders. Most studies have thus far focused on uncovering the factors influencing the offenders' ability to gather criminal incomes and to avoid the inherent risks and costs associated with crime, two outcomes which can be objectively assessed and defined (Bouchard and Nguyen, 2010; Charest and Tremblay, 2009; McCarthy and Hagan, 2001; Morselli and Tremblay, 2004; Morselli, Tremblay and McCarthy, 2006; Nguyen and Bouchard, 2011; Robitaille, 2004; Thompson and Uggen, 2012; Tremblay and Morselli, 2000; Uggen and Thompson, 2003).

While there seems to be broad cultural agreement that money is a central component of success, it is unlikely that success can simply be equated with earnings, particularly when success is individually and subjectively evaluated (see McCarthy and Hagan, 2001; Morselli and Tremblay 2004). Although focusing on offenders' beliefs about their own success in crime has only recently started to make its way in the literature, Tremblay and Morselli (2000) offer an interesting insight on how these individual perceptions are only imperfectly linked to criminal earnings. On average, offenders reaping high monetary benefits from crime were more likely to define themselves as successful in their criminal ventures than low earners. However, their analysis also suggests that, for a non-negligible portion of offenders, individual perceptions of success do not perfectly equate with illegally earned revenues: 18 percent of high earners perceived themselves as unsuccessful in crime and 54 percent of low earners perceived themselves as successful in their illegal ventures. In explaining how low earners may come to define themselves as successful, the authors argued that they were likely victims of self-serving cognitive distortions in the form of "bragging", which help unsuccessful

offenders preserve a positive self-image by bolstering past criminal performance (for a discussion on self-serving distortions, see Barriga et al., 2000). No particular hypothesis was formulated concerning high earners who viewed themselves as unsuccessful. While the cognitive distortions hypothesis is highly plausible, an alternative explanation is that offenders do not rely exclusively on past monetary attainment when forming success self-perceptions. Individual cognitive processes are highly complex, and properly understanding how they come about requires a thorough consideration of all potential correlates, some of which can be objectively assessed, such as earnings and incarcerations, others which are subjective in nature, such as emotional states and individual reactions.

Self-Efficacy

Bandura (1977) introduced the influential notion of self-efficacy in social cognitive theory. Defined as "the conviction that one can successfully execute a behavior required to produce an outcome" (1977: 193), it was argued that, given adequate skills and appropriate incentives, self-efficacy perceptions affect both initiation and persistence of action, and influence the determination of one's environment. Importantly, the original theory stipulates that: "the efficacy belief system is […] a differentiated set of self-beliefs linked to distinct realms of functioning" (Bandura, 2006: 307). The predictive power of this concept over behaviors from a wide range of activity realms has been demonstrated since its introduction in the psychology literature (Bandura, 1997; Caprara et al., 2004; Pajares and Urdan, 2006). However, research has thus far mostly focused on conventional areas of performance.

Based on Bandura's social cognitive theory legacy, an integrative theoretical framework aiming to explain and understand career development has lately been proposed.

Centered on the concept of self-efficacy, social cognitive career theory (SCCT) proposes theoretical pathways through which career related interests, choices, and performance come about (Lent, Brown, and Hackett, 1994). Empirical studies have overwhelmingly supported SCCT hypotheses: domain specific self-efficacy beliefs significantly predict the development of career interests, career choices and of vocational/academic performance (Lent, Brown, and Hackett, 1994). These findings are highly informative as they suggest pathways through which cognitive processes, in this case individual perceptions of success, can have a direct and important impact on behavioral trajectories.

Considering the central role of self-efficacy on behavioral outcomes, both self-efficacy and social cognitive career theorists have acknowledged the importance of comprehending how these self-related perceptions are determined. In his original formulation of the theory, Bandura (1997) argued that self-efficacy perceptions are developed as individuals interpret information emanating from four distinct experiential sources: personal performance accomplishments, vicarious learning, social persuasion, and physiological states and reactions. *Personal performance accomplishments* are believed to be the most potent source of information in the development of self-referent efficacy, and refer to all forms of enactive experiences. *Vicarious learning* encompasses all experiences of observing others' while they behave. *Social persuasion* includes all forms of social encouragements or discouragements toward certain actions. Finally, *physiological states and reactions* refer to the particular emotional and physical conditions under which an individual is when doing a particular activity. Adding to these four factors, Lent, Brown, and Hackett (1994) argue that self-efficacy beliefs are also influenced by individual and environmental characteristics, which are termed person input and background contextual affordances (for a complete discussion on all factors

hypothesized to influence self-efficacy beliefs, see: Lent, Brown, and Hackett, 1994). These personal and environmental factors are believed to influence perceptions of success indirectly, through their impact on the four experiential sources originally proposed by Bandura (1997).

Cognitive construction. The notion of interpretation is of central importance in both social cognitive theory and SCCT (Bandura, 1997; Lent, Brown, and Hackett, 1994). Both frameworks contrast sharply with operant conditioning views of human action, whereby past behavior predicts future behavior in a causal sequence. They instead posit that:

> "the effects of learning experiences on future career behavior are largely mediated cognitively […]. People differentially recall, weight, and integrate past performance information in arriving at efficacy appraisals; thus such appraisals are not likely to be isomorphic with, or mechanically implanted by, past performance indicators" (Lent, Brown, and Hackett, 1994: 87).

This "cognitive construction" (Bandura, 1997: 81) argument offers an explanation as to why objective indicators of success do not equate perfectly with individual perceptions of success.

Criminal Self-Efficacy

Inspired from the self-efficacy and social cognitive career theories, we argue that understanding if and how offenders come to perceive themselves as successful in their criminal pursuits can be extremely valuable in explaining criminal career outcomes such as persistence and desistance. Akin to self-efficacy in conventional occupations, criminal self-efficacy theory might suggest cognitive pathways through which offenders eventually choose particular "activities and behavioral settings, how much effort they expend, and how long they will persist in the face of obstacles and aversive experiences" (Bandura and Adams, 1977: 288). Perceiving themselves as successful in their illicit ventures may incite offenders to

pursue their criminal involvement, whereas perceiving themselves as lacking the required abilities might force them to revise their willingness to continue their offending trajectory.

Several studies on self-efficacy offer some insight concerning the link between ability self-perceptions and criminal or delinquent behaviors. Researchers in this area predominantly consider self-efficacy as a preventive factor in the avoidance of negative outcomes (Ludwig and Pittman, 1999). For example, Sharkey (2006) defined street efficacy as: "the perceived ability to avoid violent confrontations and find ways to be safe in one's neighborhood" (2006: 827). The author found that higher levels of street efficacy among adolescents lead to a decreased likelihood of associating with delinquent peers and of resorting to violence. Similarly, prosocial self-efficacy was found to decrease involvement in drug dealing and violence, and to decrease the probability of having trouble with the police among youths aged 9 to 19 (Ahlin, 2010). In an empirical test of strain theory, Agnew and White (1992) found that strain was most likely to lead to delinquency in adolescents with low levels of self-efficacy. Although none of these studies focused on the perceptions of success in crime, they nonetheless suggest that efficacy self-perceptions can exert a significant impact on delinquent behaviors.

In addition to these initial insights, qualitative research in criminology also provides clues suggesting that individual perceptions of success in crime influence offending courses of action. Several ethnographies refer to interviewees' sense of success when they are active in crime, and how such perceptions become central to their identity and allow them to pursue their illicit ventures (see Anderson, 1999; Geiger and Fisher, 2005; Shover, 1996; Steffensmeier, 1986; Steffensmeier and Ulmer, 2005). In his ethnographic study on a Puerto

Rican ghetto in East Harlem, Bourgois (1995) refers to young residents' quest for success. Economic, structural and cultural pressures greatly limit access to satisfying legitimate employment, thus preventing them from developing any sense of conventional success. Interviewees come to develop an oppositional culture – a street culture – in which criminally successful peers are highly respected and viewed as models. The development of this criminally "successful" identity is crucial in giving individuals a sense of purpose in life, particularly in the face of intense environmental adversity. These success perceptions encourage youths to pursue activities for which they believe to have the necessary and sufficient abilities – illegal ones. This idea permeates several qualitative theses that have been developed in criminology (Anderson, 1999; Bourgois, 1995; Maruna, 2000; Shover, 1996).

With the publication of a recent and innovative multimethod study, Brezina and Topalli (2012) provided a thorough exploration of offenders' perceptions of success in their criminal ventures by assessing the correlates and consequences of criminal self-efficacy. In a sample of nearly 500 male offenders drawn from a survey of Nebraska prison inmates, they found that almost half (48 percent) of the sample perceived themselves as having been "somewhat" or "very successful" in crime, and that this proportion was even higher among non-incarcerated individuals, the vast majority of interviewees (80 percent) regarding "themselves as highly effective at crime" (2012: 1058). Focusing specifically on one of Bandura's four hypothesized experiential sources of information – personal performance accomplishments – their quantitative analysis suggests that criminal income and the ability to "beat the system" (i.e. not being arrested when committing crimes, 2012: 1046) both influence criminal self-efficacy perceptions. An additional analysis based on a restricted subsample of 298 inmates suggests that criminal earnings no longer influence self-referent efficacy when the

level of criminal planning is taken into account. Of particular interest in this study is the finding that criminal self-efficacy significantly predicted inmates' intentions to "go straight" (2012: 1051) after their release from prison, thereby suggesting that self-perceptions have an impact on future criminal behavior. Results from their qualitative analysis suggest that other factors might also be important in the formation of offenders' criminal self-efficacy.

The Development of Criminal Self-Efficacy

In line with Brezina and Topalli (2012), we believe that all factors hypothesized to influence conventional self-efficacy should be evaluated for a comprehensive study of the development of criminal self-efficacy. It is argued that this cognitively constructed perception is also complexly built from an array of objective and subjective factors. Although these correlates remain to be assessed in a systematic fashion, the criminology literature is abundant with hints suggesting that the criminal counterparts of the determinants found to influence the formation of conventional self-efficacy might also serve as a basis for offenders' criminal success perceptions.

Personal Performance Accomplishments

In studying persistent thieves' biographical accounts, Shover (1992) argues that: "using the metric of thieves and hustlers, those who earn well from crime […] are successful" (1992: 90). Likewise, Bourgois (1995) highlights the idea that money is one of the most important indicators of success in the street culture, as he portrays most youths in his study as dreaming about possessing luxury cars and jewelry. This suggests that the ability to reap monetary benefits from crime affect offenders' views of their success in crime. In addition to such qualitative accounts, criminal achievement researchers have repeatedly noted the central role

embodied by money in criminal endeavors. One of the first quantitative suggestions that money is important in the development of criminal self-efficacy was offered by Tremblay and Morselli's (2000) finding that high criminal earnings are associated, albeit imperfectly, with perceived criminal success.

Another correlate of criminal involvement that has been given some attention as a measure of success in illicit trajectories is the ability to commit crimes while avoiding its inherent costs (Bouchard and Nguyen, 2010; Morselli, Tremblay, and McCarthy, 2006). Following this line of research, we argue that perceptions of success in crime depend not only on criminal activity levels, but also on avoidance of detection, arrest, and incarceration. No counterpart to this factor exists in the conventional self-efficacy literature, as legitimate careers, by being legal in nature, do not entail any kind of apprehension or sanctioning risk (Luckenbill and Best, 1981). However, it is argued that being able to avoid these negative outcomes when pursuing criminal endeavors does play an important role in the formation of self-efficacy pertaining to criminal endeavors.

Although several fundamental differences between deviant and legal careers have been noted, it is generally believed that they nevertheless share important resemblances. For instance, Luckenbill and Best (1981) argue that, akin to entering a "respectable career" (1981: 197), entering a deviant one requires acquiring the knowledge and skills necessary to adequately perform the central tasks and roles associated with criminal activities. Adding on this theoretical line of research, Shover (1996) stated that the most economically "attractive criminal opportunities" (Shover, 1996: 49) are the ones requiring the most advanced technical qualifications. Moreover, Brezina and Topalli (2012) found that criminal planning, a measure

of criminal skills, is significantly and positively predictive of offenders' sense of criminal success.

Unlike conventional careers, relationships and hierarchical positioning in deviant careers are mostly left ambiguous. Individuals in positions of authority within criminal ventures tend to be informally so, and authority is thought to: "reside in the person, not the office" (Luckenbill and Best, 1981: 199). Although the impact of authority in illegal activities on offenders' perception of their success in crime has not yet been formally evaluated, research on legitimate employment suggests that authority is an important indicator of occupational prestige and that it plays a non-negligible role in the formation of subjective view of personal career success (Chambaz, Maurin, and Torelli, 1998; Gattiker and Larwood, 1986; Sturges, 1999; Nabi, 2001). The impact of authority on perceptions of success in illegal ventures remains to be more fully explored.

Vicarious Learning

Observing similar others perform successfully is believed to increase self-efficacy beliefs (Bandura, 1997). However, an alternative way by which the observation of others' performance might come to exert an influence on success self-perceptions has been proposed in the self-efficacy literature. Instead of being viewed as behavioral models, similar others can come to be perceived as forming a normative comparison group against which performance is gauged (Usher and Pajares, 2008). In a study inspired by the "friendship paradox", an idea originally introduced in the social network literature by Feld (1991), Grund (in press) evaluated the impact of social embeddedness on self-evaluations. His results suggest that individuals' self-perceptions are highly dependent on what individuals think the social world

looks like – and that social world is highly determined by individuals' social networks. In comparing themselves with others, people may thus come to view themselves as unsuccessful if they believe themselves to be lower achievers, and to view themselves as successful if they believe themselves to be higher achievers.

In addition to being encouraged (or relatively discouraged) by similar others' performances, people may also: "seek out a model competent at tasks at which they aspire – particularly ones with status, power and prestige" (Bandura, 1997: 101). In the criminological literature, mentors have been found to fulfill this modeling role, as they provide offenders-to-be with information, guidance and support pertaining to criminal involvement (Cloward and Ohlin, 1960; Shaw, 1930; Sutherland, 1947). Observing mentors succeed in their criminal endeavors might provide offenders with a bolstered confidence that they too can succeed in crime and eventually play a determinant role on the formation of criminal self-efficacy.

Social Persuasion

Social persuasion, in the form of encouragements towards criminal involvement, is likely to come from criminally oriented peers embedded in an offender's social network. In differential association theory, Sutherland (1947) argues that individuals not only learn the motives and the techniques required to perform criminal acts, but also the required attitudes and rationalizations. This suggests that the presence of criminally oriented individuals in one's network might increase self-perceptions of criminal success by providing readily accessible and prominent pro-criminal values/encouragements.

Physiological States and Reactions

Whereas experiencing agreeable sensations in legitimate occupations and activities is mostly defined in terms of composure, stamina, and general well being, the inherent and undisputable risks associated with crime make these sensations rather unlikely to be experienced during crime commission. Instead, physiological states and reactions akin to thrills and excitement will more probably be experienced. In their general theory of crime, Gottfredson and Hirschi (1990) argued that individuals plagued with low levels of self-control display a clear preference for actions that are adventurous and that they are more likely to engage in crimes because such activities are: "exciting, risky, or thrilling" (1990: 89). Individuals with low self-control tendencies will thus be more likely to perceive emotional states during crime commission as agreeable than individuals with high self-control. These positive and relatively agreeable sensations might thus play a role in the development of perceptions of criminal career success among offenders with low levels of self-control.

Person Input and Background Contextual Affordances

One of the most consistent findings in the criminology literature is that, as they age, most offenders tend to diminish their rates of offending (Glueck and Glueck, 1940; Hirschi and Gottfredson, 1983; Shover and Thompson, 1992). Notwithstanding the various theoretical explanations that have been proposed to account for this pervasive result (see Glueck and Glueck, 1937; Shover, 1985; Walsh, 1986), the diminished criminal involvement of aging offenders inevitably reduces their personal exposure to the relevant sources of information leading to the development of self-efficacy. By being less involved in crime, the likelihood of developing positive criminal self-efficacy is likely to diminish.

Several qualitative inquiries in the criminology literature have noted that people with limited legitimate opportunities come to develop more positive criminal self-related

perceptions than individuals without such barriers. Based on his study on a poor inner-city ghetto in Philadelphia, Anderson (1999) argues that youths: "make a whole set of choices and decisions based on what they are able to do successfully" (1999: 134). Not perceiving themselves as able to develop a sense of success in the conventional occupational realm, they are more likely to develop positive views of their success in the illegal underworld. Hard drug use can in turn limit potential legitimate opportunities and lead to increased rates of offending by engendering a strong need for money, which is hardly attainable through legitimate means (Uggen and Thompson, 2003).

Classic strain theorists have posited that individuals who cannot achieve monetary success through legal ventures tend to develop feelings of frustration (i.e., strain), and are thus more likely to engage in crime (Cloward and Ohlin, 1960; Merton, 1968). Whereas most empirical tests of strain theory have generally failed to support this claim, Agnew et al., (1996) found low legitimate earnings and low levels of education to be significant predictors of strain. Feelings of strain subsequently predicted involvement in income-generating crimes. Incorporating findings from qualitative and quantitative research along with strain theory, it is possible to hypothesize that limited satisfactory employment perspectives might lead to low levels of legitimate self-efficacy[1] and to strain. When combined, these two self-defined perceptions increase the likelihood of engaging in crime, which in turn is likely to increase criminal self-efficacy beliefs.[2]

[1] Limited exposure to experience with legitimate employment leads to decreased legitimate self-efficacy beliefs (Bandura, 1997).
[2] Through feedback from direct experience with crime.

The main aim of the present study is to build on the small body of research on criminal self-efficacy, and to develop a more comprehensive understanding of how offenders come to perceive themselves as successful in their criminal pursuits. By identifying the various sources that contribute to the development of criminal self-efficacy, we seek to unveil its complexity and to highlight the relevance of self-efficacy theory to crime. Akin to conventional self-efficacy, offenders' self-efficacy beliefs may explain why offenders do what they do, particularly why they persist in crime or eventually desist from it. Based on self-efficacy theory (Bandura, 1997) and SCCT (Lent, Brown, and Hackett, 1994), it is hypothesized that the factors central in the formation of conventional self-efficacy are also central in the development of criminal self-efficacy. More specifically, rewarding personal criminal accomplishments, social persuasion favoring criminal involvement, vicarious experiences with successful co-offenders and mentors, and personal tendencies to enjoy activities that are thrilling and exciting will lead to high levels of criminal self-efficacy. In addition, increasing age and favorable contextual opportunities will lead to decreases in self-efficacy.

Method

Data

The data used in this study are drawn from a sample of 284 male inmates interviewed between summer 2000 and summer 2001 in five southern Quebec federal prisons as part of a research project of criminal earnings. Due to the complex nature of some of the survey's sections and in order to ensure high quality data, all interviews were conducted in face-to-face sessions by one of 12 interviewers. For each site, a list of names of the entire inmate population was provided by correctional services and each interviewer was given a random list

comprising 20 names. Interviewers solicited potential respondents by asking if they volunteered to participate in a university-based survey. Details on the questionnaire were purposively kept vague, but the title of the project – *Financial situation of inmates prior to their current incarceration* – did infer that questions concerning legal and illegal revenues would be asked. When inmates agreed to take part in the study, a participation consent form was dutifully signed. The overall participation acceptance rate was 76 percent.

The Questionnaire Design: Window Period and Calendar Format

The survey questionnaire contained nearly 200 questions, with the lengthiest sections being the one devoted to describing criminal and non-criminal patterns during a three-year window period and the one reserved to exploring the set of core criminal contacts. These two sections were purposefully placed in the middle of the questionnaire, following a series of questions on socio-demographic and personal background characteristics, and preceding inquiries on more general experiences, as well as a few self-perception and Likert-scale type questionnaires. After the introductory phase of the questionnaire, interviewers established a three-year window period with respondents, on which following questions would specifically focus. Following the second Rand inmate survey, responses were gathered on a monthly calendar format (Chaiken and Chaiken, 1982; Peterson and Braiker, 1981). The reliability of three-year recall data was enhanced with the use of Freedman et al. (1988) strategy, which relies on detailed life-course calendars in order to bound and situate specific criminal activities. Events were specified within each respondent's window period in this order: (1) months spent in prison, on probation or parole, in transition houses, or arrested; (2) key life events (for example: hospitalization, divorce, birth of a child, death of a close one, loss of a job); and (3) conventional work experiences and earnings. The last portion of this

questionnaire section concerned criminal activities and earnings. A crime-by-crime method was favored to structure respondents' recall for the three-year window period. For each crime for which participation was admitted, inmates were asked a series of details concerning their particular offending experiences and were asked to report monthly involvement and earnings.

Sample

Attrition. Although 284 inmates were interviewed in the present study, a total of 57 respondents were excluded from the final analyses. These participants were not incarcerated for money-oriented crimes, and did not report any participation in such activity during the 3-year window period. Since we hypothesize that criminal earnings play a role in the formation of criminal self-efficacy, their exclusion from the present study was warranted. This left us with 227 respondents. An additional fifteen participants had to be eliminated because their questionnaires were judged to be too highly incomplete.[3] The following analyses are based on a restricted sample of 212 respondents.

Portrait. Table 1 presents basic sociodemographic information pertaining to the study sample. Of the 212 respondents, 192 were native French, and 7 were native English speakers. Nearly half of the sample was in a relationship[4] when they were incarcerated. The majority of study respondents were incarcerated at the time of the interview for property offenses[5] and the

[3] Although missing data in the present study were handle with the use of multiple imputations, the extent of incompleteness of these fifteen questionnaires led to the decision to withdraw these cases from the dataset altogether. The most complete of these questionnaires included only sociodemographic information. The main reason for the incompleteness of survey questionnaires was interruption of interviews.

[4] Being "in a relationship" includes both civil union and marriage.

[5] This refers to the main crime for which respondents were incarcerated. Some were incarcerated for more than one offense.

average length of incarceration was 5 years.[6] At the time of interview, participants were 34 years old, on average. They had committed their first crime at 16, were first arrested at 19, and first convicted at 20 years of age.

Table 1. Sociodemographic Characteristics of the Study Sample (N = 212)

Variable	N	%
Native language		
French	192	90.6
English	7	3.3
Other	13	6.1
Civil status		
Single	112	52.8
In a relationship	100	47.2
Crime category at origin of current sentence		
Violent	19	9.0
Property	124	58.5
Market	59	27.8
Others	10	4.7
	Mean	**(SD)**
Age at time of interview	33.59	(9.29)
Age at first crime	15.86	(7.49)
Age at first arrest	18.88	(6.88)
Age at first conviction	19.93	(6.81)
Length of current sentence (months)	59.92	(49.42)

ABBREVIATION: SD = standard deviation.

Operationalization

In order to evaluate whether self-efficacy beliefs pertaining to criminal endeavors are influenced by factors akin to those impacting legitimate self-efficacy, the person input and background contextual affordances concepts, as well as the four experiential sources of information proposed by SCCT were operationalized with the available data. Because the data used in the present study was gathered with a research focus greatly different from the one

[6] Minimum incarceration length in Canadian federal correctional services is two years. Sentences of less than two years are served in provincially overseen prisons.

presented herein, we cannot pretend to tap into these theoretical ideas as precisely as self-efficacy research does. However, after a thorough review of operationalization issues within the self-efficacy and SCCT literatures we believe that the data from the Financial Situation of Inmates Prior to their Current Incarceration study can be adequately used to operationalize the concepts of interest as they pertain to the criminal activity realm.

Assessing Criminal Self-Efficacy

The order of presentation of the concepts involved in the development of self-efficacy in the subsequent section follows their order of entry in the analysis model. Because the impact of person input and background contextual affordances on self-efficacy beliefs is hypothetically mediated by the four sources of information, they are presented first. Of these four latter informational sources, direct personal performance accomplishments are hypothesized to account for the greatest variance in self-efficacy beliefs, no specific claims having been made concerning the relative potency of the remaining three sources of efficacy information (Bandura, 1997). To properly evaluate the impact of personal performance accomplishments on self-efficacy it was thus entered last in the multivariate model. The order of entry in the analysis model of the other three sources of information is as follows: physiological states and reactions, social persuasion, and vicarious learning.

Person input and background contextual affordances. The person input concept was simply operationalized with age of respondent at time of interview. The background contextual affordances concept comprises three distinct indicators in the present study: education, noncriminal earnings, and hard drug use. For education, participants were asked to report the age at which they had quit school and the education level attained at that time. They

were then asked whether they later had an opportunity to pursue their studies, and if so, whether they had successfully completed a higher-level diploma. The highest level of education attained at the time of interview was dichotomized, yielding a variable that distinguishes individuals who had completed high school from those who had not. Approximately 37 percent of the study sample had completed high school at the time of interview.

Noncriminal earnings were recorded on the monthly calendar pertaining to the three-year window period. Respondents were asked to estimate monthly salaries for each of the three last occupations held during the window period. Total legitimate revenues were computed by adding all monthly earnings reported. The median noncriminal earnings in the study sample over the window period were $7,997.16.[7] Because the variable distribution is highly skewed (mean = $30,449.62; S.D. = $55,739.76) this indicator was logged.[8] This procedure has been successfully used in past research on both licit and illicit earnings (Chambaz, Maurin, and Torelli, 1998; Matsueda et al., 1992; McCarthy and Hagan, 2001; Tremblay and Morselli, 2000).

Hard drug use during the window period was measured by asking participants to report the extent to which they used each of these seven types of drugs: cocaine, crack/freebase, heroin/methadone, barbiturates/depressants, hallucinogenic, amphetamines, and valium/tranquilizers. Responses were given on a 1 to 5 Likert scale (1 = never; 2 = a few times per month; 3 = a few times per week; 4 = daily; 5 = more than once a day). Hard drug use was

[7] A total of 79 study participants reported no legally earned revenues during the window period. When these 79 individuals are removed from measures of central tendency calculation, the median noncriminal earnings for the window period is $26,400 (mean = $47,972.90, SD = $64,264.11).
[8] A logarithmic transformation, base 10 was performed.

considered present when any of these drugs had been consumed a few times per month or more. The dichotomized hard drug use variable was included in the analysis model. Approximately 55 percent of the study sample reported using hard drugs at least a few times per month over the window period.

Physiological states and reactions. Scores on the twenty-four-item Grasmick et al.'s (1993) low self-control scale were used in order to evaluate the impact of physiological states and reactions on self-efficacy beliefs. This scale contains six subscales, intended to measure low self-control as defined by Gottfredson and Hirschi (1990). In order to ease interpretation, the original scale's scoring scheme was reverse coded so that high scores represent low self-control tendencies. Following Grasmick et al. (1993), the total score for low self-control was computed as the linear composite of z-scores transformation of the 24 items. Reliability between all 24-four items was acceptable (alpha = 0.80).[9] The average z-score on the Grasmick et al. scale for study respondents was 0.01. Scores ranged from approximately -23 to 25.

Social persuasion. In order to evaluate the impact of social persuasion on the development of criminal self-efficacy, a computation of the total number of contacts with whom the respondents committed criminal activities during the window period was performed. Based on a modified version of Burt's social capital questionnaire (Burt, 1992), participants were asked to divulge their main crime-oriented contacts during the three-year window period. The maximum number of contacts per respondent was limited to fifteen per

[9] Stata 12's multiple imputations estimation commands do not validly support combination of imputations to derive Cronbach's alpha. Unsupported estimation commands can be forced, but this procedure is not recommended, as validity of results cannot be ensured (StataCorp, 2011a). The alpha level presented is thus based on a single imputation of the data.

respondent, thereby defining their core criminal network. Study participants reported committing crimes with an average of 5 contacts.

Vicarious learning. The vicarious learning theoretical source of information was operationalized with two distinct indicators: mentorship and relative criminal earnings. Mentorship was assessed by asking respondents the following question: "Amongst the people that influenced you throughout your life, was there one person that introduced you to a criminal milieu and that you consider to be your mentor?" A dichotomous indicator was constructed based on participants' responses indicator whether someone had effectively introduced them in the realm of illegal activities or not. Approximately 37 percent of the study sample admitted having been introduced in the criminal milieu by someone they considered to be their mentor.

Relative criminal earnings were evaluated within the social capital questionnaire. A series of specific questions was asked to respondents concerning every criminal contact divulged. Participants were asked to assess whether these contacts' criminal earnings were superior, inferior, or equal to their own criminal earnings. The proportion of contacts reaping higher criminal earnings than the participants was computed by dividing the total number of contacts making higher criminal revenues by the total number of contacts. The relative earnings scores range from 0 to 1, the former indicating that no criminal contacts in the respondent's core network made more criminally earned money, and the latter indicating that all contacts reaped higher criminal monetary benefits. On average, respondents reported that nearly 32 percent of their contacts reaped higher criminal benefits than themselves.

Personal performance accomplishments. Having repeatedly been found to be the most influential predictor of self-efficacy beliefs, the personal performance accomplishments concept encompasses several indicators. Individual rates of offending (lambda) during the three-year window period were firstly computed. Participants were asked to enumerate all money-oriented crimes in which they had been implicated during the window period and were requested to report their corresponding average rate of offending. Crime specific lambdas could thus be computed. Whereas the precision contained in these crime-specific measures is informative, more comprehensive rates of offending had to be computed. The criminal self-efficacy variable used in the present article pertains to crime in general, not to specific illegal activities such as theft or drug distribution. Since: "the sources of self-efficacy […] function best at appropriate levels of specificity, and when they correspond with the self-efficacy outcome they are designed to predict" (Usher and Pajares, 2008: 763), it was decided to compute global lambda indicators. Based on previous research suggesting that different types of crimes are associated with different average offending rates (Chaiken and Chaiken, 1982; Peterson and Braiker, 1981; Tremblay and Morselli, 2000), rates of offending were divided in two categories, distinguishing between predatory and market offenses.[10] In order to respect the specificity level of the outcome variable, which pertains to the entire window period, crime specific lambdas pertaining to these two categories over the three years preceding current incarceration were summed to produce a total predatory lambda and a total market lambda. Because of high variations in levels of commitment for both predatory and market offenses, the overall distribution of the two variables is highly skewed (predatory lambda: mean =

[10] Predatory offenses are appropriative in nature and include armed robbery, burglary, theft, vehicle theft, and fraud. Market offenses are typically victimless and imply consensual exchanges. It consists of drug selling, drug distribution, fencing, smuggling, loansharking, procuring, illegal gambling operating, and other supply-related offenses. (Morselli and Tremblay, 2004).

164.20, S.D. = 494.44; market lambda: mean = 5,569.58, S.D. = 27,510.92). High skewness was adjusted for by applying the logarithmic transformation, base 10 (Longshore, Turner, and Stein, 1996; Morselli and Tremblay, 2004).[11]

Total number of arrests during the window period was computed. For each month during the window period, respondents were asked to report those in which they had been arrested and the corresponding number of arrests. To respect the specificity level of the criminal self-efficacy variable, reported responses were summed to generate the total number of arrests for the entire window period. On average, study participants reported having been arrested nearly 3 times during the three-year window period.

The third indicator of personal performance accomplishments was perceived level of qualifications required to successfully perform committed crimes. For all offenses in which they had been involved during the three-year window period, respondents were asked the following question: "To what extent does one need to be qualified to perform this activity successfully?" Responses were given on a 1 to 7 Likert scale, ratings of 1 indicating that no qualifications were required at all, while ratings of 7 indicated that a high level of qualification was required. In order to ensure concurrence with the criminal self-efficacy specificity level, perceptions of required qualifications were averaged over all types of crimes committed during the window period. On average, respondents believed the crimes in which they were involved to necessitate a qualification level of nearly four out of seven.

[11] The theoretical justification for the logarithmic transformation of the lambda variable is the same as the one provided for the transformation of noncriminal earnings. Logarithmic transformation of lambda variables have been successfully used in the past (Longshore, Turner, and Stein, 1996; Morselli and Tremblay, 2004)

To measure authority, respondents were asked the following question for each crime in which they were involved over the window period: “In this activity, were there people to whom you gave orders?” The dependent variable’s specificity level was respected by creating a dichotomous variable of authority in crime commission, indicating whether the respondent gave orders to others in his criminal practice or not. Nearly 45 percent of the study sample reported giving orders to others during crime commission over the three-year window period.

Criminal earnings were included in the analysis model as the final indicator of personal performance accomplishment. Illegal earnings were gathered with the use of the three-year monthly calendar. Respondents were asked to divulge monthly earnings for all reported types of criminal activity. Adding all monthly revenues yielded a total criminal earnings estimate. Because the variable distribution is highly skewed (mean = $823,283.40, S.D. = $2,164,379.00) we proceeded to the same logarithmic transformation (base 10) as for legitimate earnings (Charest, 2004; Matsueda et al., 1992; McCarthy and Hagan, 2001; Tremblay and Morselli, 2000).

Criminal Self-Efficacy

The criminal self-efficacy variable included in the present study was assessed with the following question: “During the three-year period, how successful do you think you were in doing crime?” Responses were recorded on a 1 to 4 Likert scale with the following scaling: 1 = very successful, 2 = somewhat successful, 3 = somewhat unsuccessful, 4 = very unsuccessful. In order to ease interpretation of results, this scaling was reverse coded so that low scores represent low self-efficacy beliefs and high scores represent high self-efficacy beliefs. Preliminary data screening revealed that categories 1 and 2 of the dependent variable

contained the fewest respondents (17.70 percent and 16.35 percent, respectively). This result, along with specific indicators from the ordered logistic regression that was performed[12], suggested that categories 1 and 2 needed to be merged in order for coefficient estimates to be valid. This transformation yielded a trichotomous dependent variable, ranging from low to high criminal self-efficacy. The distribution of responses across the various levels of the dependent variable was fairly equal: 34 percent of respondent perceived themselves as having low criminal self-efficacy, 28 percent moderate criminal self-efficacy, and nearly 38 percent high criminal self-efficacy.

Our confidence in the validity of this measure of criminal self-efficacy is increased by the fact that it has previously been shown to have an impact on behavioral intentions (Brezina and Topalli, 2012). Moreover, this variable was related in the expected direction to other self-perception items. Specifically, it was negatively correlated with the "I want a stable legal occupation" (r = -.20, p < .01), and the "I want work security for the rest of my life" items (r = -.16, p < .05) and positively correlated with the "I want to make a lot of money" item (r = .18, p < .05). Correlations between the criminal self-efficacy item and the various predictor variables can be found in appendix A.

Missing data

Although a total of 212 participants were eligible for inclusion in the present study's multivariate analyses, listwise deletion of nonoverlapping incomplete cases led to a restricted

[12] The non-significance of the second category's cutpoint coefficient estimate in the main regression analysis suggested that that category and the one above (category 1) have the exact same cutpoint. Because of the proportional odds assumption, this result indicates that both levels have the exact same equation. In such cases, it is suggested to combine categories of the dependent variable (Garson, 2012).

sample size of 134 participants, discarding nearly 37 percent of the original sample.[13] Whereas complete case analysis is the most easily and commonly applied methodological procedure to handle missing data, it is known to lead to significant reduction in statistical power in hypothesis testing, and to serious bias in parameter estimates (Azur et al., 2011; Graham, 2012a). Since no major differences were found between participants included and excluded from complete case analysis on any of the variables of interest, it was decided to handle missing data using multiple imputation by chained equations (MICE: for a complete discussion on the MICE technique and its related assumptions, see Potoff et al., 2006; UCLA, 2013a). Multiple imputations were performed with the use of the Stata/SE for Mac, version 12 software (StataCorp., 2011b)

Table 2 displays means of variables included in the analysis model between participants that would be included in complete case analysis (n=134) and complete data after multiple imputations (n=212). Averages are highly similar between the two groups, suggesting that the imputation model was correctly specified. Tests of sensitivity of the results to both the number of imputations and the specific imputation used were performed, and results suggest that the analysis model was not too sensitive to the number of imputations, nor to the specific set of imputation used, further suggesting the adequacy of the imputation model (UCLA, 2013b). Monte Carlo error estimates of coefficients were within acceptable range (White, Royston, and Wood, 2001).

[13] The reasons for the failure to obtain complete data for all participants are varied, and include lack of time to adequately complete questionnaires, refusal of participants to respond to specific questions for personal or distrust reasons, memory problems, and trouble with situating time constrained information.

Table 2. Comparison of Variables in Criminal Self-Efficacy Development Analysis Model Between Complete Cases and Multiply Imputed Data

Independent variables	Respondents included in complete case analysis (n=134)	Multiply imputed data (n=212)
Age	34.16	33.59
High school completed (%)	38.06	37.28
Noncriminal earnings	31,811.53	30,449.62
Logged noncriminal earnings	2.78	2.80
(Geometric mean)	(595.91)	(626.75)
Hard drug use (%)	56.72	55.19
Low self-control	-0.55	0.01
Number of contacts	5.34	5.19
Presence of mentor (%)	39.55	37.44
Relative criminal earnings (%)	29.57	31.92
Predatory lambda	128.58	164.20
Logged predatory lambda	0.80	0.90
(Geometric mean)	(6.36)	(7.93)
Market lambda	6,011.97	5569.58
Logged market lambda	1.66	1.66
(Geometric mean)	(45.39)	(45.87)
Number of arrests	2.28	2.51
Qualifications	3.89	3.97
Authority position (%)	42.54	44.92
Criminal earnings	621,224.40	823,283.40
Logged criminal earnings	4.41	4.43
(Geometric mean)	(25,969.58)	(27,003.99)
Dependent variable		
Criminal self-efficacy (%)		
Low	34.33	34.06
Moderate	27.61	28.26
High	38.06	37.69

Data analysis

Because the aim of the present paper is to uncover on what factors rests the development of criminal self-efficacy, and because this variable is ordinal in nature, ordered logistic regression was favored. This statistical method yields greater statistical power than multinomial logistic regression and avoids potential assumption violations associated with OLS regression (Garson, 2012). A logit link function was favored, offering more easily interpretable regression coefficients than other link functions, and allowing for the

computation of proportional odds ratios to evaluate individual predictors' effect size (Garson, 2012; O'Connell, 2006; Yay, and Akinci, 2009). Proportional odds ratios are calculated by exponentiating ordered logistic coefficients (e^b), and their interpretation is slightly more intuitive than the interpretation of regression coefficients: for a one-unit change in the predictor variable, the odds of being in the highest level of the dependent variable (high self-efficacy), compared to being in all lower categories (moderate and low self-efficacy) are larger by the proportional odds. All analyses were performed using Stata/SE for Mac, version 12 software (StataCorp., 2011).

Results

Table 4 displays the results of the nested ordered logistic regression models performed to predict criminal self-efficacy. In model 1, only the indicators of person input and background contextual affordances are entered. All of these variables except hard drug use significantly predict criminal self-efficacy beliefs. Although drug use has been found to impact criminal monetary achievements in past research (Uggen and Thompson, 2003; Thompson and Uggen, 2012), it does not seem to play a major role in offenders' self-referent efficacy beliefs. The physiological states and reactions model (model 2) adds low self-control, which is significantly predictive of the outcome variables: the lower self-control offenders reported having, the higher their likelihood of perceiving themselves as criminally successful ($b = .028$, $p < .10$). However, as shown in the social persuasion model (model 3), low self-control doesn't predict criminal self-efficacy when the number of criminal contacts is factored in ($b = .021$, $p = .17$). The presence of criminally-oriented individuals in one's close network is positively and significantly predictive of criminal self-efficacy when first entered in model 3

(b = .107, p < .01), and remains so even in the vicarious experiences model (model 4: b = .094, p < .05). Of the two vicarious learning variables, only relative earnings significantly predict criminal self-efficacy (b = -.740, p < .05). Mentorship doesn't appear to play a statistically significant role on the outcome variable above and beyond indicators of individual characteristics, contextual affordances, physiological states and reactions, social persuasion, and relative earnings. Criminal mentors might exert a more potent influence on the development of criminal self-efficacy when offenders have only limited previous personal experience with crime, as hypothesized by Bandura (1997) in relation to legitimate self-efficacy. Offenders in our sample are not newcomers to the criminal realm: whereas they were almost 34 years old at the time of interview, their first crime were, on average, committed at 16, their first arrest at 19, and their first conviction occurred when they were 20 years of age (see table 1). Moreover, 77 percent of respondents had been incarcerated at least once in their past at the time of interview, suggesting past experience with crime for the majority of the sample.

As previously described, all indicators of personal performance accomplishments, except criminal earnings are added in model 5. As can be seen in table 4, the number of contacts in one's criminal entourage does not significantly predict criminal self-efficacy once personal accomplishments are considered (b = .016, p = .869). Akin to the tentative explanation that was provided concerning the non-significant impact of mentorship on offenders' self-efficacy, social persuasion might be more potently influential for the development of self-perceptions when individuals have not yet perfected the skills required to successfully perform in an activity themselves (Bandura, 1997). Of all personal performance indicators, only qualifications (b = .175, p < .05) and authority (b = 1.063, p < .01) exhibit a

positive and significant effect on criminal self-efficacy. As opposed to Brezina and Topalli (2012), the ability to "beat the system" (2012: 1046), as measured with individual rates of offending in predatory and market crimes, and number of arrests, do not significantly influence offenders' self-efficacy beliefs in our sample.

The complete model (model 6) incorporates all variables hypothesized to play a role in the development of criminal self-efficacy. Despite the importance of criminal earnings in defining success (McCarthy and Hagan, 2001; Morselli and Tremblay 2004; Shover, 1996), all variables that were predictive of offenders' sense of personal achievement in model 5 remain significantly predictive of criminal self-efficacy, indicating that various factors are at play in the development of criminally-related self-perceptions. As hypothesized, criminal earnings exert a positive and significant effect on criminal self-efficacy beliefs ($b = .551$, $p < .001$). When all variables in the model are held constant, age, education, noncriminal earnings, relative earnings, qualifications, authority, and criminal earnings all have a significant impact on offenders' criminal efficacy beliefs. Post-estimation analyses suggest that the inclusion of criminal earnings in the complete ordered logistic regression model leads to a slightly bigger model effect size.[14] Results displayed in table 4 point to a slight increase in pseudo R^2 with the inclusion of criminal earnings (from .176 to .229). More importantly, results from a Wald test suggest that the addition of criminal earnings significantly improves overall model fit, $F(1, 333.40) = 10.47$, $p < .01$.

[14] Whereas pseudo-R^2 statistics do not share the "percent of variance explained" interpretation of OLS R^2, they nonetheless provide analysts with a measure of model effect size (Garson, 2012).

Table 4. Nested Ordered Logistic Regression Models Predicting Criminal Self-Efficacy (N = 212)

Variable	Model 1 Person & Context			Model 2 Physiological States			Model 3 Social Persuasion		
	b	**(SE)**	**P.OR**	***b***	**(SE)**	**P.OR**	***b***	**(SE)**	**P.OR**
Age	-.068***	(.016)	.934	-.059***	(.017)	.943	-.047**	(.017)	.954
High school completed	-.829**	(.278)	.436	-.744**	(.282)	.475	-.786**	(.286)	.456
Noncriminal earnings	-.148*	(.063)	.863	-.140*	(.064)	.869	-.153*	(.065)	.859
Hard drug use	.291	(.269)	1.338	.118	(.287)	1.125	.138	(.289)	1.148
Low self-control				.028†	(.015)	1.029	.021	(.016)	1.021
Number of criminal contacts							.107**	(.036)	1.112
Presence of mentor									
Relative criminal earnings									
Predatory Lambda									
Market Lambda									
Number of arrests									
Qualifications									
Authority									
Criminal earnings									
Pseudo R2 (McFadden)		.080			.085			.106	

ABBREVIATIONS: SE = standard error, P.OR = proportional odds ratio.

†p < .10* *p* < .05, ***p* < .01, *** *p* < .001

Table 4. Continued

Variable	Model 4 Vicarious Learning			Model 5 Personal Accomplishments			Model 6 Complete Model		
	b	**(SE)**	**P.OR**	***b***	**(SE)**	**P.OR**	***b***	**(SE)**	**P.OR**
Age	-.046**	(.017)	.955	-.036*	(.018)	.964	-.035†	(.020)	.966
High school completed	-.770**	(.291)	.463	-.986**	(.312)	.373	-1.113***	(.333)	.328
Noncriminal earnings	-.169*	(.067)	.845	-.152*	(.070)	.859	-.144*	(.075)	.866
Hard drug use	.197	(.295)	1.218	.406	(.318)	1.501	.327	(.335)	1.387
Low self-control	.018	(.016)	1.018	.008	(.017)	1.008	.008	(.019)	1.008
Number of criminal contacts	.094*	(.038)	1.099	.016	(.044)	1.016	.008	(.046)	.992
Presence of mentor	.453	(.337)	1.572	.433	(.349)	1.542	.178	(.373)	1.195
Relative criminal earnings	-.740*	(.399)	.477	-.987*	(.425)	.373	-1.085*	(.453)	.338
Predatory Lambda				.245	(.154)	1.278	-.015	(.175)	.985
Market Lambda				.142	(.101)	1.152	.002	(.112)	1.002
Number of arrests				-.009	(.024)	.991	-.014	(.025)	0.986
Qualifications				.175*	(.074)	1.191	.146†	(.080)	1.157
Authority				1.063**	(.351)	2.894	.752*	(.377)	2.122
Criminal earnings							.551***	(.147)	1.735
Pseudo R2 (McFadden)		.121			.176			.229	

ABBREVIATIONS: SE = standard error, P.OR = proportional odds ratio.

†p < .10* $p < .05$, **$p < .01$, *** $p < .001$

In order to ease interpretation of the complete model and to reduce the noise induced by the presence of several non-significant variables, a final parsimonious model based on model fit test statistics was developed. A Wald test was performed on the complete model's non-significant predictor variables to assess their joint impact on the prediction of criminal self-efficacy. Jointly, age, hard drug use, self-control tendencies, number of criminal contacts, mentorship, predatory and market lambdas, and number of arrests did not significantly improve model fit: $F(8, 17847.90) = 0.74$, $p = .659$, suggesting that their removal from the complete analysis model does not affect prediction of criminal self-efficacy. Table 5 presents the final parsimonious ordered logistic regression model predicting criminal self-efficacy. The removal of non-significant predictors did not lead to a significant decrease in overall model effect size, as suggested by McFadden's pseudo R^2, which remained highly similar to the complete model's value (from 0.229 to 0.221).

Table 5. Parsimonious Ordered Logistic Regression Model Predicting Criminal Self-Efficacy (N = 212)

Variable	Model 7 Parsimonious Model		
	b	(SE)	P.OR
Age	-.037*	(.019)	.963
High school completed	-1.088***	(.314)	.337
Noncriminal earnings	-.137*	(.072)	.872
Relative criminal earnings	-1.003*	(.439)	.367
Qualifications	.136	(.078)	1.146
Authority	.636*	(.334)	1.889
Criminal earnings	.573***	(.125)	1.774
Pseudo R2 (McFadden)		.221	

Results from the parsimonious model suggest that various sources of information have a significant impact on criminal self-efficacy. Person input (age), along with two of the background contextual affordances indicators (education and noncriminal earnings) are significantly predictive of criminal self-efficacy. As offenders age, they tend to have lower self-efficacy beliefs (b = -.037, p < .05). Interpretation of proportional odds ratios suggest that this effect is of modest magnitude: for a one unit increase in age, the odds of being in the highest criminal self-efficacy categories are reduced by a factor of .963. In terms of education, in comparison with respondents who have not completed high school, those who have show a decreased likelihood of perceiving themselves as criminally successful (b = -1.088, p < .001). Examination of computed proportional odds ratios suggest that this effect is quite strong: as education levels increase, the odds of being in the highest coded categories of criminal self-efficacy compared to the lowest decrease by a factor of .337. In the same fashion, the higher the revenues offenders can gather from legitimate endeavors, the lower their perceived criminal success is (b = -.137, p < .05). Careful interpretation of proportional odds ratios for legal earnings is required, as this variable has been logged before the analysis model was run. For each one unit increase in the log of total legitimate revenues, offenders' odds of perceiving themselves as highly successful in crime is decreased by a factor of .872. More simply, the younger an offender is, the less education he has and the less money he is able to earn legitimately, the more likely he is to perceive himself as successful in crime.

One of the two indicators of vicarious experience, relative criminal earnings, significantly predicts criminal self-efficacy (b = -1.003, p < .05). The less monetary benefits offenders are able to generate from their criminal participation *in comparison* to their close criminal contacts (i.e. the lower their relative criminal earnings), the less they perceive

themselves as successful in their illegal ventures. This relationship holds true, above and beyond the actual amount of earnings reaped from illegal activities and is rather strong, as indicated by proportional odds ratios. For each increase of one unit in the proportion of their criminal contacts reaping higher illegal benefits, offenders' odds of perceiving themselves as highly successful in their criminal endeavors decreases by a factor of .367.

Of the proposed indicators of personal performance accomplishments, three are significantly and positively predictive of criminal self-efficacy: qualifications, authority, and criminal earnings. Similarly to what was previously found by Brezina and Topalli (2012), the more offenders believe one needs to be qualified to successfully commit the crimes in which they are themselves involved, the higher is their criminal self-efficacy beliefs are (b = .136, p < .10). Similarly, respondents who give orders to others in the crimes they commit (i.e. who are in a position of authority) are more likely to perceive themselves as criminally successful (b = .636, p < .05). Interpretation of proportional odds ratios suggest that this effect is rather strong: the odds of displaying high levels of self-efficacy of offenders who are in a position of authority are increased by a factor of 1.889 in comparison to those who do not hold such an authoritative position. Finally, the more criminal earnings offenders are able to reap from their criminal activities, the higher their criminal self-efficacy (b = .573, p < .01). This effect is rather strong, but interpretation needs to be done with caution. Offenders' odds of perceiving themselves as very successful in crime increases by a factor of 1.774 for each one unit increase in the log of total criminal revenues.[15]

[15] Results of ordered logistic regression models restricted to complete cases (n=134) were also conducted for comparison with results based on multiple imputation. These results can be found in appendix C. Results did not differ significantly, but the multiple imputation seemed to have yielded

Discussion

The aim of the present study was to build on the growing body of literature on criminal self-efficacy and to provide a thorough quantitative exploration of how offenders come to perceive themselves as successful in their illegal ventures. Inspired from the self-efficacy and social cognitive career theories' legacy (Bandura, 1997; Lent, Brown, and Hackett, 1994), it was hypothesized that, akin to self-efficacy pertaining to legitimate occupations, criminal self-efficacy is a complex subjective concept determined by a wide array of factors. Our results largely support the hypothesis that offenders' perceptions of their success in crime are complexly built from individual and environmental characteristics, as well as from direct personal experiences with crime.

The previously acknowledged theoretical importance of individual characteristics and contextual affordances in criminal involvement offers some interesting insights as to why these factors were found to be so central in the determination of offenders' perceptions of criminal success in the present study. Age has consistently been found to be inversely related to rates of offending (Glueck and Glueck, 1940; Hirschi and Gottfredson, 1983; Shover and Thompson, 1992). Whereas age could indirectly lead to decreased criminal self-efficacy beliefs merely because offenders' direct experience with crime diminishes, an alternative explanation is also possible. Laub and Sampson (2003) have suggested that offenders not only reduce the rates of their illegal activities as they age, but also come to revise their personal identity. Similarly, Shover (1985) argues that as they get older, criminally-oriented individuals become aware of their "time-until-death", and as such: "become increasingly unwilling to risk

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greater statistical power, allowing for qualifications and authority in crime commission to significantly predict criminal self-efficacy.

wasting their remaining years in prison" (1992: 91). In line with these authors, aging offenders may become fatigued of being entrenched in an illegal lifestyle and may come to feel the burden of costs inherent in criminal ventures. The cumulative effect of previous arrests and incarcerations may also incite disillusionment and encourage them to stop perceiving criminal involvement in a favorable light. The modifications in aging offenders' perceptions of their future may thus reduce their incentives to define themselves as being criminally successful, as this necessarily entails endorsing a criminal identity.

Offenders with low educational attainments, as well as those with unsatisfactory legitimate earnings tended to perceive themselves as more criminally successful than their more educated and more financially well-off counterparts. This finding is in line with Agnew et al.'s (1996) quantitative test of strain theory, in which the combination of these constraints may lead to dissatisfaction with monetary status, i.e., strain (Cloward and Ohlin, 1960; Merton, 1968). Moreover, it is also in line with qualitative inquiries suggesting that individuals with inadequate legal structures of opportunities are not only more likely to turn to crime, but also to develop positive criminal identities. In his ethnographic account, Anderson (1999) argues that residents abiding by a widely accepted "code of the street" come to develop positive self-images in spite of their limited, if at all existent, involvement in the legal realm of work. These self-images, he argues, are partly dependent upon people's ability to successfully commit crimes. As also suggested in our results, and as argued by Brezina and Topalli (2012), there thus seems to be an inverted relationship between legitimate and criminal self-efficacy beliefs, whereby offenders who can't develop legitimate success perceptions are more likely to willingly turn to criminally successful ones.

Our results further suggest that as they gain more personal exposure to crime, offenders might come to rely less on co-offenders' and mentors' performances as models for success, but more as a forming a comparison group against which their own performance can be gauged. This is consistent with our finding that offenders having high proportions of their criminal contacts reaping higher earnings from illegal activities than themselves have lower perceptions of personal success in crime. This is in line with recent research on the friendship paradox (Feld, 1991), which suggests that comparative normative groups are important in the development of individual self-percepts (Grund, in press). As individuals evaluate their attributes, they are unmistakably influenced by the attributes of their social surrounding – and this is true of many (if not all) life situations. To illustrate simply, a highly renowned and productive researcher in a given university can suddenly become unnoticeable when working in another university where performance standards are higher. Our results suggest that offenders' evaluations of their criminal capabilities are similarly influenced by the social niche in which they operate. Fully comprehending how criminal self-efficacy develops requires acknowledging the fact that several offenders do not operate in a social vacuum.

Direct personal experience with crime, as measured with qualifications, authority and criminal earnings, was also found to be important in the formation of self-referent criminal efficacy. As predicted, achieving high monetary gains from criminal activities was found to be associated with higher levels of self-efficacy. Whereas this particular result could be interpreted as tautological (objective success leads to perceptions of success), we argue that our results warrant a finer interpretation in line with research on conventional career success and self-efficacy. One of their most consistent findings is that subjectively defined career success is multidimensional and that is it based on both subjective features such as self-esteem

and having a sense of competence, and objective features such as rank and promotions (Gattiker and Larwood, 1986; Peluchette, 1993). In other words the subjective definition of success does not equate with its purely objective definition. In this study, we found subjectively defined criminal success to be based on more than classical objective measures of success such as earnings and arrests. To perceive themselves as successful, offenders require not only interesting illegal monetary attainments, but also a sense that they perform better than their close criminal peers, that they are involved in crimes they believe to require high qualifications, and that they are in a position of authority. Individual characteristics (age) and contextual opportunities (education and legitimate earnings) were also important factors in the formation of criminal self-efficacy.

The issue of proper measurement is central in the self-efficacy literature, and researchers have dedicated considerable efforts in the construction of valid scales tapping into this central concept. Although the measure of criminal self-efficacy investigated in the present article has been successfully used in previous research (Brezina and Topalli, 2012; Tremblay and Morselli, 2000), it bares certain limitations that need to be acknowledged. Some studies on legitimate self-efficacy have successfully resorted to single-item measures (Raudenbush, Rowan, and Cheong, 1992; Ross, Cousins, and Gadalla, 1996), but multiple items scales are more frequently used as they are thought to more precisely assess all aspects of domain-specific efficacy beliefs (Betz and Hackett, 1983; Enochs and Riggs, 1990; Lent, Brown, and Larkin, 1984; Pearlin, Menagahn, Lieberman, and Mullan, 1981). Moreover, as recognized by Brezina and Topalli (2012), this criminal self-efficacy measure assesses participants' efficacy pertaining to crime at large, thereby disregarding crime specific efficacy beliefs. Self-efficacy theorists have pointed out that the predictive utility of self-efficacy is diminished when these

self-beliefs are assessed at broad levels of specificity (Bandura, 1997; Bandura, 2006; Betz and Hackett, 2006; Pajares, 1997; Usher and Pajares, 2008). This does not imply, however, that largely specified self-efficacy are of no theoretical and empirical interest and research with single-item, broad specificity level measures of self-efficacy have been successfully conducted in the past (Bandura, 1997; Brezina and Topalli, 2012). Another limitation of our criminal self-efficacy measure concerns its retrospective nature. Respondents were required to report their perceived criminal success over the past three years. Furthermore, our measure did not allow for the evaluation the evolution of criminal self-efficacy over time. A more theoretically sound measure of self-efficacy should be forward looking and take into consideration its evolution through offenders' criminal trajectories.

Similarly, it is important to acknowledge the limitations regarding the various measures used to operationalize the concepts central to the development of self-efficacy in the present study. Whereas studies on conventional self-efficacy generally rely on instruments specifically built to evaluate the concepts they intend to measure, this was not our case. Research centered on developing and validating instruments tapping into the four informational sources – personal performance accomplishments, vicarious learning, social persuasion, physiological states and reactions – as well as person inputs and background contextual affordances pertaining to criminal ventures should be carried out for proper operationalization of concepts.

Our decision to exclude offenders who had not participated in money-oriented crimes during the window period was warranted by our hypothesis that criminal earnings are an important factor in the determination of criminal self-efficacy. However, and as our results

suggest, money is not the only factor influencing offenders' perceptions of their success in crime. Individuals committed to non-lucrative crimes such as violent and sexual offenses most likely also come to develop individual perceptions of success in their illicit activities. Future research should evaluate how self-efficacy is formed in these offenders and if it differences exist between them and money-oriented offenders. Moreover, all offenders in the present study sample were incarcerated at the time of interview. Their incarceration status might have led them to revise their perceptions of success in crime, and made them less likely to view themselves as highly successful, thereby restricting the variability in responses on the self-efficacy measure. It also needs to be acknowledged that incarcerated offenders might not be representative of offenders in general. As such, results from this study need to be interpreted with caution and future research should aim at uncovering whether the same factors also influence perceptions of success in crime among active offenders.

Finally, while we strongly believe that understanding how offenders eventually develop perceptions of success in their illegal ventures is an important theoretical pathway to understanding criminal trajectory outcomes such as persistence and desistance, our dataset did not include measure of future behavior, nor of behavioral intentions. While Brezina and Topalli (2012) included a measure of behavioral intentions (intentions to "go straight") in their study, and found that higher perceptions of success in crime were predictive of higher intentions to stop committing crime, future research should evaluate the impact of criminal self-efficacy on actual criminal behavior (self-reported or official data), as intentions and actions do not always equate.

Conclusion

A few decades ago, Bandura (1977) introduced the notion of self-efficacy in socio-cognitive theory and it is now generally recognized that self-efficacy beliefs are among the most fundamental and pervasive mechanisms of human agency (Bandura, 1989). Defined as the purposeful execution of individual will (Matza, 1964), human agency is hypothesized to exert a potent influence on much human behavior. However, as was acknowledged by social cognitive theorists, human agency does not operate in a vacuum. Rather, a complex bidirectional interaction is constantly at play between individual, environmental, and behavioral characteristics, whereby people are not merely shaped by their surrounding environment and their biological/genetics endowments, but are also actively impacting them (Bandura, 1997). They are observers/receivers, but also active actors of the unraveling of their life-course.

Although this has been recognized time and again by criminological theorists and researchers, a behavioristic determinism has overwhelmingly flooded the criminology literature (Maruna, 2001). The underlying assumption that inevitably ensues from this theoretical perspective is that offenders are somehow behaviorally preprogrammed (Sampson and Laub, 2005), following the prescribed path that has been assigned to the typological group in which they are believed to belong (see Moffit, 1993). Pressures from the political and criminal justice realms, combined with research suggesting that offenders can effectively and justifiably be categorized has led to a "fixation on the prediction of later crime from childhood characteristics" (Sampson and Laub, 2005: 40). In this operant conditioning take on human action, it is implied that past behavior affects future behavior in a causal sequence. Yet, the complexity of offending behavior (as of any human behavior) requires a greater consideration

of human will/agency and of its impact on individual courses of action. We largely agree with theorists like Maruna (2001) and Sampson and Laub (2005) who concur with the social cognitive intellectual legacy: a more cognitively sophisticated view of behavior is required for a comprehensive understanding of offending. Such a theoretical perspective puts the individual – in this particular case, the offender – back at the core of his or her personal experience. Evidently, as previously argued, this does not happen in a vacuum: through both their personal characteristics and their behaviors, individuals are influenced and in turn influence their environments.

Although we do not (and certainly cannot) pretend to offer such a complete framework for understanding the unraveling of offending, we believe our results are informative in this regard, nonetheless. Self-efficacy has been shown to influence multiple types of human behaviors, including career-related interests, choices and performance. Notwithstanding its illegal nature, crime is widely believed to be an economically driven behavior. As such, we believe it shares several common features with noncriminal ventures (Becker, 1968). Our findings suggest that, akin to perceptions of success in legitimate occupations, offenders come to develop differential levels of self-perceived criminal success. In addition to their individual characteristics and the environmental constraints in which they navigate, criminal self-efficacy beliefs are shaped by how offenders themselves perform (i.e. behave), and how they perceive significant others to perform. This brings support to the idea that cognitive appraisals are actively based on individual interpretations of surroundings. These, we believe, are in turn important determinant of future behavior. Perceiving themselves as successful in their criminal trajectories, offenders are more likely to pursue their illegal ventures than those believing to have limited success. The impact of subjectively defined perceptions pertaining to oneself on

actual courses of action cannot be understated and research on conventional self-efficacy has repeatedly demonstrated the predictive power of self-efficacy. In the criminal realm, this assertion is supported by Brezina and Topalli's (2012: 1054) finding that criminal self-efficacy is significantly and negatively predictive of offenders' "intentions to go straight". Evidently, behavioral intentions and actions are two distinct notions. It is therefore necessary that, in addition to more accurately defining criminal self-efficacy and its correlates, future research aims at understanding the link between these individual views of personal ability and persistence (or, eventually, desistance) in crime.

We acknowledge that pressures to safeguard the population's safety have certainly influenced criminologists' reluctance to more fully consider self-referent thinking patterns as a guide to offending motivation and actions. However, understanding criminal persistence, and thus eventually creating efficient measures to lower recidivism probabilities requires acknowledging the complexity of human cognition and behavior. Failure to do so will certainly lead to a misunderstanding of offenders who speak as blatantly as New York Red, one of Brezina and Topalli's (2012: 1058) interviewees: "When I first started out I was reckless… [But] I know what I'm doing [now]. Jail ain't gonna stop me. I tasted sweet success plenty of times and I'm still here."

Chapter 4

Conclusion

Discussion

The aim of the present study was to build on the growing body of literature on criminal self-efficacy and to provide a thorough quantitative exploration of how offenders come to perceive themselves as successful in their illegal ventures. Inspired from the self-efficacy and social cognitive career theories' legacy (Bandura, 1997; Lent, Brown, and Hackett, 1994), it was hypothesized that, akin to self-efficacy pertaining to legitimate occupations, criminal self-efficacy is a complex subjective concept determined by various factors. More specifically, we argued that criminal self-efficacy perceptions are developed as offenders interpret information emanating from four experiential sources: personal performance accomplishments, vicarious learning, social persuasion, and physiological states and reactions. Moreover, it was hypothesized that individual characteristics and background contextual affordances also exert a significant role on the formation of criminal self-efficacy. Our results largely support the hypothesis that criminal self-efficacy is complexly built from individual and environmental characteristics, as well as from personal experiences with crime.

Individual characteristics and contextual affordances were found to exert a direct and non-negligible influence on the development of criminal self-efficacy. The previously acknowledged theoretical importance of these indicators in criminal involvement offers some interesting clues as to why these factors have been found to be so central in the determination of offenders' perceptions of their success in crime. Age has consistently been found to be inversely related to rates of offending (Glueck and Glueck, 1940; Hirschi and Gottfredon, 1983; Shover and Thompson, 1992). Whereas age could indirectly lead to decreased criminal self-efficacy beliefs merely because offenders' direct experience with crime diminishes, an

alternative explanation is also possible. Laub and Sampson (2003) have suggested that offenders not only reduce the rates of their illegal activities as they age, but also come to revise their personal identity. Similarly, Shover (1985) argues that as they get older, criminally-oriented individuals become aware of their "time-until-death", and as such: "become increasingly unwilling to risk wasting their remaining years in prison" (1992: 91). In line with these authors, aging offenders may become fatigued of being entrenched in an illegal lifestyle and may come to feel the burden of the risks inherent in criminal ventures. The cumulative effect of previous arrests and incarcerations may also incite disillusionment and encourage them to stop perceiving criminal involvement in a favorable light. The modifications in aging offenders' perception of their future may thus reduce their incentives to define themselves as being criminally successful, as this necessarily entails endorsing a criminal identity.

Background contextual affordances were also found to exert a significant impact on criminal self-efficacy. Offenders with low educational attainments, as well as those with unsatisfactory legitimate earnings tended to perceive themselves as more criminally successful than their more educated and more financially well-off counterparts. As suggested by Agnew et al.'s (1996) quantitative test of strain theory, the combination of these constraints may lead to dissatisfaction with monetary status, i.e., strain (Cloward and Ohlin, 1960; Merton, 1968). Our results support this finding: among offenders, those who have lower chances of succeeding satisfactorily in legal occupations are more likely to define themselves as criminally successful than those who are less constrained by their environmental backgrounds. This is also in line with qualitative inquiries suggesting that individuals with inadequate legal structures of opportunities are not only more likely to turn to crime, but also to develop

positive criminal identities. In his ethnographic account, Anderson (1999) argues that residents abiding by a widely accepted "code of the street" come to develop positive self-images in spite of their limited, if at all existent, involvement in the legal realm of work. These self-images, he argues, are partly dependent upon people's ability to successfully commit crimes. As also suggested in our results, and as argued by Brezina and Topalli (2012), there thus seems to be an inverted relationship between legitimate and criminal self-efficacy beliefs, whereby offenders who can't develop legitimate success perceptions are more likely to willingly turn to criminally successful ones. This assertion is potently suggested in Maruna's (2001) study on desistance. While focusing on the reformative aspects of generative pursuits, the author argues that the desistance process requires offenders to find alternatives to crime that will provide them with positive perceptions of themselves, which they were previously able to find through crime. Although offenders in Maruna's inquiry are on the edge of desisting from their illegal trajectories, and not still active as are the offenders presented in the present study, the inverted association between legitimate and criminal self-efficacy remains clearly stipulated. One of the interviewees in the Liverpool Desistance Study puts it this way:

> "The only thing that is going to improve a geezer is changing your currency of life, from pounds to something slightly more heady: yoga, or art, or music, or whatever. The people I know from nick that took up art, they get an equivalent buzz. When I finish a painting, I get the same buzz as I got when I landed 80 kilos on a beach in Spain. So, I don't make much money, I'm quite poor, but I altered the currency. Life's currencies can be less, you know, hard cash, basically less physical. What do you spend your money on? Having a nice time. For what? So you can enjoy life. But if I can enjoy life by painting pictures, talking to impoverished artists and getting arse-holed every now and again, going to exhibitions, it suits me fine" (Maruna, 2001: 100).

Finding alternative legal endeavors that lead offenders to perceptions of personal success might be one of the pathways through which criminal trajectories may be disrupted. Understanding how offenders eventually come to define themselves as criminally successful

thus requires a careful consideration of individual characteristics and of legitimate opportunities for a financially and personally satisfying occupational status.

As opposed to what was originally hypothesized, social persuasion did not exert a significant impact on criminal self-efficacy in the present thesis. Vicarious learning did so only partially. Interestingly, however, the two indicators that fail to significantly influence offenders' perception of their success in crime - presence of criminal contacts and mentorship - are both hypothesized to be potent determinants of self-efficacy when individuals have not yet had personal direct experiences with an activity, or when they have not yet developed the skills required to perform adequately (Bandura, 1997). As previously argued, most respondents in this study have previous experience with crime and have thus had time to potentially perfect required criminal skills. As they gain more personal exposure to crime, offenders might come to rely less on co-offenders' and mentors' performances as models for success, but more as a forming a comparison group against which their own performance can be gauged. This is consistent with our finding that offenders having high proportions of their criminal contacts reaping higher earnings from illegal activities than themselves have lower perceptions of personal success in crime. This is in line with recent research on the friendship paradox (Feld, 1991), which suggests that comparative normative groups are important in the development of individual self-percepts (Grund, in press). As individuals evaluate their attributes, they are unmistakably influenced by the attributes of their social surrounding – and this is true of many (if not all) life situations. To illustrate simply, a highly renowned and productive researcher in a given university can suddenly become unnoticeable when working in another university where performance standards are higher. Our results suggest that offenders' evaluations of their criminal capabilities are similarly influenced by the social niche

in which they operate. Fully comprehending how criminal self-efficacy develops requires acknowledging the fact that several offenders do not operate in a social vacuum.

Bandura (1997) and social cognitive career theorists (Lent, Brown, and Hackett, 1994) originally hypothesized that direct performance accomplishments are the most potent source of information upon which self-efficacy rests. Whereas we found multiple factors to be important determinants of criminal self-efficacy, our results also suggest that direct personal experience with crime is important in the formation of perceptions of success in crime. As highlighted by Shover (1996) in his study on persistent thieves, displaying technical skills and competence in one's criminal endeavor seems to be linked to a more positive criminal self-image. In the same line of thinking, we found that offenders who participated in crimes which their believed to require high levels of qualifications were more likely to define themselves as criminally successful than those who participated in crimes requiring low levels of qualifications. Similarly, giving orders to co-offenders during criminal ventures – being in a position of authority – led to significantly higher perceptions of criminal success. This finding is in accordance with research on legitimate employment, which suggests that authority is an important factor of perceived occupational success and prestige (Chambaz, Maurin, and Torelli, 1998; Gattiker and Larwood, 1986; Sturges, 1999; Nabi, 2001). Moreover, and as predicted, achieving high monetary gains from criminal activities was found to be associated with higher levels of self-efficacy. Whereas this particular result could be interpreted as tautological (objective success leads to perceptions of success), we argue that our results warrant a finer interpretation in line with research on conventional career success and self-efficacy. One of their most consistent findings is that subjectively defined career success is multidimensional and that is it based on both subjective features such as self-esteem and

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The issue of proper measurement is central in the self-efficacy literature, and researchers have dedicated considerable efforts in the construction of valid scales tapping into this central concept. Although the measure of criminal self-efficacy investigated in the present article has been successfully used in previous research (Brezina and Topalli, 2012; Tremblay and Morselli, 2000), it bares certain limitations that need to be acknowledged. Some studies on legitimate self-efficacy have successfully resorted to single-item measures (Raudenbush, Rowan, and Cheong, 1992; Ross, Cousins, and Gadalla, 1996), but multiple items scales are more frequently used as they are thought to more precisely assess all aspects of domain-specific efficacy beliefs (Betz and Hackett, 1983; Enochs and Riggs, 1990; Lent, Brown, and Larkin, 1984; Pearlin, Menagahn, Lieberman, and Mullan, 1981). Moreover, as recognized by Brezina and Topalli (2012), this criminal self-efficacy measure assesses participants' efficacy pertaining to crime at large, thereby disregarding crime specific efficacy beliefs. Self-efficacy theorists have pointed out that the predictive utility of self-efficacy is diminished when these

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crime. Individuals committed to non-lucrative crimes such as violent and sexual offenses most likely also come to develop individual perceptions of success in their illicit activities. Future research should evaluate how self-efficacy is formed in these offenders and if it differences exist between them and money-oriented offenders. Moreover, all offenders in the present study sample were incarcerated at the time of interview. Their incarceration status might have led them to revise their perceptions of success in crime, and made them less likely to view themselves as highly successful, thereby restricting the variability in responses on the self-efficacy measure. It also needs to be acknowledged that incarcerated offenders might not be representative of offenders in general. As such, results from this study need to be interpreted with caution and future research should aim at uncovering whether the same factors also influence perceptions of success in crime among active offenders.

Finally, while we strongly believe that understanding how offenders eventually develop perceptions of success in their illegal ventures is an important theoretical pathway to understanding criminal trajectory outcomes such as persistence and desistance, our dataset did not include measure of future behavior, nor of behavioral intentions. While Brezina and Topalli (2012) included a measure of behavioral intentions (intentions to "go straight") in their study, and found that higher perceptions of success in crime were predictive of higher intentions to stop committing crime, future research should evaluate the impact of criminal self-efficacy on actual criminal behavior (self-reported or official data), as intentions and actions do not always equate.

Conclusion

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actual courses of action cannot be understated and research on conventional self-efficacy has repeatedly demonstrated the predictive power of self-efficacy. In the criminal realm, this assertion is supported by Brezina and Topalli's (2012: 1054) finding that criminal self-efficacy is significantly and negatively predictive of offenders' "intentions to go straight". Evidently, behavioral intentions and actual behaviors are two distinct notions. It is therefore necessary that, in addition to more accurately defining criminal self-efficacy and its correlates, future research aims at understanding the link between these individual views of personal ability and persistence (or, eventually, desistance) in crime.

We acknowledge that pressures to safeguard the population's safety have certainly influenced criminologists' reluctance to more fully consider self-referent thinking patterns as a guide to offending motivation and actions. However, understanding criminal persistence, and thus eventually creating efficient measures to lower recidivism probabilities requires acknowledging the complexity of human cognition and behavior. Failure to do so will certainly lead to a misunderstanding of offenders who speak as blatantly as New York Red, one of Brezina and Topalli's (2012: 1058) interviewees: "When I first started out I was reckless… [But] I know what I'm doing [now]. Jail ain't gonna stop me. I tasted sweet success plenty of times and I'm still here."

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Appendix A. Bivariate Correlations of Variables in Criminal Self-Efficacy Development Analysis Model (N = 212)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	1														
2. High school completed	.10	1													
3. Noncriminal earnings	-.08	-.07	1												
4. Hard drug use	-.09	.07	-.01	1											
5. Low self-control	-.32*	-.15*	-.06	.35*	1										
6. Number of criminal contacts	-.32*	-.06	.07	.06	.27*	1									
7. Presence of mentor	-.16*	-.15*	.13	.09	.25*	.41*	1								
8. Relative criminal earnings	.07	-.02	.02	.08	-.01	.05*	.03	1							
9. Predatory lambda	-.23*	-.05	.01	.24*	.32*	.15*	.08	-.07	1						
10. Market lambda	-.22*	-.14*	-.05	.14*	.34	.43*	.28	.07	-.04	1					
11. Number of arrests	-.15*	-.07	-.09	-.04	-.03	.18*	.08	-.05	-.06	.15*	1				
12. Qualifications	-.02	.13	-.10	-.05	-.03	.11	.08	.04	.04	.01	.01	1			
13. Authority	-.32*	.01	-.06	-.08	.16*	.52*	.19*	-.01	.08	.38*	.19*	.19*	1		
14. Criminal earnings	-.32*	-.01	-.10	.19*	.33*	.43*	.30*	.03	.39*	.48*	.13*	.22*	.44*	1	
15. Criminal self-efficacy	-.31*	-.20*	-.13*	.10	.27*	.30*	.21*	-.13*	.21*	.29*	.08	.16*	.38*	.56*	1

* $p < .05$

Appendix B. Auxiliary Variables and Imputation Methods used in Multiple Imputation using Chained Equation

Imputed variables	Imputation method	Additional auxiliary variables
Education	Logistic regression	Types of crimes committed; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; age at first crime; age at first arrest; age at first conviction; number of legal occupations; authority in legal occupations; prestige of legal occupations; qualifications of legal occupations; legitimate self-efficacy
Noncriminal earnings	Predictive mean matching	Types of crimes committed; length of current sentence; alternative sentences; alcohol use; marijuana use; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; number of legal occupations; number of months legally worked; authority in legal occupations; prestige of legal occupations; qualifications of legal occupations; legitimate self-efficacy
Low self-control	Linear regression	Types of crimes committed; length of current sentence; alternative sentences; alcohol use; marijuana use; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; age at first crime; age at first arrest; age at first conviction; number of months legally worked; legitimate self-efficacy
Mentorship	Logistic regression	Types of crimes committed; alternative sentences; alcohol use; marijuana use; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; legitimate self-efficacy
Relative earnings	Predictive mean matching	Types of crimes committed; length of current sentence; alcohol use; marijuana use; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; number of months legally worked
Predatory lambda	Predictive mean matching	Types of crimes committed; length of current sentence; alternative sentences; alcohol use; marijuana use; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; age at first crime; age at first arrest; age at first conviction; number of legal occupations; number of months legally worked; prestige of legal occupations; qualifications of legal occupations; legitimate self-efficacy

Appendix B. Continued

Imputed variables	Imputation method	Additional auxiliary variables
Market lambda	Predictive mean matching	Types of crimes committed; length of current sentence; alternative sentences; alcohol use; marijuana use; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; age at first crime; age at first arrest; age at first conviction; number of legal occupations; number of months legally worked; prestige of legal occupations; qualifications of legal occupations; legitimate self-efficacy
Number of arrests	Predictive mean matching	Types of crimes committed; length of current sentence; alternative sentences; alcohol use; marijuana use; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; age at first crime; age at first arrest; age at first conviction; number of legal occupations; number of months worked
Qualifications	Predictive mean matching	Types of crimes committed; length of current sentence; alternative sentences; alcohol use; marijuana use; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; age at first crime; age at first arrest; age at first conviction; authority in legal occupations; prestige of legal occupations; qualifications of legal occupations; legitimate self-efficacy
Authority	Logistic regression	Types of crimes committed; length of current sentence; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; authority in legal occupations
Criminal earnings	Predictive mean matching	Types of crimes committed; length of current sentence; alternative sentences; alcohol use; marijuana use; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; number of legal occupations; number of months legally worked; authority in legal occupations; prestige of legal occupations; qualifications of legal occupations; legitimate self-efficacy
Criminal self-efficacy	Ordinal regression	Types of crimes committed; alternative sentences; alcohol use; marijuana use; prestige of criminal activities; number of months criminally active; number of months free of criminal justice supervision; age at first crime; age at first arrest; age at first conviction; number of months legally worked; prestige of legal occupations; qualifications of legal occupations; legitimate self-efficacy

Appendix C. Odds Ratios and Confidence Intervals of Multiply Imputed Data and Complete Case Analysis for Final Model of Ordered Logistic Regression Predicting Criminal Self-Efficacy

Variables	Complete case (n=134)			Multiple imputation (n=212)		
	P.OR	**95% CI**	***p* value**	**P.OR**	**95% CI**	***p* value**
Age	.957	.910, 1.006	.086	.967	.929, 1.004	.081
High school completed	.303	.127, .723	.007	.328	.171, .631	.000
Noncriminal earnings	.762	.619, .937	.010	.866	.748, 1.004	.049
Hard drug use	1.573	.629, 3.933	.333	1.387	.719, 2.676	.329
Low self control	.984	.937, 1.033	.524	1.008	.971, 1.046	.689
Number of contacts	1.020	.901, 1.155	.754	.992	.906, 1.087	.869
Mentor	1.150	.465, 2.846	.762	1.195	.574, 2.486	.633
Relative earnings	.359	.116, 1.116	.077	.338	.139, .823	.017
Predatory lambda	.951	.572, 1.580	.845	.985	.699, 1.388	.931
Market lambda	.943	.701, 1.269	.700	1.002	.804, 1.248	.987
Number of arrests	.996	.931, 1.067	.917	.986	.940, 1.035	.577
Qualifications	1.143	.930, 1.405	.203	1.157	.990, 1.353	.067
Authority	1.087	.409, 2.893	.867	2.122	1.014, 4.442	.046
Criminal earnings	3.006	1.840, 4.910	.000	1.735	1.300, 2.316	.000

ABBREVIATIONS: P.OR = proportional odds ratios, CI = confidence interval