

## SUPERMAX INCARCERATION AND RECIDIVISM\*

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*Since the early 1980s, supermax incarceration has emerged as a common feature of the American corrections landscape. This special type of high-cost housing, which involves extended isolation with little programming or contact with others, remains largely unevaluated and is of interest for three reasons. First, the study of supermax housing offers a unique opportunity to understand the factors related to the successful reentry of offenders back into society. Second, it affords an opportunity to test the claims, many of which are grounded in mainstream criminological theory, that have been made about the putative effects of supermax confinement. Third, it provides an empirical touchstone that can help inform policy debates about the merits of such confinement. Examining data from the Florida Department of Corrections, we test competing hypotheses about the effects of supermax housing on 3-year recidivism outcomes. We find evidence that supermax incarceration may increase violent recidivism but find no evidence of an effect of the duration of supermax incarceration or the recency of such incarceration to the time of release into society. We discuss the findings and their implications for theory, research, and policy.*

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When the Eastern State Penitentiary opened in 1829, its emphasis on solitary confinement established it as a forerunner of the supermaximum security housing that exists today in all but a small handful of states (Kurki and Morris, 2001; Morris and Rothman, 1995). Prison reforms came and went, and then, in 1934, Alcatraz opened. This federal prison facility embodied much of what today is considered “supermax” confinement, but it closed in 1963. Twenty years later, in response to a prison riot, the federal prison in Marion, Illinois, reintroduced the idea of placing the putatively “worst of the worst” inmates in permanent lockdown mode, with inmates placed in single-cell confinement and having few if any privileges (Richards, 2008; Ward and Werlich, 2003). At that time, there were no state-level equivalents to the Marion facility.

Then, in a little more than two decades, 44 states established supermax housing similar to that of the Marion facility (Mears, 2008). States have always relied on specialized housing for certain inmates, but as Riveland (1999: 5) has stressed, “seldom have those prisons operated on a total lockdown basis as normal routine. Even prisons designated as maximum security have generally allowed movement, inmate interaction, congregate programs, and work opportunities.” The rapid spread of supermax housing makes it “one of the most dramatic features of the great American experiment with mass incarceration during the last quarter of the 20th century” (King, 1999: 163). Perhaps equally dramatic is the fact that so little is known about the effects of such housing (Briggs, Sundt, and Castellano, 2003; Kurki and Morris, 2001; Mears and Watson, 2006; Pizarro and Narag, 2008). One especially critical question that remains largely unaddressed is whether such housing affects the recidivism of inmates exposed to it (Lovell, Johnson, and Cain, 2007; Pizarro, Stenius, and Pratt, 2006).

The prevalence of supermax housing and the dearth of knowledge about its effects on recidivism make it of particular interest for several reasons. First, this housing has emerged in a context in which prisoner reentry has assumed considerable policy relevance and has generated marked interest in ways to increase public safety. Second, the use of such housing provides an opportunity to test hypotheses about the effects of extreme isolation on prisoner reentry. Third, supermax housing not only has been a lightning rod for controversy but also constitutes a costly investment (Richards, 2008); thus, information about its effects can help inform debates regarding whether such housing should be continued, expanded, or eliminated. To be clear, recidivism is but one dimension of relevance for evaluating supermax prisons (Mears and Watson, 2006), but it is nonetheless an important one (Lovell, Johnson, and Cain, 2007; Pizarro and Stenius, 2004).

The goal of this article is to advance scholarship on prisoner reentry, offending, and debates about supermax prisons. To this end, we draw on

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data from the Florida Department of Corrections to test hypotheses about the effects of supermax housing. We begin first by discussing prisoner reentry and the emerging literature on supermax incarceration. We then develop competing hypotheses about the influence of supermax housing on five types of recidivism. After discussing the findings, we conclude by discussing the implications of the study for theory, research, and policy.

### BACKGROUND: PRISONER REENTRY AND SUPERMAX HOUSING

Since the early 1980s, a “get tough” orientation toward crime developed (Garland, 2001; Western, 2006) and is reflected in incarceration trends. For example, between 1980 and 2007, the U.S. population grew by 33 percent, whereas the number of federal and state prisoners grew by almost 400 percent, from 319,598 prisoners to 1,595,034 (Bureau of Justice Statistics, 2008; Sabol and Couture, 2008). One result has been the emergence of a prominent social problem—namely, the reentry of ever-larger numbers of inmates back into society. Recent estimates indicate that more than 700,000 inmates are released from prisons annually, which is only slightly less than the total number of new admissions each year (Sabol and Couture, 2008: 4). The fact that roughly two thirds of released inmates will be rearrested within 3 years (Langan and Levin, 2002) and the fact that many “have been born with, or have developed, serious social, psychological, and physical problems,” and “will be released to poor inner-city communities with few services” (Petersilia, 2005: 45) has only served to amplify concerns about prisoner reentry.

Perhaps not surprisingly, the issue has garnered attention from Democrats and Republicans alike, including the two most recent presidential administrations (Travis, 2005). Naturally, considerable interest has emerged in finding ways to improve reentry outcomes, especially offending patterns, among released prisoners; yet considerable gaps remain in the research literature on factors that influence recidivism (Cullen, 2005; Cullen and Gendreau, 2000; Kubrin and Stewart, 2006; Kurlychek, Brame, and Bushway, 2006; Petersilia, 2003; Visher and Travis, 2003). This situation has given rise to efforts to identify not only “what works” but also “what doesn’t” (Farabee, 2005; Sherman et al., 1997). It also has contributed to an increased interest in understanding patterns of persistence in and desistance from offending and how certain life events or turning points may influence them (Piquero, Farrington, and Blumstein, 2007; Sampson and Laub, 2005).

In this context, a focus on supermax housing is timely because such housing has spread so rapidly without information about its effects and

because such a focus may offer insight into the reentry experience, recidivism in particular, of some of the most serious offenders in prison systems (Pizarro, Stenius, and Pratt, 2006). In so doing, it can shed light on whether supermax incarceration may constitute an example of “what works,” as advocates claim, or of a policy that either does not work or is harmful, as critics claim.

Conservative estimates indicate that at least 25,000 inmates in the United States reside in supermax housing (Briggs, Sundt, and Castellano, 2003; King, 1999; Mears, 2008; National Institute of Corrections, 1997). Although some disagreement exists about the best definition of such housing, broad consensus seems to exist among scholars and practitioners about some core features. These features include 23-hour-per-day single-cell confinement for an indefinite period of time with little to no programming, services, or visitation, and with security measures that significantly exceed those of maximum-security prisons (Mears and Castro, 2006; Naday, Freilich, and Mellow, 2008; Riveland, 1999).

Case study accounts consistently depict the conditions of supermax housing as contributing to an experience fundamentally different from that which other inmates have, even those in maximum-security housing or temporary segregation (Haney, 2003; Irwin, 2005; Kurki and Morris, 2001; Mears and Watson, 2006; Rhodes, 2004; Toch, 2003). Some key themes in these accounts include a lack of due process before and after placement in such housing to register complaints or appeals; mistreatment, degradation, and abuse; increased mental illness; difficulty in managing sustained isolation from others; and a lack of consistent access to any kind of programming or services. Interviews with inmates in supermax housing by Rhodes (2004: 55) reveal typical responses to those reported in other qualitative accounts. One inmate with whom she spoke, for example, emphasized that supermax housing “is meant to break a man’s spirit, that’s what it’s about,” and another noted, “If I’m being good and they don’t give me nothing, I can’t take that kind of rejection. . . . I just went off, spitting, urinating, tearing up my whole cell, the whole nine yards.” Her interviews with officers reinforced such images. One stated of his peers: “The term ‘supercop’ comes up—most of them won’t give the inmates the time of day. They won’t de-escalate a situation . . . they almost want to accelerate it. It makes them feel powerful and commanding” (2004: 57). Similar observations can be found in federal court cases, including the U.S. Supreme Court’s *Madrid v. Gomez* decision in 1995, which concerned the operations at California’s Pelican Bay facility (King, Steiner, and Breach, 2008).

In short, supermax incarceration, as Sundt, Castellano, and Briggs (2008: 101) have succinctly described it, “is, by design, painful and demeaning.” The extended isolation and limited social contact associated

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with supermax housing, as well as the possible exposure to additional deprivations, places the supermax experience in a category by itself (Haney, 2003; King, 2005; O'Keefe, 2008; Toch, 2003). The reportedly much greater costs of building and operating such housing—by some estimates up to three times greater stemming from a greater reliance on single-cell confinement, technology, and a higher officer-to-inmate ratio—also places it in a unique category (Lawrence and Mears, 2004; Richards, 2008; Rive-land, 1999). Even so, few empirical studies have evaluated the impact of such housing on their intended outcomes (Pizarro and Narag, 2008).

One exception is work by Briggs, Sundt, and Castellano (2003), which examined whether the emergence of supermax housing in three states improved prison system order and safety. Their assessment suggested that the housing contributed to no decrease in system-wide order and might have contributed to increased staff safety. Subsequent analyses by Sundt, Castellano, and Briggs (2008) focused on Illinois and reinforced the view that supermax housing had little effect on inmate-on-inmate violence but may have decreased inmate-on-staff assaults; the analyses also pointed to the possibility that the housing reduced the use of lockdowns at other prisons (Sundt, Castellano, and Briggs, 2008).

These two studies focused on the prison system, but another outcome salient to any debate about supermax housing is its effect on public safety and, in particular, the question of whether such housing affects the recidivism of inmates exposed to it (Pizarro and Narag, 2008). One study by Ward and Werlich (2003: 64) attempted to address the issue by examining the rates of reincarceration of released Alcatraz inmates (50 percent) and Marion inmates (49 percent), respectively. Their study is notable for providing one of the first empirical footholds on how supermax incarceration might influence subsequent inmate behavior, but it included no controls for prior behavior, and as King (2005) has noted, it did not include any comparison groups. As a result, and as Ward and Werlich (2003: 69) emphasized, it is difficult to know whether the Alcatraz or Marion prison experiences increased the recidivism of inmates relative to similar inmates who were not placed in these prisons.

A more direct assessment of the question comes from a recent study by Lovell, Johnson, and Cain (2007: 643). The researchers examined 200 inmates released from supermax housing in Washington State and then created a comparison group of 200 non-supermax inmates. They found no difference between the two groups in their rate of recidivism. However, when they examined direct-release inmates and compared them with the matched group, they found that these inmates were more likely to commit a new felony if directly released from supermax incarceration to society. Specifically, 69 percent of the 55 direct-release inmates were convicted of

a new felony within 3 years of release compared with 51 percent of their 55 counterparts (2007: 644).

These findings suggest that an empirical basis exists for questioning the effectiveness of supermax housing in reducing recidivism and, in turn, the very use of such housing. At the same time, important questions remain unaddressed by the study, in part because of sample size limitations (King, 2005; Pizarro and Narag, 2008: 647). For example, the study by Lovell, Johnson, and Cain (2007) was not able to match on a wide range of controls and did not simultaneously match with respect to multiple measures of prior record and count measures of different types of in-prison behavior. For similar reasons, it did not examine different types of recidivism, nor did it explore the theoretical reasons for why supermax housing might either increase or decrease recidivism and, in particular, violent offending. Even so, the study provides intriguing evidence that supermax housing might in fact increase offending. Additional studies are needed, such as this one, that rely on larger samples and that can determine whether the results were perhaps specific to the study by Lovell, Johnson, and Cain (2007) or to the state of Washington. Researchers must also evaluate whether the use of a more rigorous matching approach with a well-grounded set of matching variables, along with a focus on disaggregated categories of offending, might yield different results. At the very least, we need to articulate clearly the theoretical rationales for the beneficial or harmful effects of supermax housing on recidivism.

## HYPOTHESES

Discussions of supermax incarceration frequently assume that the theoretical underpinnings of such incarceration are straightforward. Few individuals systematically assess these underpinnings (see, however, Mears and Watson, 2006; Pizarro and Narag, 2008; Pizarro and Stenius, 2004), and apart from the article by Lovell, Johnson, and Cain (2007), none provide a rigorous empirical test of whether such incarceration actually increases or decreases recidivism. That situation may reflect the biases of some observers, or it may reflect a situation in which, depending on one's vantage point, the reasoning for an effect seems so self-evident as to not require articulation. A careful reading of the literature reveals, however, that strong theoretical grounds exist to support competing views about the impacts of supermax incarceration. Articulating these grounds is important because, ultimately, any observed impacts have more credibility if they are linked to theory. At the same time, findings inconsistent with theory may point to avenues along which it may need to be modified or developed. Thus, we will develop in this article hypotheses that link theory

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to competing expectations about the effects that supermax confinement may have on recidivism.

We begin first with arguments for the hypothesis that supermax confinement decreases recidivism. The central argument centers around the notion of specific deterrence (Mears and Watson, 2006; Pizarro and Stenius, 2004; Ward and Werlich, 2003) and, more pointedly, a deterrent effect stemming from the severity of punishment. The conditions associated with supermax housing create what seems, by many accounts (King, Steiner, and Breach, 2008; Kurki and Morris, 2001; Rhodes, 2004), to constitute a substantially more aversive situation than that associated with traditional housing (see, however, King, 2005). Accordingly, inmates who experience supermax incarceration should be deterred from committing any crime, especially those crimes that might result in a return not only to prison but also to supermax housing.<sup>1</sup>

Other theoretical arguments for the hypothesis also exist. King (2005) and Pizarro and Narag (2008) have observed that supermax confinement may disrupt exposure to negative peer influences, which, if true, would accord with Sutherland's (1947) differential association theory and with social learning theory (Akers, 1998). Based on interviews with supermax inmates, King (2005: 129) noted that such confinement may enable some inmates to develop more patience and self-control: "Over half the prisoners I interviewed reported at least some positive feedback on their experience in supermax: it had given them time to think and reflect, and in so doing they had learned patience and control, or had been given the opportunity to turn themselves around away from the influence of their peers" (see also Lovell et al., 2000; Mears and Watson, 2006). If the inmates he interviewed are representative, then, per self-control theory (Gottfredson, 2006), supermax incarceration may produce reduced rates of recidivism. It is true that the theory argues that self-control does not substantially change over time; even so, recent empirical research suggests that it can and does change (Hay and Forrest, 2006). An additional argument has been that the isolation in supermax housing gives inmates a chance to reflect "on the wrongfulness of their actions" (Pizarro and Narag, 2008: 30). This argument dovetails with several theories, including differential association (Sutherland, 1947) and reintegrative shaming (Braithwaite, 1989), that emphasize the role of cognitive understandings of right and

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1. One counter to a specific deterrence argument bears mention. Several scholars have emphasized that supermax placement may not be a certain outcome; from that standpoint, a deterrent effect would be undermined. At the same time, some inmates may prefer supermax confinement to housing that involves association with other inmates, which again, would undermine a deterrent effect (King, 2005; Mears and Watson, 2006; Pizarro and Narag, 2008).

wrong behavior. It also enjoys considerable support from a large evaluation literature on the positive role that changes to antisocial cognitions can have on criminal behavior (Cullen and Gendreau, 2000).

What about the hypothesis that supermax housing increases recidivism? Perhaps the strongest argument for a criminogenic effect of supermax incarceration centers around what has been termed the “rage hypothesis” (King, 2005; Korn, 1988; Ward and Werlich, 2003)—namely, the idea that inmates become so angry and frustrated by their experience in supermax that they emerge from it with an active desire, or a heightened readiness, to exact revenge on society. Such an argument clearly flows from general strain theory (Agnew, 1992, 2006), in that several important conditions are conjointly present in a supermax setting, including the failure to achieve positively valued goals, the imposition of barriers to achieving such goals, the withdrawal of positive stimuli, and the exposure to negative stimuli.

A second argument stems from consideration of the nature of supermax confinement, which allows inmates limited to no programming or visitation and impedes the ability to learn how to manage interpersonal conflict (Bottoms, 1999) or to develop reentry plans, which can be critical to successful transitions back into society (Petersilia, 2003; Thompson, 2008; Visher and Travis, 2003). Illustrative of such possibilities is a recent study that found that inmates not visited in prison are at greater risk of recidivating (Bales and Mears, 2008). As a general matter, then, the ability of supermax inmates to maintain or develop a strong social bond through contact with others (e.g., visitation) is diminished, which, according to social bond theory, would increase the risk of recidivism (Gottfredson, 2006; Hirschi, 1969).

An additional argument comes from accounts of inmates reporting that their placement in supermax housing was unfair and that they are treated in an extreme, unfair, and demeaning way (Irwin, 2005; King, 2005; Kurki and Morris, 2001; Rhodes, 2004). From the perspective of reintegrative shaming (Braithwaite, 1989) and defiance (Sherman, 1993) theories, this sense of mistreatment and procedural injustice would be expected to translate into a greater risk of future offending. King’s (2005: 131) interviews with supermax inmates illustrate this possibility: “Many prisoners felt themselves to be the victims of injustice over their transfer to a supermax facility and criticized the administration for transferring them despite the fact that they did not meet the expressed criteria [for transfer]” (see also Mears and Watson, 2006; Rhodes, 2004).<sup>2</sup>

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2. As but one instance proffered by King (2005: 131): “Several inmates complained, for example, that they had been transferred to supermax because of a riot at another establishment, despite the fact that they had not themselves been involved.”



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Several of the above arguments point to three additional hypotheses. First, greater exposure to supermax incarceration may lead to greater effects on recidivism. Here, the logic is straightforward—greater “doses” of supermax confinement presumably should generate either greater increases or greater decreases in recidivism. For example, if supermax incarceration reduces social bonds or increases strain, then greater changes in either should translate into greater increases in recidivism. The counterargument is that supermax incarceration of any duration can influence inmate behavior. Consider, for example, research on policing and racial profiling, which shows that even a single encounter with the police that is perceived as unfair may create a strong and sustained feeling of animosity and mistrust toward law enforcement (Weitzer and Tuch, 2006). It is at least plausible that even short stays in supermax might exert similar effects and may, in turn, for example, generate sufficient anger or frustration to lead to violent or criminal behavior at a later date (Lovell, Johnson, and Cain, 2007; Ward and Werlich, 2003). Similarly, even short stays may be perceived as sufficiently severe to produce a lasting specific deterrent effect.

Second, supermax incarceration may exert a greater effect on recidivism if the experience of it occurs close to the timing of reentry back into society. For example, if it reduces negative peer influence and so decreases the likelihood of offending, then presumably such an effect would be reduced or eliminated when inmates are afforded an opportunity, after release from such confinement, to resume relationships with other inmates. Similarly, if supermax incarceration reduces social bonds and increases strain, the expected effect would be one of increasing recidivism, but such an effect might be tempered or eliminated if, after release from such confinement, inmates have a sufficient period of time in traditional prison housing to recover and regain their coping skills (Lovell, Johnson, and Cain, 2007: 639; see also Grassian and Friedman, 1986).

A timing effect is also anticipated by the increasing literature on prisoner reentry, which highlights the salience that reentry planning can have on successful transitions back into society (Petersilia, 2003; Thompson, 2008; Visser and Travis, 2003). Supermax incarceration likely inhibits efforts to plan for reentry, and thus, if it occurred closer to the time of release into society, it might be more likely to impede a successful reentry process. A timing effect also accords with life-course theories and their emphasis on the salience of life events as potential turning points (Maruna, 2001; Piquero, Farrington, and Blumstein, 2007; Sampson and Laub, 2005). Nothing in such theories argues that extreme isolation should influence offending, but they do underscore the importance of exploring critical life events and how they may affect behavior. Released prisoners in general face a significant life event when they are released from prison.

This transition may well be influenced, however, if other significant life events immediately precede it. Clearly, supermax confinement may constitute one such example. As King (2005: 130) recounted of his interviews with supermax inmates, "It was clear that for some of these prisoners, supermax was the most vivid experience of their lives, and one which had come to define their very being." Other accounts of supermax inmates convey equally strong sentiments. For example, one inmate interviewed by Rhodes (2004: 69) reported, "You go through days where you think, I like living, but if this is all I have to look forward to, I'd kind of like to die. . . . This loss of hope, that's what starts building what I call that monster inside of you."

A final hypothesis stemming from prior work is that supermax housing may exert a stronger influence on violence. Supermax incarceration has been promoted as a way to manage inmates who commit violent and disruptive acts, hence the characterization of them as housing the "worst of the worst" (King, 1999; King, Steiner, and Breach, 2008; Kurki and Morris, 2001). Any violent tendencies among this population thus might be amplified through restrictive custody, all the more so if the perception among such inmates is that they were unfairly placed in supermax housing or were mistreated (Rhodes, 2004). Even if, in fact, inmates have been placed in supermax housing for other reasons, such as being a nuisance (Lovell et al., 2000; Mears and Watson, 2006; O'Keefe, 2008; Riveland, 1999), the conditions of supermax housing suggest, per the rage hypothesis, that individuals in them would be pushed toward violent behavior. As one inmate interviewed by Rhodes (2004: 55) stated, "If they feel like I'm gonna be a badass, why not be one?"

## DATA AND METHODS

Our goal is to advance scholarship on prisoner reentry, offending, and supermax prisons. To this end, we examine whether supermax incarceration increases or decreases recidivism, net of other factors that might influence both offending and selection into supermax confinement. For the analyses, we use data from the Florida Department of Corrections (FDOC) and do so for several reasons. First, Florida has many inmates who have experienced supermax confinement. One challenge that confronts efforts to assess the impact of supermax housing is the fact that, in many states, the number of inmates placed in such housing is relatively small (King, 1999; Lovell, Johnson, and Cain, 2007; National Institute of Corrections, 1997; Mears and Watson, 2006). National studies indicate that the percent of inmates in supermax incarceration varies among states, from less than 1 percent of all inmates in a given state to as high as 12 percent; the national average in states with supermax facilities is, however,

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estimated to be roughly 2 percent (King, 1999; Naday, Freilich, and Mellow, 2008; National Institute of Corrections, 1997). In Florida, for the period of study, approximately 3 percent of released inmates had experienced supermax incarceration, and roughly 2 percent of all Florida inmates—roughly 1,300 to 1,600 in any given year—were in supermax housing (Florida Department of Corrections, 2004; Naday, Freilich, and Mellow, 2008: 85).<sup>3</sup> The relatively large number of inmates in supermax housing stems, of course, from the fact that the Florida prison population is substantially larger than that of most states.

Second, FDOC data provide a rich source of information about inmates, which includes their behavior while in prison. We use a file created by the FDOC (2003b) that includes all inmates released from prison between July 1996 and June 2001. It contains a wide range of measures, including inmate demographic characteristics, disciplinary infractions, time served, and prior criminal record. To this file, we added new variables by accessing the Department's Offender-Based Information System (OBIS), which, for each inmate, contains data on movements in and out of prison, movements internally within the prison system (e.g., from one type of security-level institution to another), the instant offense that led to incarceration, and the details about all conviction events before and after incarceration. We use the combined data and focus on all inmates released between July 1996 and June 2001 who served at least 12 months in prison; for each inmate, we compiled recidivism measures for a 36-month postrelease follow-up period ( $N = 58,752$ ). We excluded inmates, supermax and non-supermax alike, who returned to states besides Florida after release from prison to ensure that the analyses were unaffected by potential differences in felony convictions of such inmates in other states.<sup>4</sup> As discussed in the Analytic Strategy section, we used propensity score analyses to generate a sample of non-supermax inmates to serve as a matched comparison group to the supermax inmates. In the next section, we discuss each variable used in our study; descriptive statistics for the variables are provided in appendix A.

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3. The FDOC (2004) report indicated, for example, that on June 30, 2001, there were 72,007 inmates, with, as Naday, Freilich, and Mellow (2008: 85) have reported, 1,401 of them in supermax housing.

4. In their recidivism study that involved 15 states and 272,111 inmates released from prison in 1994, Langan and Levin (2002) reported that only 7.6 percent of the inmates were arrested in a state different from their release state, which suggests that any recidivism underestimates stemming from the use of Florida-specific felonies only should not be especially problematic.

## DEPENDENT VARIABLES

Recidivism is operationalized here as a conviction for a new felony that results in a sentence to local jail, state prison, or community supervision any time within the 3 years after release. The use of felony convictions helps to ensure that our focus centers around more serious offending (Baumer, 1997; Davies and Dedel, 2006; Langan and Levin, 2002; Maltz, 1984; McGuire et al., 2008; Smith and Akers, 1993; Wilson, 2005). In addition, a recent review of recidivism studies indicates that reconviction is the most commonly used measure of recidivism in research (Villettaz, Killias, and Zoder, 2006: 8).

Five different measures of recidivism are used in our analyses. The first is whether releasees recidivated for any type of felony within 3 years (0 = no, 1 = yes). The remaining recidivism measures are based on the type of felony crime (violent, property, drug, and other) for which the releasee was convicted. If inmates were convicted of multiple types of offenses, each type was counted for purposes of generating the type-specific recidivism measures. For example, if a releasee was convicted for a violent crime and a drug crime was committed as part of the same incident, then the releasee was defined as both a violent recidivist and a drug recidivist. An inspection of appendix A shows that 58 percent of the combined group of supermax inmates and the matched non-supermax inmates were reconvicted of any crime within 3 years.<sup>5</sup> In addition, 22 percent of released inmates were reconvicted for a violent crime, 21 percent for a property crime, 22 percent for a drug crime, and 11 percent for other crimes.

## INDEPENDENT VARIABLES

Florida has had supermax housing for male inmates for almost two decades (King, 1999; Naday, Freilich, and Mellow, 2008).<sup>6</sup> Although the state does not use the “supermax” description, it has close management housing—distributed across four facilities (Charlotte, Florida State Prison, Santa Rosa, and Union)—that includes cells that are used in a manner that directly accords with how supermax confinement has been defined

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5. The overall reconviction rate of the entire population of Florida prisoners released during the time period of the study was 47 percent. This rate of reconviction during a 3-year period is identical to that found in the Langan and Levin (2002: 3) 15-state study.
  6. Information about Florida’s supermax housing comes from several sources, which include the Department of Corrections’ annual reports; the Florida Department of State’s (2008) account of the Florida Administrative Code, which details the criteria for placement into and release from supermax housing and for operating such housing; studies that include data on Florida’s prison system (e.g., Naday, Freilich, and Mellow, 2008); and personal communications with FDOC staff.

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(King, Steiner, and Breach, 2008; Mears and Castro, 2006; National Institute of Corrections, 1997; Riveland, 1999).<sup>7</sup> Specifically, the FDOC has a category of close management housing, termed CM1, that involves many of the same conditions and restrictions found in states where the supermax terminology is used, including indefinite 23-hour-per-day single-cell confinement with limited to no visitation or programming. The operations of and conditions within such housing are required to be, and reportedly in fact are, consistent regardless of the location where the CM1 cells exist (Florida Department of State, 2008).

As in other states, the inmates targeted for placement in Florida's supermax housing consist primarily of those who have committed violent or serious crimes or have engaged in violent or disruptive behavior. Targeted behaviors, which parallel the types of acts that lead to supermax incarceration in other states (King, 1999; Mears and Watson, 2006; Naday, Freilich, and Mellow, 2008; National Institute of Corrections, 1997), include committing murder and assault, instigating a riot or disorder, causing more than \$1,000 in property damage, escaping or attempting to escape, possessing weapons or drugs, and, more generally, exhibiting behaviors that "threaten the safety of others, threaten the security of the institution, or demonstrate an inability to live in the general population without abusing the rights and privileges of others" (Florida Department of State, 2008). Also as with other states, extensive written procedures exist for the treatment of inmates in supermax housing as well as the release of inmates from such housing. These procedures include behavioral risk assessments conducted several times annually and review of each inmate's institutional adjustment and their potential impact on staff and inmate safety and security (Florida Department of State, 2008).

Several factors point to the reason why more inmates are eligible for supermax housing in Florida than end up in it. One is that although the number of supermax beds remained relatively constant before and during the study period, the Florida prison population grew by more than 60 percent, from 47,012 inmates in 1991 to 72,007 inmates in 2001 (Florida Department of Corrections, 2003a). A second is that the criteria for supermax placement are largely open ended, in that they cover a wide range of possible behaviors that could implicate large swaths of the inmate population.<sup>8</sup> Third, Florida's supermax bed space rarely goes unused,

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7. Many states have supermax housing in stand-alone facilities, whereas many others have similar housing that exists in wings or sections of general population facilities (see King, 1999; Mears and Watson, 2006; Naday, Freilich, and Mellow, 2008; National Institute of Corrections, 1997).

8. It bears noting that placement into Florida supermax housing is not restricted by geography. That is, decisions about placing inmates in such housing can occur regardless of whether inmates reside proximate to it. Florida's supermax housing

except during periods when inmates are transferred. Fourth, as the analyses in this study indicate, we had little difficulty identifying close matches to the supermax inmates among the general population inmates along such critical dimensions as past offending record, current offense, and behavior while incarcerated.

The FDOC's OBIS data capture the entry and exit dates of inmates placed in supermax housing. We used these data to identify inmates who experienced any amount of supermax incarceration and those who experienced none. We also used the data to create measures of duration and of recency. Duration was measured as the number of months a given supermax inmate experienced supermax incarceration. As we will discuss, we examined inmates with different durations (measured in months) of exposure to supermax housing and created matched samples from the supermax inmate population that had higher amounts of exposure to such housing. Recency was measured as the proximity of the last supermax experience to the date of release back to society. Here, again, and as we will describe, we examined inmates with different recency values (measured in months from the time of release) and created matched samples from the inmate population whose last supermax experience occurred more distally from the time of release.

Of the 58,752 inmates in the study, 1,507 experienced supermax confinement. For the analyses we present, we excluded females (only nine females experienced supermax incarceration). For the main analyses, we follow the lead of Lovell, Johnson, and Cain (2007) and focus on inmates who experienced 91 days or more of total supermax confinement and a matched group of general population inmates. As Lovell, Johnson, and Cain (2007: 638) have argued, this approach clearly differentiates supermax incarceration from an accumulation of shorter term spells in disciplinary segregation. Excluding the prisoners with 90 or less days of supermax incarceration, the final supermax group consisted of 1,247 inmates.

## CONTROL VARIABLES

We drew on a wide range of variables for the propensity score analyses to increase our confidence that the estimates of the effects of supermax exposure are unbiased and do not, for example, reflect the selection effects that lead individuals who are differentially prone to recidivate to experience supermax incarceration. We include many controls typically used in other recidivism studies because they have been found to be important predictors of post-prison offending (Anderson, Schumacker,

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is located in facilities in the northwest, northeast, and central-south regions, so few logistical constraints (such as travel of more than a few hours) exist to transporting inmates from general population facilities to supermax housing.

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and Anderson, 1991; Kubrin and Stewart, 2006; Langan and Levin, 2002; Uggen, 2000). However, the FDOC data allow us to introduce additional controls, such as in-prison behavioral measures, that are not usually available to researchers conducting recidivism studies but that nonetheless may be relevant to isolating the effects of in-prison experiences. This issue is especially relevant to assessing the impacts of supermax prisons given that misconduct is held to be a prominent reason for why inmates end up in supermax housing (see, e.g., Mears and Castro, 2006; Riveland, 1999).

Two demographic variables are used in the analyses, which include age at release, measured in years, and race (white, non-Hispanic black, and Hispanic). We excluded females from all analyses because so few ( $n = 9$ ) were placed in supermax housing. The age and sex variables were obtained from the FDOC's OBIS database, whereas the Sentencing Guidelines data and OBIS database were used to determine whether the offender was black or Hispanic. An additional method of identifying whether an offender was Hispanic involved comparing the surnames of offenders not designated as Hispanic from the guidelines or OBIS data with the U.S. Census list of Hispanic surnames (Word and Perkins, 1996). Offenders whose last name matched to the list of surnames were identified as Hispanic; this approach was used in prior studies (e.g., Bontrager, Bales, and Chiricos, 2005).

The most serious offense for which inmates were serving time—sometimes referred to as the instant offense—was categorized as violent, property, drug, or other. Four dummy variables thus were created, one for each type of crime (0 = no, 1 = yes), and were included in the analyses. We also included three other measures of prior criminal record. First, we used a measure of the number of prior recidivism events. This variable is defined as the number of times an inmate had previously been imprisoned in Florida and then subsequently been reimprisoned for a new felony conviction. Second, we included the number of prior convictions for violent felony crimes. This measure is included to address the possibility that supermax inmates may be those who are more likely to have a history of violent behavior. Third, we included a measure of the number of times inmates had been convicted for escaping from a local jail or prison.

We also control for the total time (years) served in prison prior to release and for in-prison behavior. Two measures of prison behavior were included. The first is the number of disciplinary infractions that resulted from violent acts during the inmate's release commitment. The second is the number of disciplinary infractions received as a result of defiant behavior. Here, again, our focus is on addressing the possibility that supermax inmates, prior to their placement in supermax housing, are more prone to be violent or disruptive. Finally, we include a variable that indicates whether the inmate was sentenced to prison under Florida's Truth-

in-Sentencing Law (F.S. 944.275), which provides that all inmates with offense dates on or after October 1, 1995 must serve a minimum of 85 percent of their court-imposed sentence (0 = no, 1 = yes).

For the recency analyses, which focused only on the supermax inmates, we introduced the duration measure of supermax incarceration as a covariate in the propensity score matching. For the supermax inmates with 91 days or more of supermax exposure, the average number of days in supermax housing was 379, the median was 317, and the minimum and maximum were 91 days and 2,067 days, respectively. The average stay in particular highlights that, as noted, supermax confinement is characterized by indefinite stays in extended isolation.

### ANALYTIC STRATEGY

As we have discussed, the placement of inmates into supermax confinement is not likely a random occurrence. Indeed, Florida's policies on supermax incarceration, as well as most accounts of supermax housing, indicate that placement results from violent or disorderly behavior, as well as escape attempts, that happen during incarceration (Bruton, 2004; Mears and Castro, 2006; Riveland, 1999; Stickrath and Bucholtz, 2003). The ideal approach to estimating the effect of supermax incarceration would be to conduct an experiment in which inmates were randomly assigned to supermax and non-supermax conditions. That approach clearly is not possible in a correctional setting. However, propensity score matching, which was first developed by Rosenbaum and Rubin (1983), enables one to compare outcomes across treatment and comparison groups that are as close to equal as possible.

The basic goal of matching is to create a comparison group as close to equal as possible to the treatment group with respect to observable covariates; thus, the method typically performs best when a large pool of possible comparison subjects is available from which to select. Although the use of propensity score matching to determine the effect of interventions when using observation data is more established in such disciplines as medicine and economics (see, e.g., Austin, 2008), it increasingly has been applied in criminology (e.g., Apel et al., 2007; King, Massoglia, and MacMillan, 2007; Massoglia, 2008). Here, we use the approach because of the possibility that selection effects may influence the estimated effects of supermax incarceration, the large number of possible comparison subjects that can be generated from the FDOC data, and the well-established advantages of propensity score matching in addressing selection effect biases and in approximating a randomized experiment when one has appropriate controls (Harding, 2003; Rosenbaum and Rubin, 1983; Smith, 1997; Winship and Morgan, 1999). Even so, it must be emphasized that



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propensity score analyses, or any other matching procedure, cannot magically resolve a situation in which unobserved factors contribute substantially both to placement in supermax housing and to recidivism. We discuss this issue when reporting analyses aimed at identifying how sensitive the results here are to unobserved confounders.

We proceed first by presenting the main propensity score analyses, which focus on identifying whether supermax incarceration of 91 days or more decreases or increases recidivism. Here, we compare supermax inmates with a matched sample from the general inmate population and discuss the findings from sensitivity analyses. Second, we discuss the results of propensity score analyses using only supermax inmates; here, the focus is on identifying whether the duration of supermax incarceration has an effect on recidivism. Third, we discuss the results of propensity score analyses that again focus only on supermax inmates but that this time are directed at examining whether the proximity of supermax incarceration experiences to the time of release into society exerts any effect on recidivism.

### FINDINGS

The first step we took was to generate propensity scores for each released inmate in the entire sample through a logistic regression model using STATA (version 9; StataCorp, College Station, TX), which includes all the independent variables displayed in appendix A. The propensity scores range from 0 to 1 and reflect the conditional probability of each inmate being placed in supermax housing. An important diagnostic test when the propensity scores are generated is to examine whether there is statistical balance for each covariate across the treatment and comparison groups. If balance is achieved, then “for a given propensity score, exposure to treatment is random and therefore treated and control units should be on average observationally identical” (Becker and Ichino, 2002: 2). The distribution of propensity scores are divided into equal intervals, or strata, and if the difference between the average propensity score of the treated and comparison groups within them are not statistically different, balance is achieved. In developing the scores for the supermax and comparison group inmates, balance was achieved across 15 strata and all covariates. It bears emphasizing, however, that achieving balance does not mean the groups necessarily are identical with respect to unobserved covariates, which is a central limitation of propensity score analyses and other matching procedures (Caliendo and Kopeinig, 2008; Morgan and Harding, 2006; Winship and Morgan, 1999).

After developing the propensity scores, we employed the one-to-one nearest neighbor within the caliper matching algorithm and set the caliper

width to .005. This approach identifies the propensity score of each supermax inmate and then chooses a non-supermax inmate whose score is closest; the use of the caliper restriction, which is set more conservatively than in most studies (see, e.g., Barth, Guo, and McCrae, 2008; DiPrete and Gangl, 2004), ensures that nearest neighbors have scores nearly identical to each other (Massoglia, 2008). We use the nonreplacement option so that once a non-supermax inmate is selected to serve as a match to a supermax inmate, he cannot be used again to match to another one. We began the propensity score matching analysis with 1,247 supermax inmates and 57,245 non-supermax inmates. The nearest-neighbor matching procedure resulted in 1,241 matched non-supermax inmates. The loss of a few treatment cases (i.e., six inmates) resulted from restricting the analyses to regions of common support, which refers to areas where there is overlap in the propensity scores of the two groups being compared. Given that the supermax groups were matched to comparison groups such that they were homogenous with respect to key predictors of supermax confinement, any resulting differences in recidivism between the final samples of supermax inmates and their counterparts should result from a “treatment” effect of supermax incarceration if no imbalance in unobserved confounders exists (Becker and Ichino, 2002; Caliendo and Kopeinig, 2008; Winship and Morgan, 1999).<sup>9</sup>

Before discussing the analyses, the results of a final diagnostic test merits brief mention. In addition to meeting the balancing criterion we discussed, we conducted *t* tests to compare the covariates across the supermax and matched non-supermax groups. As an inspection of table 1 shows, the matching procedure indeed created a comparison group that is similar with respect to the covariates. Prior to matching, significant differences were found between the supermax inmates and the general inmate population.<sup>10</sup> For example, supermax inmates were considerably more likely to be incarcerated for a violent crime, to have prior violent crime convictions, to have prior escape convictions, to have longer stays in prison, and to have more violent and defiance disciplinary infractions. However, the matching procedure resulted in a non-supermax group that did not differ statistically across the observed covariates, as indicated in the lack of significant *t* tests in the third column. Indeed, the means across the two groups are either identical or differ by an almost indiscernible

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9. In the analyses that include all inmates who actually experienced supermax confinement, the estimates are what the propensity score matching literature refers to as the effects of treatment on the treated (Becker and Caliendo, 2007; Becker and Ichino, 2002; Smith, 1997).

10. We do not present tests of statistical significance when comparing the supermax inmates and the general population inmates because the two groups represent populations, not samples (see, generally, Imai, King, and Stuart, 2008: 495–8).

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**Table 1. Supermax versus Non-Supermax Inmates: Comparison of Covariate Means in Unmatched and Matched Samples**

	<b>Supermax Inmates</b>	<b>Unmatched Sample: Non-Supermax Inmates<sup>a</sup></b>	<b>Matched Sample: Non-Supermax Inmates<sup>b</sup></b>
Age at release	28.50 (.19)	32.25 (.04)	28.36 (.20)
Black	.75 (.01)	.59 (.00)	.75 (.01)
Hispanic	.05 (.01)	.06 (.00)	.04 (.01)
Current offense violent	.54 (.01)	.39 (.00)	.55 (.01)
Current offense property	.27 (.01)	.30 (.00)	.27 (.01)
Current offense drug	.13 (.01)	.25 (.00)	.13 (.01)
Prior recidivism	.95 (.03)	.98 (.00)	.92 (.03)
Prior violent crimes	2.15 (.04)	1.64 (.01)	2.16 (.04)
Prior escape convictions	.12 (.01)	.07 (.00)	.13 (.01)
Years in prison	5.93 (.07)	3.53 (.01)	5.96 (.07)
Violent discipline reports	2.69 (.02)	.62 (.00)	2.69 (.02)
Defiance discipline reports	7.44 (.09)	1.34 (.01)	7.47 (.09)
Minimum 85% law	.15 (.01)	.39 (.00)	.15 (.01)
<i>N</i>	1,241	57,245	1,241

<sup>a</sup> For the comparison of the covariate means of the supermax and unmatched non-supermax groups, no tests of statistical significance are presented because the comparison involves populations, not samples.

<sup>b</sup> The matched sample was created using propensity score analysis (1-to-1 nearest-neighbor matching without replacement algorithm and with caliper set to .005). Standard errors are reported in parentheses. For the supermax-versus-matched sample covariate comparisons, *t* tests were computed. No statistically significant differences were found between the two groups with respect to any of the covariates.

\* *p* < .05; \*\* *p* < .01; \*\*\* *p* < .001 (two-tailed test).

amount. The matching procedure thus was effective in matching on the covariates, in turn allowing for a comparison of recidivism rates between supermax and equivalent non-supermax cases in a manner that approximates a randomized experimental design. Any estimated effect assumes, however, that no significant differences in the results would emerge if unobserved confounders were included. We cannot test this assumption, but as we will report, statistical tests can be conducted to assess how sensitive the results are to such confounders.

We turn now to the results of the matching analyses presented in table 2, which show differences in the rates of recidivism among supermax inmates and non-supermax inmates for five types of recidivism (any, violent, property, drug, and other). For the comparison of the supermax group and the matched comparison group, we use two-tailed tests of significance because of the competing hypotheses about the effects of supermax housing.<sup>11</sup> First, when comparing the unmatched groups, we observe that supermax

11. See footnote 10.

inmates have substantially higher rates of any recidivism as compared with non-supermax inmates (58.8 percent vs. 46.6 percent, respectively). The difference is slightly greater for violent recidivism (24.2 percent vs. 10.9 percent, respectively). By contrast, it is much smaller for property recidivism (21.5 percent vs. 17.9 percent, respectively) and drug recidivism (22.0 percent vs. 20.2 percent, respectively). For other recidivism, no difference is found between the two groups. In short, prior to matching, the evidence suggests that supermax inmates recidivate at a considerable higher rate than is the case with other inmates and that much of the difference results from a higher level of violent offending and, to a much lesser extent, property and drug offending.

**Table 2. Average Effect of Supermax Exposure on Recidivism Outcomes at Three Years Using One-to-One Nearest-Neighbor Matching without Replacement<sup>a</sup>**

	Supermax	Non-Supermax	Difference	Standard Error	t Value <sup>b</sup>
Any Recidivism					
Unmatched	58.8%	46.6%	12.2%		
Matched	58.8%	57.6%	1.4%	.020	.69
Violent Recidivism					
Unmatched	24.2%	10.9%	13.3%		
Matched	24.2%	20.5%	3.7%	.017	2.22*
Property Recidivism					
Unmatched	21.5%	17.9%	3.6%		
Matched	21.5%	20.9%	.6%	.016	.39
Drug Recidivism					
Unmatched	22.0%	20.2%	1.8%		
Matched	21.9%	22.4%	-.5%	.017	-.29
Other Recidivism					
Unmatched	10.1%	9.7%	.4%		
Matched	10.2%	11.0%	-.8%	.012	-.65

<sup>a</sup> The matched sample was created using propensity score analysis (1-to-1 nearest-neighbor matching without replacement algorithm and the caliper set to .005).

Unmatched *N* = 1,241 supermax inmates versus 57,245 unmatched non-supermax inmates. Matched *N* = 1,241 supermax inmates versus 1,241 matched non-supermax inmates.

<sup>b</sup> The *t* test results are for the matched group comparisons; no statistical significance tests are presented for the unmatched group comparisons because two populations, not samples, are being compared.

\* *p* < .05 (two-tailed test).

A much different story emerges after creating a matched comparison group. Here, we observe that across the five types of recidivism, only one statistically significant difference remains between the supermax inmates and the matched non-supermax inmates. Specifically, 24.2 percent of supermax inmates were reconvicted of a violent crime compared with 20.5

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percent of other inmates. Put differently, supermax inmates have a rate of violent recidivism that, in absolute terms, is 3.7 percentage points higher than that of non-supermax inmates, and, in relative terms, is 18 percent greater. It thus seems that any observed differences in the recidivism of supermax inmates derives largely from selection effects, which, once taken into account, either eliminate the differences, or, in the case of violent recidivism, substantially reduce the difference. Notwithstanding the reduction, however, it seems that supermax incarceration is associated with an increased risk of violent recidivism.

One question that remains, however, is how sensitive this estimated effect is to unobserved confounders. A common strategy for answering that question involves conducting sensitivity analyses that attempt to quantify how large the hidden bias would have to be before the results from the propensity score analyses would change. Rosenbaum bounds are a commonly used strategy for assessing how sensitive propensity score results are to such bias (Caliendo and Kopeinig, 2008; DiPrete and Gangl, 2004; Morgan and Harding, 2006). This approach results in the creation of an odds ratio, which is called gamma ( $\Gamma$ ), that estimates how high the odds would have to be before we would question whether supermax incarceration increases violent recidivism; when  $\Gamma = 1$ , the study is considered to be free of hidden bias (Becker and Caliendo, 2007: 78). To assess the sensitivity of the result for violent recidivism, we created Rosenbaum bounds and found that, in fact, the identified effect is sensitive to unobserved confounders ( $\Gamma = 1.1$ ). Specifically, if an unobserved covariate caused the odds ratio of supermax assignment to differ between the supermax and comparison group cases by a factor of 1.1, we would question whether the effect was a real one (DiPrete and Gangl, 2004: 291; Massoglia, 2008: 301).<sup>12</sup>

We next turn to the duration analyses and the question of whether greater exposure to supermax incarceration decreases or increases recidivism. Briefly, we found no evidence that the amount of time spent in supermax incarceration influences recidivism. This assessment is based on a series of propensity score analyses that examined supermax inmates only ( $N = 1,247$ ).<sup>13</sup> The analyses proceeded using the following steps. First, we identified inmates who had experienced 3.1 to 4.0 months of supermax confinement. Second, we used propensity score analysis to identify a matched group of supermax inmates who experienced a greater amount of supermax incarceration and then examined whether any differences between the two groups existed for each of the five recidivism measures.

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12. The sensitivity results are available upon request.

13. We thank the anonymous reviewers for their recommendations for assessing the effects of the duration of supermax confinement and the recency of supermax confinement, respectively.

Third, we then repeated the first two steps again; only this time we compared inmates with between 4.1 and 5.0 months of supermax incarceration and used propensity score analyses to create a matched set of inmates who had experienced more time (i.e., 5.1 months or more) in supermax confinement. In total, we examined 24 duration groups (3.1–4.0 months of supermax exposure, 4.1–5.0 months, . . . , 26.1–27.0 months) and, in each instance, compared their outcomes with those of matched counterparts who experienced greater amounts of supermax incarceration. Notably, across all the comparisons, the balancing property was satisfied using the covariates from the previous analyses, along with the duration measure.

For 120 comparisons—involving 24 duration groups and their matched counterparts with respect to each of five outcomes—we found almost no statistically significant differences. For the five statistically significant comparisons that surfaced, which we would expect by chance given the number of comparisons undertaken, no clear pattern emerged. For example, for the 20.1–21.0 month comparison, a statistically significant difference emerged, but no statistically significant effects were identified in the duration groups before or after this one. We repeated the analyses with all supermax inmates, including those with 90 days or less of supermax incarceration ( $N = 1,507$ ). In addition, to ensure that the null effects were not caused by a lack of power, we re-ran the analyses using 3-month duration periods (e.g., 3.1–6.0 months).<sup>14</sup> In both sets of analyses, no significant duration effects were identified. (All results are available upon request.) In short, the total amount of exposure to supermax incarceration does not seem to influence recidivism of any kind, violent or otherwise.

Next, we pursued a similar strategy for examining whether the recency of the supermax incarceration prior to release to society exerts an influence on recidivism. Here, again, we found no evidence of a statistically significant effect. For these analyses, we excluded, as before, any inmates with 90 or less days of supermax exposure. We then conducted a series of propensity analyses that included as a covariate the duration of supermax confinement (in months, truncated at 18+ months because of skew) and that again included analysis of the five types of recidivism. For the first analysis, we examined whether supermax inmates whose last supermax exposure occurred within 1 month of release were more likely or less likely to recidivate as compared with a matched group of supermax inmates. For the second analysis, we examined whether supermax inmates whose last exposure occurred within 1.1–2.0 months of release were more likely or less likely to recidivate as compared with a matched group of supermax inmates whose last supermax experience occurred more distally

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14. Most duration groups had sample sizes of at least 30 or more cases, but in some instances, the sample sizes were somewhat smaller.

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from the time of release back into society. In total, we conducted 24 separate propensity score analyses and compared each set of matched groups with respect to the five recidivism measures. The balancing property for all comparisons was satisfied when using the covariates from the earlier analyses. An inspection of the propensity score results revealed almost no statistically significant recidivism differences between the recency groups, and among those that were significant, no clear pattern existed. To address concerns that the null results may have stemmed from small sample sizes for specific recency groups, we repeated the analyses using 3-month intervals (e.g., supermax incarceration within 0–3 months of release, within 3.1–6.0 months of release, etc.). The same pattern of null results emerged. (All results are available upon request.) In short, neither the duration nor the recency of supermax incarceration seems to be consequential for recidivism.

## CONCLUSION AND IMPLICATIONS

The goal of this study was to contribute to theory and research on prisoner reentry and offending as well as to provide scholarship aimed at understanding the effects of supermax incarceration. Drawing on prior work on reentry and supermax prisons, we used Florida Department of Corrections data to examine competing hypotheses about whether supermax confinement increases or decreases recidivism. On the one hand, some scholars have argued that extended isolation may produce specific deterrent effects, reduce negative peer influence, and provide an opportunity for reflection on one's behavior, which in turn may increase one's ability to manage conflict in an appropriate manner and better discern "right" versus "wrong" behavior, leading ultimately to a decreased inclination to offend. On the other hand, arguments have been made that isolation may reduce social bonds to others and induce strain and possibly embitterment and rage. It also may undermine inmates' beliefs in conventional moral codes and impede efforts to prepare inmates for reentry. From either set of perspectives, the duration of supermax incarceration may exert a greater effect on recidivism. In addition, the timing of supermax incarceration may be consequential when viewed through the prism of life-course theories, which anticipate that critical transitions—such as the release from supermax confinement and eventually from the prison system—can influence whether some people commit crime. An increasing body of scholarship underscores the fact that the transition back into society constitutes a considerable challenge and that, as a general matter, it involves adapting to social circumstances far different from that of prison. Thus, the question of how inmates' prison experiences may influence that transition is especially critical to address.

Briefly, when we did not adjust for possible selection effects, we found that supermax inmates were much more likely to recidivate and, in particular, to commit more violent crime and, to a lesser extent, more property and drug crimes. After using propensity score matching to adjust for possible compositional differences between supermax and non-supermax inmates, the recidivism differences were either eliminated or substantially reduced. In fact, the sole remaining difference was that 24.2 percent of supermax inmates were likely to recidivate for violent crimes within 3 years after release from prison compared with 20.5 percent of non-supermax inmates. This finding both differs from and is similar to Lovell, Johnson, and Cain's (2007) study of Washington supermax inmates. As with their study, we found no effect of supermax incarceration on recidivism in general, but in contrast to their study, we found that such incarceration was associated with an increase in violent recidivism. At the same time, analyses using Rosenbaum bounds indicated that this finding was sensitive to the possibility of hidden bias. DiPrete and Gangl (2004: 291) have emphasized, however, that Rosenbaum bounds assume "worst case" scenarios. Put differently, the sensitivity of the results to unobserved variables does not mean that supermax incarceration does not increase violent recidivism; rather, it simply indicates that additional caution is warranted in interpreting the results.

We also examined the hypothesis that the amount of supermax incarceration influences recidivism and found no evidence to support it. Similarly, and following Lovell, Johnson, and Cain's (2007) lead, we examined whether supermax incarceration that occurs close to the time of release into society influences recidivism. In contrast to Lovell, Johnson, and Cain's study, which found that direct-release supermax inmates were more likely than other supermax inmates to recidivate, we found no evidence that the timing of the supermax experience influences recidivism.

We turn now to the study's implications. First, the lack of evidence for a substantial specific deterrent effect of supermax incarceration is notable. Supermax housing constitutes what is arguably the most severe sanction that prison systems can apply and clearly accords with emphases in recent decades on "get tough" criminal justice policies. The failure of supermax confinement to exact a specific deterrent effect, and indeed, possibly to increase violent offending, reinforces some criticisms that have been leveled concerning the logic of supermax housing (Pizarro and Stenius, 2004). In addition, our findings also reinforce questions that reviews of the empirical literature have raised about the apparently nominal-to-weak role that sanction severity plays in producing a specific deterrent effect (Akers and Sellers, 2004; Pogarsky, 2002; Pratt et al., 2006).

Second, that supermax housing may increase violent offending certainly accords with what one would expect from several theoretical perspectives.



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Such housing essentially prevents inmates from sustaining or creating a social bond (Gottfredson, 2006; Hirschi, 1969). It fulfills the requirements that general strain theory puts forth, including the failure to achieve positively valued goals, removal of positive stimuli, imposition of negative stimuli, and introduction of barriers to achieving goals (Agnew, 1992, 2006). In this same vein, and dovetailing with research on inmate behavior, supermax confinement does little to assist inmates in developing effective, nonviolent strategies to achieve goals or to manage interpersonal conflict (Bottoms, 1999). At the same time, if applied in a way that feels unfair or demeaning, it might create feelings of anger and hostility as well as defiance (Braithwaite, 1989; Irwin, 2005; Sherman, 1993). The effect is predicted in part from studies of prisoner reentry, which suggest that reentry preparation can be critical to a successful transition back to society (Petersilia, 2003; Visser and Travis, 2003). At the very least, it is anticipated by life-course theories that highlight the critical role of transitions as turning points in individuals' lives (Maruna, 2001; Sampson and Laub, 2005).

The fact that supermax confinement may contribute to increased violent offending, not to offending in general, is notable and calls attention to the need for theoretical accounts that can specify the conditions under which certain criminogenic factors contribute to specific types of crime. As we hypothesized and has been intimated by other scholars (e.g., Ward and Werlich, 2003), the conditions of supermax confinement suggest that any criminogenic effect might be more evident for violent offending. Few mainstream crime theories provide concrete guidance for making such predictions, but advances in this direction hold the potential to increase the predictive power of these theories (Agnew, 2005) and to contribute to debates about whether offenders are generalists or specialists (Gottfredson, 2006; Piquero, Farrington, and Blumstein, 2007).

These observations highlight a critical avenue not only for theory but also for future empirical research. Clearly, a range of mechanisms could lead supermax incarceration to increase violent recidivism. For example, that the positive association we identify for violent offending accords with different theoretical perspectives does not, of course, mean that each is in fact "the" causal pathway. To determine what exactly produces this effect will require collecting data on measures of the intervening mechanisms that may give rise to it, including assessments of how exactly inmates perceive their experience in supermax housing and how their perceptions compare with that of similar inmates in non-supermax housing. Without such measures, explanations of how exactly supermax incarceration produces any effects will necessarily require speculation as to what seems reasonable. Ultimately, however, the adjudication of which mechanisms explain the effect will require empirical research.

One intriguing explanation that develops from this research stems from the fact that we identified no duration or recency effects. Specifically, an absolute effect of supermax incarceration—that is, one that occurs in the event of any such incarceration and independent of the total amount of it or the proximity of its occurrence to the time of release back into society—is anticipated by defiance theory (Sherman, 1993) and by accounts of police–citizen contacts (Weitzer and Tuch, 2006). Many accounts indicate that supermax inmates frequently feel that they were placed in supermax housing unfairly, that they were mistreated while in supermax custody, and that such feelings exert a strong effect on how the inmates perceive the prison system (see, e.g., Irwin, 2005; King, 2005; Rhodes, 2004). In short, it may be that the supermax incarceration—merely the placement in it and not the total amount of it or the timing of it—contributes to increased violent offending by negatively affecting inmates’ views of the legitimacy of the prison system and perhaps the criminal justice system and society at large. We have no way of testing that possibility with the data at hand, but it is one that may warrant attention in future studies of supermax confinement.

Additional lines of research also are needed. For example, some work suggests that supermax prisons house different types of inmates (Lovell et al., 2000), and so the possibility exists that some types may be affected differently by supermaxes. Similarly, although supermax housing across the United States shares some of the same basic elements, such as 23-hour-per-day single-cell confinement, variation in such housing might produce different effects. To illustrate, differences in how corrections staff treat supermax inmates may increase the harmful effect of supermax confinement on violent recidivism (Mears and Watson, 2006).

A basic challenge to conducting research on the impact of supermax housing on individuals is the identification of appropriate comparison groups. Ultimately, any individual-level assessment of impact is valid only to the extent that “apples-to-apples” comparisons can be made. To date, no national or state-level assessments exist of the precise number of inmates who “merit”—using formally stated criteria—placement into supermax housing. It thus remains an open question as to how many valid comparison subjects exist. For this reason, a critical prerequisite for future studies should be the use of matching procedures that can determine whether valid comparison groups can be identified (Lovell, Johnson, and Cain, 2007). Ultimately, absent the random assignment of inmates to supermax conditions, studies such as the present one will be limited in their ability to address fully the fact that unobserved confounders may bias the results. This problem can, however, be tempered in part by relying on matching procedures and on data that include measures of in-prison behavior.

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Finally, several policy-related observations merit discussion. The fact that the analyses in this study led to the identification of prisoners from the general inmate population who matched supermax inmates on a range of dimensions raises questions about whether all inmates who might be deemed appropriate for such housing end up in it. Riveland (1999) and others (e.g., King, 1999, 2005; Pizarro and Narag, 2008) have emphasized that much remains unknown about who ends up in supermax housing and why. In a similar vein, Mears and Reisig (2006) have raised the question of how many supermax-“worthy” inmates must be placed in supermax incarceration to increase order and safety throughout a prison system. The findings here underscore the possibility that many states that have supermax housing may not be incarcerating all inmates who formally fit their criteria for supermax placement. That issue in turn highlights the more general problem that little is known about the actual decision-making processes for placing inmates in supermax incarceration and releasing them from it (Kurki and Morris, 2001; Lovell et al., 2000; Mears and Watson, 2006; Riveland, 1999).

Critics say that supermaxes harm individuals (Haney, 2003). That observation only partially holds true in this study. Certainly, there seems to be an increased risk of violent offending, but that estimated effect is sensitive to unobserved confounders. Thus, other studies may find that supermax housing exerts no harmful effect on recidivism. In addition, this study found no evidence of an effect of supermax incarceration on other types of recidivism (e.g., property or drug offending). On these grounds, then, there is no clear policy implication. That said, the potential effect of supermax incarceration on violent offending raises, at a minimum, questions about whether the benefits of such incarceration, whatever they are found to be, offset the costs.

Our study focused on the potential effects of supermax incarceration on recidivism. The study was not designed to assess whether supermax prisons affect order and safety throughout a given prison system (Briggs, Sundt, and Castellano, 2003) or whether supermax incarceration affects such outcomes as mental illness, homelessness, and employment (Haney, 2003). It also largely ignores the critical question of whether such incarceration is humane or constitutional (Collins, 2004), or more effective than alternative approaches to managing difficult inmates (Gendreau and Keyes, 2001; Sparks, Bottoms, and Hay, 1996). For that reason, the results should not be construed as the sole basis for advocating for or against supermax prisons as a corrections policy. As Mears and Watson (2006) have argued, a balanced assessment of these prisons requires taking into account a range of outcomes, including not only recidivism but also such outcomes as systemwide order, safety, and mental illness.

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APPENDIX A. DESCRIPTIVE STATISTICS, FULL  
SAMPLE OF MATCHED CASES (N = 2,482)

	Mean	Standard Deviation
Dependent Variables		
Recidivism within 3 years after prison release (0 = no, 1 = yes)	.58	.49
Recidivism for violent crime within 3 years after release (0 = no, 1 = yes)	.22	.42
Recidivism for property crime within 3 years after release (0 = no, 1 = yes)	.21	.41
Recidivism for drug crime within 3 years after release (0 = no, 1 = yes)	.22	.42
Recidivism for other crime within 3 years after release (0 = no, 1 = yes)	.11	.31
Control Variables		
Age at release (years)	28.43	6.97
Black (0 = white or Hispanic, 1 = black)	.75	.43
Hispanic (0 = non-Hispanic, 1 = Hispanic)	.04	.20
Current offense violent (0 = no, 1 = yes)	.55	.50
Current offense property (0 = no, 1 = yes)	.27	.44
Current offense drug (0 = no, 1 = yes)	.13	.34
Current offense other (0 = no, 1 = yes)	.05	.21
Prior recidivism events (0, 1, 2, 3+)	.94	1.06
Prior violent crime convictions (0, 1, 2, 3, 4+)	2.15	1.50
Prior escape convictions (0, 1, 2+)	.12	.37
Years in prison (0, 1, 2, . . . , 10+)	5.94	2.51
Violent disciplinary infractions/reports in prison (0, 1, 2, 3+)	2.69	.73
Defiance disciplinary infractions/reports in prison (0, 1, 2, . . . , 10+)	7.46	3.27
Sentenced under 85% minimum time served law (0 = no, 1 = yes)	.15	.36

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