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Prison Visitation and Recidivism

ABSTRACT

Scholars and policymakers have called for greater attention to understanding the causes of and solutions to improved prisoner reentry outcomes, resulting in renewed attention to a factor—prison visitation—long believed to reduce recidivism. However, despite the theoretical arguments advanced on its behalf and increased calls for evidence-based policy, there remains little credible empirical research on whether a beneficial relationship between visitation and recidivism in fact exists. Against that backdrop, this study employs propensity score matching analyses to examine whether visitation of various types and in varying amounts, or “doses,” is in fact negatively associated with recidivism outcomes among a cohort of released prisoners. The analyses suggest that visitation has a small to modest effect in reducing recidivism of all types, especially property offending, and that the effects may be most pronounced for spouse or significant other visitation. We discuss the implications of the findings for research and policy.

KEYWORDS: prison visitation recidivism reentry

INTRODUCTION

In recent decades, America entered what many scholars have described as an era of mass incarceration (Garland 2001; Gottschalk 2006; Clear 2007; Rosenfeld and Messner 2010). The result, according to recent estimates, is that over 1.6 million individuals are incarcerated in America's state and federal prisons (West 2010) and that over 735,000 inmates are released annually (Sabol et al. 2009). The growth has brought with it attendant concerns about the economic and social costs of large-scale incarceration, concerns that have been heightened by questions about whether the investment in it has reduced crime or, among released prisoners, whether it reduces recidivism (Tonry and Petersilia 1999; Visher and Travis 2005; Nagin et al. 2009; Pratt 2009). Such concerns assume particular importance given the many barriers ex-prisoners now face to successful reintegration back into society (Travis 2005; Bushway et al. 2007; Lattimore et al. 2010) and estimates that, on average, approximately two-thirds of ex-prisoners will be rearrested within three years after their release (Langan and Levin 2002).

This situation has led to considerable attention among scholars to identifying factors that affect prisoner reentry outcomes and, more broadly, to undertaking theoretical and empirical research that explains persistence in and desistance from offending (Maruna 2001; Piquero et al. 2003; Kubrin and Stewart 2006; Mears et al. 2008; Hochstetler et al. 2010; Huebner et al. 2010). One prominent strand of research, for example, has focused on how prison experiences influence offending (Visher and Travis 2003; Nagin et al. 2009; Berg and Huebner 2010). Another has focused on examining prison policies and practices that improve reentry outcomes (Cullen and Gendreau 2000; Gideon and Sung 2010). There remains, however, much that remains unknown about the factors that contribute to improved inmate transitions to society (Lattimore et al. 2010).

Against that backdrop, the goal of the present study is to examine the contribution, if any, of prison visitation to recidivism. The significance of focusing on visitation derives from several considerations. First, it has been a prominent focus of researchers for many decades (see, e.g., Glaser 1954, 1964; Ohlin 1961). In part, that reflects the simple, but no less important,

observation that, as Adams (1992:399) has emphasized, the “loss of contact with the outside world, especially with regard to family members and other persons with whom significant relationships have been established, is a burdensome experience for the majority of inmates” that may have consequences for reentry. A focus on visitation thus is responsive to calls for prisoner reentry scholarship that identifies ways in which in-prison experiences and social ties influence recidivism (e.g., Visher and Travis 2003; Bales and Mears 2008; Nagin et al. 2009). Second, many theoretical arguments have been advanced that persuasively argue that visitation should reduce recidivism. Third, prison systems have been encouraged to implement visitation policies and practices based on the belief that, among other things, visitation will improve the reintegration of ex-prisoners back into society. Fourth, even so, there is relatively little credible empirical research that assesses this belief. The few studies to date typically have relied on small samples, examined only males or inmates from only a single facility, used descriptive analyses rather than multivariate or matching analyses that could address confounding effects, and employed limited measures of visitation and recidivism. Fifth, and as we discuss in the conclusion, if visitation does reduce recidivism, it may constitute an activity that is politically more viable to pursue than some other types of efforts aimed at improving reentry outcomes.

Accordingly, this study examines whether visitation, including the type and amount, or “dose,” of visitation reduces recidivism in general and for specific types of offending (violent, property, and drug). We begin by discussing the broader context—prisoner reentry—that gives rise to the importance of examining visitation effects on recidivism. Next, we present the theoretical arguments that have been advanced to support the notion that visitation should reduce offending among ex-prisoners. We then describe the data, which consist of a full cohort of inmates released from Florida prisons, and present the results of propensity score matching analyses that estimate not only the effect of any visitation but also the effect of varying amounts, or “doses,” of visitation. For the latter analyses, we employ generalized propensity score matching, which extends traditional matching procedures to allow for estimating the effects of “treatments” that may be ordinal or continuous in nature. We then conclude by summarizing the

study's findings and discussing the implications for theory, research, and policy.

PRISONER REENTRY

Prisoner reentry has emerged as one of the foremost social problems of the twenty-first century and, for that reason, it has garnered considerable attention from scholars interested in developing and testing theories of crime and social change, understanding the process and experience of reentry, and identifying and evaluating ways to improve successful inmate transitions back into society (Gendreau et al. 1996; Cullen and Gendreau 2000; Garland 2001; Petersilia 2003; Travis and Visser 2005; Gottschalk 2006; Bushway et al. 2007; Pratt 2009; Rosenfeld and Messner 2010). However, as Lattimore et al. (2010:255) have recently emphasized, “despite some promising advances over the last two decades, it is clear that prisoner reentry remains an important—and unresolved—national issue.”

This situation constitutes a particular concern given that reentry likely will remain a prominent problem. Prison populations, for example, have continued to grow; inmate programming and services have declined relative to prison growth; and ex-prisoners face increasingly more barriers to civic engagement (e.g., many ex-prisoners cannot vote), housing, employment, and welfare benefits (Lynch and Sabol 2001; Petersilia 2003; Travis 2005; Gideon and Sung 2010; Weisberg and Petersilia 2010). Such factors assume greater importance at a time when national and state economies have declined substantially (Gottschalk 2010; Inman 2010; Johnson et al. 2010) and when the profile of most inmates—poverty, limited education, health problems, histories of drug abuse and addiction, poor employment histories (Petersilia 2005)—places them at risk of being disproportionately affected by sustained downturns in the economy.

Precisely because of this situation, a large body of scholarship has turned to examining programs, policies, and practices that can reduce recidivism. This work has identified a large array of efforts that have demonstrated effectiveness or show promise of effectiveness (Gaes et al. 1999; Cullen and Gendreau 2000; Travis 2005; MacKenzie 2006; Lipsey and Cullen 2007;

Gideon and Sung 2010; cf. Farabee 2005). Alongside of such research has been an emerging literature aimed at describing prisoner experiences during and after incarceration and how these experiences, as well as services, programs, and supervision, may affect recidivism. The 1992 federal Serious and Violent Offender Reentry Initiative, for example, involved the allocation of over \$100 million in grants to states, with the goal of fostering greater policymaking and scholarly attention to understanding and improving the reentry process (Lattimore et al. 2010). There nonetheless remains a considerable need for studies that can provide greater insight into how incarceration experiences may affect reentry, and, more broadly, how ex-prisoner recidivism can be reduced (Visher and Travis 2003; MacKenzie 2006; Clear 2010). Such studies have the potential not only to further efforts to reduce recidivism, but also to inform theoretical efforts aimed at understanding why some individuals turn away from or continue a life of crime.

PRISON VISITATION AND RECIDIVISM

Visitation has long been a feature of prison systems (Glaser 1954, 1964; Adams and Fischer 1976; Hairston 1988; Tewksbury and DeMichele 2005). However, it has not always been enthusiastically embraced by corrections officials despite arguments that inmate ties to communities may improve prisoner adjustment and reduce recidivism (Toch 1977; Wooldredge 1999; Casey-Acevedo and Bakken 2002; Tewksbury and DeMichele 2005; Jiang and Winfree 2006). With the growth in prison populations and the concomitant concern about ex-prisoners and their transition back into society, there is renewed interest in efforts, such as visitation (see, e.g., Hairston et al. 2004; Bales and Mears 2008; Laughlin et al. 2008), that may improve reentry outcomes (Petersilia 2003; Travis 2005; Berg and Huebner 2010).

Despite the arguments for viewing visitation as an effective tool for reducing recidivism, the evidence to date is in fact limited. Indeed, as one recent study found, the evidence “remains scant and is mixed” (Bales and Mears 2008:295)—few empirical studies were found that examined how being visited affects prisoner reentry and the studies that investigated visitation

and recidivism typically did not employ multivariate models or other approaches to controlling for selection bias. Other problems were identified as well. For example, extant work, dating back to Ohlin (1951) and Glaser's (1954, 1964) pioneering work (see also Holt and Miller 1972; Adams and Fischer 1976; LeClair 1978; Baumer et al. 2009), typically has focused only on inmates from one facility, on a special program such as furlough or home visitation, on just one type of visitation, such as visits from spouses or family, or on recidivism in general rather than on different types. Bales and Mears' (2008) research overcame several of these problems and found that visitation indeed appeared to reduce recidivism. They did not, however, have complete visitation histories for the inmates in their sample and they did not employ a matching methodology for visitation in general or for types of visitation specifically; they also did not examine how visitation may influence different types of recidivism. Other recent work suggests that inmate social ties to the outside world may contribute to reduced recidivism (e.g., Visher et al. 2004; Berg and Huebner 2010), but these studies have not directly measured in-prison visitation or, in turn, whether, net of a range of factors, it is associated with less recidivism.

A focus on visitation is of interest because of policy considerations. If, for example, visitation reduces recidivism, policymakers and corrections officials might want to consider efforts that could increase visitation. It is of interest as well, however, because prior scholarship suggests that it is a theoretically relevant predictor of recidivism. For this reason, a focus on visitation may contribute to efforts to understand how incarceration experiences affect recidivism and, more broadly, to theoretical efforts aimed at explicating how social relationships affect offending. There are several theoretical reasons to expect that prison visits play important roles during and after incarceration. These roles may involve both providing a buffer against the immediate prison experience and increasing the chances that inmates will be supported and monitored post-release. Although these theories are markedly distinct, they all lead us to expect not only beneficial effects of visitation on recidivism but also dose-dependent effects, such that greater numbers of visits cause greater reductions in recidivism.

First, visitation may sustain or strengthen an inmate's social bond and, by extension, insulate

or constrain him or her from an impulsion to engage in crime (Hirschi 1969; Hairston 1988; Laub and Sampson 2003; Maruna and Toch 2005). The continuation or activation of social ties to the outside world while residing in a prison setting may assume particular importance because the theory anticipates that the bond must be sustained to exert an effect (Gottfredson 2006:79; see Agnew 2005). As Maruna and Toch (2005:167) have observed: “Visitations offer inmates the only face-to-face opportunities they have to preserve or restore relationships that have been severed by imprisonment.” Visits do appear to improve inmates’ post-release family relationships (La Vigne et al. 2005). These relationships in turn provide a vehicle through which informal social control, vis-à-vis a social bond, can be exerted during and after incarceration. They also may affect the extent to which incarceration serves as a harmful turning point in the life course of crime. By this logic, greater numbers of visits should cause greater reductions in recidivism because each additional visit should further strengthen an inmate’s social bond.

Second, visitation may temper the strain that inmates feel during and after incarceration. The premise for anticipating such an effect flows from the observation that prison entails many deprivations (Sykes 1958), not least of which is the potential loss of social ties that inmates had prior to imprisonment (Adams 1992). As inmate accounts and reviews of the prison adjustment literature suggest, one of the central concerns that inmates express is the isolation from the social networks in which they previously belonged and participated (Adams 1992; Rhodes 2004; Hassine 2009; Johnson and Tabriz 2009; George 2010). Accordingly, from a general strain theory (Agnew 2006) perspective, visitation may reduce the feelings of loss, frustration, and hopelessness associated with having one’s ties to family, friends, and community severed (Adams 1992; Maruna 2001; Bales and Mears 2008). At the same time, it may provide, as Hairston (1988) has argued, a source of support for coping with and surviving prison, especially those aspects—the “variety of negative stimuli” (p. 50; see also Agnew 2006)—that are strain-inducing and that create a criminogenic effect (see, generally, Wooldredge 1999; Jiang and Winfree 2006; Nagin et al. 2009). In addition, visitation may sustain or create social networks that, upon release, enable ex-prisoners to negotiate challenges and barriers to successful reentry

and so reduce the strains that confront released inmates (Travis 2005; Berg and Huebner 2010). This perspective, too, anticipates additive beneficial effects of multiple visits on recidivism, because a single visit may be an insufficient buffer against the strains of imprisonment.

Third, visitation may temper potential labeling effects associated with incarceration. The experience of imprisonment can lead an inmate to develop or cement an identity as “offender,” and incarceration itself can result in society labeling him or her as “offender” (Nagin et al. 2009:127; see, generally, Paternoster and Iovanni 1989; Akers and Sellers 2004; Bernburg 2009). Maruna’s (2001) recent work illustrates how these processes can unfold and how social support can help ex-prisoners to view themselves less as “offenders”—despite the myriad social forces that serve to reinforce an ex-prisoner’s status as, first and foremost, a criminal (Petersilia 2003; Travis 2005)—and more as prosocial individuals who have something different than crime to offer the world (see especially pp. 95-96). Viewed in this way, visits during incarceration can enable prisoners, upon release, to avoid labeling influences and, in turn, recidivism. Here, again, a labeling approach suggests that there may be an additive effect of visitation on recidivism.

Fourth, visitation may, as noted above, sustain or create social relationships that provide ex-prisoners with access to resources and support, including assistance with obtaining housing, employment, and social services (Hairston 1988; Visher and Travis 2003). For example, ex-inmates who received family visits are more likely to report having relatives who can help them find jobs, battle addictions, and make ends meet (La Vigne et al. 2005). Such assistance may reduce the likelihood of offending through a range of mechanisms, including increasing social bonds, reducing strain, and allowing for changes in self-identity and self- and other-labeling. Regardless of the intervening mechanism specified, the central notion highlighted by both social support theory (Cullen 1994; Jiang and Winfree 2006; Hochstetler 2010; Listwan et al. 2010) and social capital theory (Sampson and Laub 1993; Wright et al. 2001) is that relationships are central to how individuals think about themselves and negotiate the social world. Activities such as visitation that facilitate continued contact with or, upon release from prison, access to social networks provide a critical platform from which to avoid criminogenic influences and to become

exposed to, or enmeshed in, prosocial influences.¹ To the extent that visits strengthen inmates' ties to people who later provide instrumental support (Berg and Huebner 2010), we can anticipate that visitation may have the greatest effect on property offending.

Finally, life-course theoretical perspectives, such as Sampson and Laub's (1993) age-graded theory of informal social control (see also Sampson et al. 2006), emphasize the importance of turning points and social relationships to offending (Lilly et al. 2007). Incarceration can be viewed as a critical life event (Adams 1992; Johnson and Tabriz 2009), one that constitutes a turning point in the lives of many ex-prisoners (Maruna 2001). The effect, though—whether incarceration is, for example, criminogenic or not—may depend on the extent to which social supports have been sustained or activated (Cullen 1994; Shafer 1994; Visser and Travis 2003; Bales and Mears 2008; Nagin et al. 2009). That is, the criminogenic effects of incarceration (Nagin et al. 2009) may be offset through social ties, during and after incarceration, that provide critical sources of support or informal social control (Hairston 1988; Berg and Huebner 2010).

In short, prior scholarship suggests ample grounds for anticipating that visitation should reduce recidivism and, by extension, that greater amounts of visitation will exert an additive effect in reducing offending. At the same time, it can be argued that additional visitation may produce diminishing returns, such that additional visits may not add appreciably much beyond what an initial visit or two provides. Here, the logic, following Bales and Mears (2008), is that it may be the initial few visits that are sufficient to sustain a social tie and, in turn, activate the bond and obtain the resources during or after incarceration that help to ameliorate strain or to facilitate a successful reentry. In this study, we test these different arguments. We do not, however, test which specific pathways may contribute to a visitation effect; rather, our focus is on establishing whether in fact the hypothesized effects of visitation on recidivism exist. In addition, and drawing on the logic of social support and social capital theories, we test the argument that visitation, if it has an effect, primarily reduces property recidivism. The reasoning is that the support and resources that come from sustained or activated social ties may serve primarily to help ex-prisoners to access housing and obtain employment, thus reducing financial

strain and the motivation to engage in property crime (Berg and Huebner 2010). Finally, we test the hypothesis, based on prior work (e.g., Markley 1973; Burstein 1977; Hairston 1988; La Vigne et al. 2005; Bales and Mears 2008), that spousal and significant other visitation, more than other types, will be associated with less recidivism. The argument implied by previous studies is that spouses and individuals who are most invested in a prisoner may in turn exert a stronger influence on recidivism (see especially Hairston 1988).

DATA AND METHODS

Overview

The data for this study come from the Florida Department of Corrections' Offender-Based Information System (OBIS) and include visitation information that the Department collected during an 18-month period. Collection of detailed visitation data is uncommon among correctional systems (La Vigne et al. 2005; Bales and Mears 2008) and so the availability of the data affords a unique opportunity to examine the potential effects of visitation on recidivism. To maximize the number of cases for which complete visitation data were available before inmates' release, we use administrative data for individuals who were admitted to Florida prisons between November 1, 2000 and April 30, 2001, and who were released on or before April 30, 2002. The final data file (N = 3,903) consists of inmates who served 12 months or less at release.

This one-year-or-less restriction potentially limits the generalizability of the study results to inmates serving relatively shorter sentences, but was necessary both because of the limitations on the data made available to us and because of the focus on creating complete visitation histories for each inmate from the point of entry into prison to the point of departure. The creation of complete visitation records is especially critical for ensuring that the study captures all visitation events, not just those that occur at one point in time or in the months immediately preceding release, which is how many previous studies have proceeded (see, e.g., Bales and Mears 2008).

As we discuss in the conclusion, the effects of visitation on the recidivism of inmates who

serve lengthier prison terms may vary from the effects of visitation on the recidivism of inmates who serve shorter prison terms; it true, that would limit the generalizability of this study's results. It bears emphasizing, however, that studies to date have not suggested that visitation effects vary by length of incarceration. In addition, the study results still may apply to a relatively large swath of the ex-prisoner population, at least those who share characteristics similar to those of inmates who are visited, given that a non-trivial number of inmates serve relatively short prison terms. Both in Florida (Florida Department of Corrections 2005) and nationally, many inmates serve one year or less in prison and many others have prison stays of just over one year. For example, among state prison inmates released nationally in 2008, the median time served was 16 months (Bureau of Justice Statistics 2011).

For each inmate, we compiled reconviction data for a full three-year period. The primary focus is on whether any visitation, or the amount or “dose” of visitation, reduces recidivism and whether the effect varies by type of visitation or recidivism. A credible assessment of any such effects must address the potential for selection bias to create the appearance of a recidivism-reducing impact when none may exist. To this end, we employ a quasi-experimental research design involving propensity score methodologies, which provide a counterfactual approach to treatment effect estimation and increasingly have become common in the social sciences (see, generally, Guo and Fraser 2010) and, in recent years, in criminological studies (see, e.g., Massoglia 2008; Loughran et al. 2009; Mears and Bales 2009; Apel and Sweeten 2010; Kurlychek and Johnson 2010). In particular, we use propensity score matching to examine the effect of binary measures of visitation on recidivism and then an extension of Rosenbaum and Rubin's (1983) approach, generalized propensity score matching (Hirano and Imbens 2004; Bia and Mattei 2008), to estimate models aimed at identifying whether greater amounts, or doses, of visitation reduce recidivism. In the findings section, we describe the analytical approach in more detail. The recidivism, visitation and matching variables are discussed immediately below. Table 1 provides the summary descriptive statistics for each measure.

Insert table 1 about here

Dependent Variables

For all analyses, we use a dummy variable measure of recidivism indicating whether released inmates were reconvicted of a new felony within three years following release and that led to a sanction. Killias et al.'s (2006) review for the Campbell Collaboration indicates that reconviction is the most commonly used operationalization of recidivism. The focus on felonies that resulted in reconviction ensures that our focus centers on serious offending, while the three-year window ensures that the study includes analysis of a greater swath of reoffending than is captured in studies that use only one-year or two-year windows. It also ensures that the focus is not restricted to those ex-prisoners who are most likely to fail within the first year or two after release (Kurlychek et al. 2006; Langan and Levin 2002). For this study, we examine a measure of general recidivism—that is, whether an ex-prisoner was convicted of any crime—and three types of recidivism, including violent, property, and drug (1=reconvicted, 0=not reconvicted).

Independent Variables

The goal of this study is to assess the effects of inmate visitation on recidivism. In keeping with prior work, we examine a binary measure of visitation (1=visited, 0=not visited) using data from the Florida Department of Corrections.² Extending this work, we also include a measure of the frequency of visitation; this latter measure enables us to investigate whether greater amounts, or doses, of visitation lead to lower probabilities of recidivism and whether these effects diminish or remain constant. An important strength of the study design lies in the fact that the measures here reflect the complete number of visits that inmates received during their entire term of incarceration. Prior studies typically have examined visitation during only parts (e.g., the last year) of prisoners' incarceration stays (Holt and Miller 1974; Bales and Mears 2008).

Following recent scholarship on the potential for visitation to influence recidivism (see, e.g., La Vigne et al. 2005; Berg and Huebner 2010), we examine general visitation and three types:

visits from spouses or significant others, family members other than spouses or significant others, or friends. In each instance, if an inmate was visited by a particular visitor type, such as a friend, the visitation measure was coded to reflect this fact (e.g., 1=visited by friend, 0=not visited by anyone). If inmates experienced multiple types of visitation, they would have “1” values each of the different types of visitation. That is, for the visitation type analyses, these inmates were part of each visitation group to which they could belong based on the types of visitors that they received. The matched subjects, identified using propensity score matching, as discussed below, came from the pool of inmates who received no visitation of any type.³

In this study, visitation was a relatively rare event among inmates, a finding that accords with prior research. Specifically, 24 percent of inmates received any visitation, 10 percent received at least one visit from a spouse or significant other, 18 percent received at least one visit from a family member other than a spouse or significant other, and 5 percent received at least one visit from a friend. The fact that so few inmates (76 percent of the sample) were not visited provides a large pool of subjects from which to develop matched subjects for the analyses.

Matching Variables for Propensity Score Analyses

The matching analyses include covariates that, if not taken into account, might bias the estimated effects of visitation. Prior criminal history is perhaps the most consistently identified predictor of recidivism (Gendreau et al. 1996) and, along with a wide range of other factors that research has found to be associated with recidivism (see, e.g., Visher and Travis 2003; Kubrin and Stewart 2006; Kurlychek et al. 2006; Mears et al. 2008; Jones et al. 2010), is included in the matching analyses. Drawing on the Department of Corrections’ inmate records data, the analyses match on age, sex, and race (black, white, Hispanic), as well as information on each inmate’s sentence length (measured in months), primary offense type (violent, property, drugs, other), prior criminal history (number of prior convictions and number of prior prison commitments), disciplinary incidents while in prison (number of disciplinary reports for violent,

property, drug, or disorder infractions, respectively), and supervision status after release (supervised or not). Importantly, many of these factors have been linked to inmate visitation as well (Jackson et al. 1997; Casey-Acevedo and Bakken 2002; Hairston et al. 2004; Bales and Mears 2008) and thus are important confounders to include to address possible selection bias. Inmate behavior while in prison constitutes a salient and frequently overlooked control (Jones et al. 2010), while post-release supervision, also overlooked in many studies, may increase the likelihood of apprehension (Kubrin and Stewart 2006; Sabol 2007; Pettit and Lyons 2007). Inclusion of prior record and these measures provides added confidence that the matching analyses address differences in recidivism among the visited and non-visited inmates that may stem from pre-existing differences in the propensity to offend.⁴

FINDINGS

Inmate Visitation and Recidivism—An Initial Assessment

Our main focus centers around the question of whether inmate visitation reduces recidivism. A central starting point for answering that question involves determining whether visited inmates in fact have lower rates of recidivism relative to those who are not visited. As inspection of table 1 shows, inmates who are visited do indeed recidivate less than inmates who have not been visited.⁵ This pattern holds true for recidivism in general as well as for violent recidivism, property recidivism, and drug recidivism. Among those not visited, for example, 46 percent were reconvicted within 3 years, compared with a 40 percent reconviction rate among those who were visited. Similarly, 10 percent of inmates who were not visited recidivated for a violent offense as compared with 7 percent among inmates who were visited.

On the face of it, then, visitation appears to be associated with modest reductions in the likelihood of recidivism. Such comparisons are not valid estimates of the visitation effect, however, because they do not take into account differences among visited inmates and non-visited inmates. For example, non-visited inmates were more likely to be Black and had more

prior prison commitments. To generate appropriate, “apples-to-apples” comparisons that approximate what one would obtain with an experimental design, we need analyses that create appropriate matches to the visited inmates.

Visitation and Recidivism—A Propensity Score Matching Assessment

Predicting Visitation

Propensity score matching allows for such comparisons. The first step involves generating a predictive model for treatment, in this case, visitation, and then using the resulting propensity scores to match “treated” individuals—that is, inmates who received visitation—with those who did not. Accordingly, we created logistic regression models, using the covariates in table 1, to predict visitation. We ran separate models for each type of visitation (any vs. no visitation, spouse or significant other visitation vs. no visitation, family visitation vs. no visitation, friend visitation vs. no visitation). From the prediction models for each of the four respective types of visitation, we then obtained propensity scores, ranging from 0 to 1, which reflect the conditional probabilities of inmates receiving a given type of visitation.⁶

Balance on the Matching Variables

Before proceeding to comparisons, it is important to obtain balance across all matching variables for the treatment (i.e., visited) and comparison (i.e., non-visited) groups. This condition is essential for approximating what would occur with an experiment. That is, 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; see also Apel and Sweeten 2010:546). Balance occurs when, after dividing the propensity scores into strata, the average scores of the treated and comparison groups do not statistically differ. For all analyses, including the comparisons of each type of visitation with non-visitation, we obtained balance across all strata and covariates using Stata’s propensity score

matching procedure (Becker and Ichino 2002).

Balance was evident both through inspection of the means comparisons after matching and through inspection of the standardized bias (SB) statistics for all four sets of matched comparisons (any visitation with matched group, spouse or significant other visitation with matched group, etc.). The use of SB statistics, as Apel and Sweeten (2010:549) have noted, “is equivalent to Cohen’s d (Cohen 1988), a common measure of effect size. . . . The degree to which the SB is attenuated by conditioning on the propensity score provides some indication of the degree to which the conditional independence assumption is satisfied.” In this study, for example, prior to matching, half or more of the covariates had SB values that revealed imbalance between the treatment (i.e., visited) and comparison (i.e., non-visited) groups; after matching, no imbalance was evident.⁷ Thus, after matching the visited inmates, and assuming no imbalance in unobserved confounders, any resulting reduction in recidivism should be due to visitation (Winship and Morgan 1999; Becker and Ichino 2002; Caliendo and Kopeinig 2008).⁸

Matching Analyses

To create matched groups, we employed one-to-one nearest neighbor, non-replacement matching using a conservative caliper width of .01 (see, e.g., DiPrete and Gangl 2004; Barth et al. 2008). Each visited inmate had a propensity score and then was matched with a non-visited inmate who had a similar score, using the caliper setting to restrict the matching to scores that were very nearly identical (see Massoglia 2008). Once a non-visited match was found, the non-replacement option excluded that inmate from the pool of potential matches for other visited inmates. We repeated this process for each type of visitation (any, spouse or significant other, family, and friend). In each instance, the inmates from which matches were selected consisted of the same individuals—that is, those inmates who had never received any type of visitation.

The final samples, after matching and eliminating cases that fell outside the common support region (i.e., cases were used only if their scores fell within the range of overlap between the two

groups' scores), were as follows: any visitation vs. no visitation (N=1,846); spouse or significant other visitation vs. no visitation (N=774); family visitation vs. no visitation (N=1,350); friend visitation vs. no visitation (N=408). Almost all treatment cases had matches—that is, few cases were outside the region of common support (21 cases were off-support for any visitation, 7 for spouse or significant other visitation, 11 for family visitation, and 6 for friend visitation). Loss of many cases can be a concern because it limits the generalizability of estimated treatment effects. Conversely, when, as in the present study, all or nearly all treatment cases are retained and have matches, we can have greater trust in the counterfactual and in the generalizability of the estimated effects (Apel and Sweeten 2010:548, 551). It bears emphasizing, however, that the generalizability of the results extends only to the types of inmates who likely would be visited; the analyses do not necessarily generalize to the types of inmates who could not be matched.⁹

Propensity Score Matching Results

Given that balance was achieved for the different comparisons, we turn to the estimated effect of visitation on recidivism, that is, the average effect of the treatment on the treated (Apel and Sweeten 2010:549). A few patterns are evident in table 2, which presents the matching analysis results. First, receiving any visitation is associated with a statistically significant 4.7 percentage point reduction in the likelihood of recidivism (40.4 percent vs. 45.1 percent).¹⁰ The reduction in the absolute rate of recidivism is relatively modest; viewed, however, as a relative reduction in the base rate of recidivism, it constitutes a more than 10 percent decrease in the likelihood of recidivism (4.7 percent as a percentage of 45.1 = 10.4 percent).

Insert table 2 about here

Second, that effect appears to result from accumulated reductions in all types of recidivism, including violent, property, and drug. The only offense-specific effect that achieves statistical significance is property recidivism; for this type of visitation, there is an almost 3 percentage

point reduction in recidivism. Even so, the absolute differences across the types of recidivism are not so large as to suggest that visitation only affects property recidivism. Rather, visitation appears to exert a modest effect on all types of offending, but more so for property offending.

Third, these effects vary by type of visitation. Being visited by a spouse or significant other results in a 9.6 percentage point reduction in recidivism, from 47.0 percent to 37.5 percent. Viewed in relative terms, that amounts to a more than 20 percent decrease in the base rate of recidivism relative to the matched comparison sample. Here, again, this effect appears to stem from a reduction in all types of recidivism, especially property offending.

Visitation from friends exerts a similar reduction in overall recidivism (8.3 percentage point difference). Here, though, the effect appears to be driven primarily by reduced violent recidivism, which is the only offense for which a statistically significant difference emerged. Even so, the difference in property recidivism, though not statistically significant at conventional significance levels, was close to statistically significant and appears to constitute the other main contributor to the overall reduction in recidivism associated with visitation from friends.

Family visitation exhibits the weakest relationship with recidivism. There is, for example, no evidence of a statistically significant reduction in overall recidivism. However, family visitation is associated with a statistically significant 3.9 percent reduction in property recidivism.

The results of the matching analyses suggest, in short, that visitation reduces recidivism, especially property recidivism and that two types of visitation—spouse and significant other, on the one hand, and friend, on the other—appear to produce the largest reductions. Even so, family visitation contributes to a lower probability of being reconvicted of a property crime as well.

Sensitivity Analyses

Are these results robust? For example, would the results differ appreciably if unobserved confounders could be included? The question can be addressed in part by creating Rosenbaum bounds to assess the sensitivity of the propensity score matching results to hidden bias (Caliendo

and Kopeinig 2008; DiPrete and Gangl 2004; Morgan and Harding 2006). The sensitivity analyses generate an odds ratio, called gamma (Γ), which can be evaluated at different values to determine the threshold at which the results are sensitive to bias. As shown in table 2, gamma ranges in value from 1.0 to 1.20. To illustrate what that means, a gamma of 1.15 indicates that the results are sensitive to a bias that would increase by 15 percent the odds of visitation (see, generally, Becker and Caliendo 2007:78). There is, unfortunately, no established standard for what constitutes a high or low degree of sensitivity using Rosenbaum bounds. From these results, however, it appears safe to conclude that the estimated effects of visitation may be sensitive to exclusion of omitted confounders given how close the Γ values are to 1.0. That said, it is important to emphasize that the bounds present a “worst-case” scenario and as such provide a conservative assessment of sensitivity (DiPrete and Gangl 2004:291).¹¹

Visitation Dose and Recidivism—A Generalized Propensity Score Matching Assessment

Generalized Propensity Score Matching

We turn now to the question of whether, among inmates who were visited, higher amounts, or doses, of visitation produce additional reductions in recidivism and to the related question of whether perhaps a process of diminishing marginal returns occurs, such that additional visits yield smaller reductions in recidivism. Here, we use generalized propensity score analysis, an approach that extends the propensity score matching methodology by taking into account treatments that are continuous rather than binary (Hirano and Imbens 2004; Bia and Mattei 2008; Ertefaie and Stephens 2010). As with the traditional matching approach in the binary case, the benefit of the generalized propensity score methodology lies in its greater ability, as compared to a traditional regression approach, to eliminate bias due to differences across treatment groups in the covariates (Hirano and Imbens 2004). With generalized propensity score analyses, one proceeds in a manner similar to binary propensity score analyses. For example, using Stata’s `gpscore.ado` program, the first step consists, as Bia and Mattei (2008) have written, of using

maximum likelihood estimation to model “the conditional distribution of the treatment given the covariates” (which is analogous to predicting binary treatment outcomes in conventional propensity score matching), testing whether the treatment is normally distributed, conditional, again, on the covariates, and then testing for balance (p. 357). Dose, in this study, is a continuous measure and so the model results parallel what one would obtain through ordinary least squares regression. Assuming that balance on the covariates is achieved, as was the case in the present analyses and in the binary visitation analyses presented in table 2, the second step involves modeling the conditional expectation of recidivism, using logistic regression, given treatment and the generalized propensity score. The generalized propensity score analysis program within State (`doseresponse.ado`) then averages “the estimated regression function over the score function evaluated at the desired level of treatment,” with standard errors estimated by bootstrapping (p. 359).¹² The estimated dose-response values, and the accompanying confidence intervals, then can be plotted (see, generally, Hirano and Imbens 2004).

The need for a variant of the propensity score matching methodology stems from the fact that greater amounts, or doses, of treatment may involve selection effects that are not typically well addressed in a regression framework (Loughran et al. 2009:713). For any given visitation dose, for example, there may be, as there was in this study, a different distribution of values of covariates, especially at the low and high ends of a dose spectrum. To illustrate, in the present study, among inmates who were visited, 20 percent received one visit, 14 percent received two visits, 10 percent received three visits, 6 percent received four visits, 6 percent received five visits, 5 percent received six visits, and 5 percent received seven visits. Thereafter, the percentages (and therefore numbers) of cases in each dose declined substantially. Accordingly, we truncated the last dose category to include all cases with dose values of eight or more visits. The distribution of covariates across levels of visitation were, as in the binary treatment case depicted in table 1, imbalanced.¹³ In the dose model analyses presented here, however, which focused on eight levels of dose—ranging from 1 visit to 8 or more visits—the generalized propensity score achieved balance on all covariates and thus addressed this potential source of

bias. These analyses focused only on inmates who were visited. Accordingly, they provide not only an opportunity to test for dose effects among the treated (i.e., visited inmates) but also to reinforce the findings from the binary analyses that compare visited with non-visited inmates. In particular, the identification of dose effects would lend credence to the view that the visitation effects identified earlier may be attributable to visitation and not to unaddressed selection effects.

Insert figure 1 about here

Generalized Propensity Score Matching Results

Figure 1 presents the results of the generalized propensity score dose analyses. As inspection of the figure shows, each additional visit is associated with a continuing decrease in recidivism. Among visited inmates, the baseline estimated probability of recidivism associated with one visit is 44.9 percent. Among inmates visited twice, the estimated probability of recidivism declines to 42.9 percent, a decrease of two additional percentage points. The decline associated with a third visit is not as great, but there is still an added benefit; specifically, a third visit further reduces the estimated probability of recidivating to 41.5 percent. Thereafter, additional reductions in recidivism occur with additional visitation, but the marginal returns appear to taper off. Although not shown here, this pattern surfaced in analyses that examined type of visitation and type of recidivism; in these cases, though, data restrictions rendered many of the estimates unreliable (e.g., too few inmates experienced friend visitation to allow for estimating the effects of amounts of such visitation on violent recidivism, itself a relatively rare event).

The results thus suggest that the effect of visitation is not constant, contrary to what is implied in prior work (e.g., Bales and Mears 2008). That is, the general effect of visitation suggested by other studies may obscure the possibility, as shown here, that the marginal benefit of additional benefits may decline. Even so, the results suggest that the cumulative benefit of additional visits—at least among inmates who serve one year or less in prison—nevertheless may be substantial. Here, for example, the effect associated with eight or more visits as

compared with just one visit—36.6 percent versus 44.9 percent, respectively, or a decline of 8.3 percentage points—is considerable, approximating the reduction in recidivism associated with well-implemented programs aimed at reducing offending among justice-involved populations (Cullen and Gendreau 2000; Lipsey and Cullen 2009). Finally, the results also suggest that receiving just one or two visits may not generate an appreciable reduction in recidivism.¹⁴

It bears emphasizing that the same general pattern occurred regardless of how dose was operationalized. In the analyses here, we truncated the visitation dose measure to 8+ visits because too few inmates experienced higher levels of visitation. However, additional analyses using other truncation thresholds generated results consistent with those presented here. The main difference is that with additional dose levels, the estimation became less reliable because of the sparseness of the data, and the distribution of covariates, at higher dose levels. Even so, the same general pattern emerged. Following Loughran et al. (2009), we also reestimated all models using subclassification analyses (see Zanutto et al. 2005). Both approaches generated largely consistent results, suggesting that regardless of modeling strategy, there appear to be recidivism-reducing benefits of additional visitation.¹⁵ (The ancillary analyses are available upon request.)

CONCLUSION AND IMPLICATIONS

Prisoner reentry has emerged as one of the central criminal justice policy challenges of the twenty-first century. Accordingly, scholars, policymakers, and practitioners have invested considerable attention in understanding the factors that give rise to successful ex-prisoner transitions back into society. The scholarship to date points to a wide range of policies and programs that may improve reentry outcomes and to an equally wide range of factors that may affect such outcomes (see, e.g., Petersilia 2003; Visser and Travis 2003; MacKenzie 2006; Thompson 2008; Nagin et al. 2009; Berg and Huebner 2010; Hochstetler et al. 2010; Lattimore et al. 2010). Even so, and as this same body of scholarship emphasizes, considerably more research is needed to understand how successful reentry, and reduced recidivism in particular,

can be achieved. At the same time, this work highlights the strategic usefulness of reentry studies for extending scholarship on the causes of offending.

Accordingly, the goal of this study was to contribute to efforts to understand and improve prisoner reentry, and, in particular, to examine whether prisoner visitation reduces recidivism. Although many reviews and accounts suggest that such an effect may exist, and although visitation programs have been created based on an assumed recidivism-reducing effect held to flow from the logic of criminological theories, few empirical studies of this relationship exist, and fewer still exist that employ rigorous methodologies for addressing potential selection bias. Extant studies have focused on delimited populations, such as only males or only inmates from a single prison, and has not systematically examined visitation by different types of individuals or how the amount, or “dose,” of visitation may affect recidivism. A study by Bales and Mears (2008) stands as a notable exception, but it examined visitation only in the year prior to release, did not investigate types of recidivism, and did not employ a matching methodology.

This study aimed to extend prior work by examining complete visitation records for a release cohort of ex-prisoners and employing propensity score matching and dose modeling strategies for estimating whether receiving any, or greater amounts of, visitation indeed reduces recidivism and whether the effect holds across types of recidivism and types of visitors. Briefly, the analyses showed, first, that being visited appears to reduce recidivism in general. This effect stems from reductions in all types of recidivism (e.g., violent, property, drug); however, it appears to be somewhat more pronounced for property recidivism. Second, greater amounts, or doses, of visitation are associated with greater reductions in recidivism. However, the greatest reductions are associated with the accumulation of up to the first three to four visits; thereafter, it appears that the marginal returns associated with visitation may decline. Third, spouse or significant other visitation exerts the largest reduction in recidivism, followed by friend visitation and (non-spousal or significant other) family visitation. It bears emphasizing that because the study focused on inmates who served 12 months or less, the results may not necessarily be generalizable to inmates who serve lengthier sentences. In addition, the estimated effects of

visitation on recidivism are based on matching to inmates with characteristics similar to inmates who are visited. It therefore remains unknown whether visitation would exert similar effects to inmates with characteristics that differ from those of inmates who are visited.

These findings underscore the importance of themes that have emanated from recent theory and research on prisoner reentry and desistance. Visher and Travis (2003), for example, have emphasized the importance of social support and resources, and, more generally, social capital, for inmates during and after their prison terms. Incarceration is, by its very nature, an experience that isolates inmates from established social ties (Adams 1992) and that creates strains and trauma that can contribute to a greater likelihood of offending upon release (Hochstetler et al. 2010). In so doing, it can sever or weaken these ties and, in turn, can reduce the informal social control that such ties may exert (Hirschi 1969). It also can reduce the social supports that could help inmates adjust to prison and thereby potentially increase the criminogenic effects of incarceration, including the strains and hostilities that arise during incarceration and that may affect propensities to offend (Hairston 1988; Cullen 1994; Agnew 2005; Nagin et al. 2009; Hochstetler et al. 2010). The loss of such supports can also make the transition back into society, more difficult. Families and friends, for example, provide an important source of support for identity transformation, one that allows ex-prisoners to see and label themselves as more than or different from criminals and that allows them to see such transformation as possible (Maruna 2001). They also can provide resources, including housing and food, as well as assistance in finding employment, that may facilitate successful reentry (Hairston 1988; Bales and Mears 2008; Berg and Huebner 2010).

The fact that we find that visitation is associated with reduced recidivism suggests that inmates, at least those who serve shorter sentences, indeed may benefit from social ties to society. The fact that greater amounts, or doses, of visitation contribute to even greater reductions in recidivism, albeit with potentially diminishing returns after three or four visits, reinforces this idea. Put differently, the maintenance or creation of social ties—including relationships with spouses, significant others, family, and friends—appears to be a critical

mechanism through which people in prison can avoid the potentially criminogenic influence of incarceration (Nagin et al. 2009).

The analyses thus reinforce the argument that social relationships are consequential not only for offending prior to prison or behavior while in prison (Adams 1992; Bottoms 1992) but also for successful reentry back into society. This idea harks back to a prominent line of theorizing in criminology, one that emphasizes the social nature and embeddedness of individuals (see, e.g., Maruna 2001; Laub and Sampson 2003; Mears et al. 2008). Even so, it is one that has been largely neglected in many empirical studies of recidivism, much of which, as Cullen and Gendreau (2000) and others (e.g., Visher and Travis 2003; Kubrin and Stewart 2006; Jones et al. 2010) have emphasized, has focused on a wide range of static rather than dynamic risk factors and on individual-level factors rather than sociological ones, including the social networks, contexts, and areas to which individuals released from prison return.

The idea that visitation may improve inmate behavior after release from prison is one that holds considerable conceptual appeal. Indeed, the idea seems intuitive, so much so that policies to promote it have been advanced despite the relative lack of empirical research documenting that the presumed negative relationship (more visitation, less recidivism) exists. However, intuition is not a substitute for empirical research. A considerably larger body of research is needed to develop a more credible foundation to justify the assumption that visitation reduces recidivism. Prior research identifies the separation from prior social networks as one of the primary “pains” of imprisonment (see, e.g., Adams 1992). From this perspective, any visitation may be helpful. However, it may be that the quality of visitation, which we were not able to examine, is what is most consequential. For example, perhaps some visits, especially if they proceed in a manner that accords with what inmates expect, create greater resiliency among inmates and thus reduce strain and recidivism. Perhaps some visits do not proceed as expected or create greater anxiety, frustration, or anger, in turn increasing strain and recidivism (see, e.g., Visher et al. 2003). Perhaps, too, it may be that a critical threshold of visits of multiple types (e.g., spouse, family, and friend) is most consequential for building on or developing social ties

that may facilitate a more successful transition of ex-prisoners back into society.

Studies, in short, are needed that will be able to examine systematically the types, amounts, and quality of visitation and their potentially differential effects on different types of offending across a wide spectrum of different types of inmates. We found that friend visitation was associated with a reduced likelihood of violent recidivism but that family visitation was not. Perhaps friendships and the support that they create upon release are especially salient for reducing the hostility that some inmates develop while incarcerated (Hochstetler et al. 2010). By contrast, families may primarily serve as a source of financial support. Only additional research that includes details about the mechanisms through which these effects arise will be able to adjudicate what accounts for these differences. Indeed, as a more general matter, research is needed that can unpack how exactly visitation of various types, amounts, or quality produces reduced recidivism, if it does so. The notion that visitation may reduce the pains of imprisonment seems compelling, but so, too, does the notion that visitation sustains social networks and ties that provide for greater informal social control upon release or that create access to housing and employment (Berg and Huebner 2010). Future studies would do well to illuminate which possibilities account for any identified relationship, as well as the conditions under which the different theoretical pathways may arise, and whether identified effects vary by gender, race, ethnicity, and other social and demographic divides (see, e.g., Bales and Mears 2008). For example, women and men vary in the quality of their family relationships, which may in turn affect visitation as well as the quality and effects of visitation.¹⁶ Such possibilities suggest the need for developing a body of scholarship that more systematically delineates the nature and effects of prisoner visitation.

It bears emphasizing that this study focused on inmates who served 12 months or less at release. Although it would be preferable to have been able to examine visitation effects for inmates who served longer than one year in prison, the study results may nonetheless be relevant to discussions about a large swath of the inmate population, including not only those who served one year or less but also, presumably, those who serve only slightly longer sentences. Caution is

needed, of course, in making any such generalization. However, there exists little theoretical basis to anticipate that inmates who serve more time in prison would benefit less from visitation. And it is conceivable that they may benefit more, given the greater exposure to the deprivations, strains, isolation, and potentially criminogenic effects of incarceration (Nagin et al. 2009). Perhaps, though, the benefits of visitation dissipate over time, especially among those who serve multi-year sentences. Future research is, accordingly, needed that will be able to adjudicate which outcome is the more likely one and how the incarceration experience itself affects the probability and nature of visitation experiences (La Vigne et al. 2005).

From a policy perspective, the findings here are, we believe, intriguing. Until more studies are conducted, it will be important, as Bales and Mears (2008) have emphasized, to proceed cautiously in assuming that visitation causes reduced recidivism. We matched on measures, such as prior record, that should lend confidence to the idea that an assessment of the impact of visitation reflects just that, a visitation effect, as opposed to unobserved confounders, such as social bonds. More confidence in such results would be possible with a larger body of studies. Until then, the results of this study should be interpreted with caution. If, however, future research identifies similar effects to those presented here, it would point to an intriguing policy implication. To date, reviews suggest that well-implemented, effective programs fare well if they reduce recidivism by 10 percent or more (see, e.g., Lipsey and Cullen 2009). Visitation may achieve comparable results, especially if inmates are visited 3-4 times or more, and may do so for potentially far less cost.

This possibility, coupled with the fact that inmate visitation occurs relatively rarely (Sykes 1958; Holt and Miller 1972; Hairston et al. 2004; Bales and Mears 2008) and that simple and safe steps can be taken to increase visitation—such as improving parking availability at prisons; making visitation rooms cleaner and more hospitable, especially for families with children; reducing the administrative paperwork required for visitation; and encouraging community residents and organizations to visit inmates or facilitate visitation (Glaser 1964; Hairston 1988; Casey-Acevedo and Bakken 2002; Austin and Hardyman 2004; Tewksbury and DeMichele

2005)—suggests that policymakers and corrections officials may want to take a closer look at efforts to promote visitation. Investing in policies, programs, and practices that increase visitation holds the potential not only to reduce offending but also to increase prison order and other reentry outcomes, including increased employment, reduced homelessness, and improved family functioning (Reed and Reed 1997; Hairston et al. 2004; Tewksbury and DeMichele 2005; Jiang and Winfree 2006; Berg and Huebner 2010). Not least, visitation is an approach that the public appears to endorse (Applegate 2001) and that liberals and conservatives would seem equally comfortable endorsing given that they could do so without appearing to be “soft on crime” and without calling for large-scale and costly programs (Bales and Mears 2008).

NOTES

¹ This same idea extends to furlough programs (see, e.g., LeClair 1978; Baumer et al. 2009).

² Although Florida's prison data have been used in many studies, the reliability of the measures derived from the data remains unknown. This issue is endemic to correctional system studies (see, generally, Logan 1993; Reisig 2002; Gaes et al. 2004). In Florida, prison officers record details of visitation events into OBIS. (Details about the State's visitation policies can be found on-line: <http://www.dc.state.fl.us/oth/inmates/visit.html#qualifying>. See also Office of Program Policy Analysis and Government Accountability 2007.) Accordingly, there may be inconsistencies in the reporting of these events. Two considerations deserve mention, however. First, the Florida Department of Corrections automated their offender records system in the late 1970s and have relied on electronic information to document and manage all facets of the correctional system for over three decades. The visitation records specifically were automated in the 1990s; correctional officers thus have relied on this automated system for over a decade. This automation of electronic data entry may reduce any error or omissions in the recording of visitation events. Second, for purposes of assessing the effect of visitation on recidivism, there is no suggestion in the literature that missingness in visitation data is patterned, or patterned in a way that would bias estimated visitation effects on recidivism.

³ Some overlap in visitation types existed in the sample. For example, among inmates who were visited by friends, roughly 25 percent also received a visit at some point from a spouse; among those who were visited by family, roughly 18 percent were visited by friends; and among those who were visited by spouses or significant others, 52 percent were also visited by family. As we discuss in the conclusion, isolating the unique effects of each type of visitation, "net" of visitation of other types is an important task for future research, but it will be difficult to undertake without severely limiting the generalizability of the results. For example, by focusing on inmates who only receive friend visits and no other type of visits, one necessarily is estimating an effect that is specific to these types of individuals and not to the types of

individuals who receive multiple types of visitation.

⁴ The controls for prior record and in-prison misconduct should address concerns that it is social bonds prior to incarceration that caused visitation and reduced recidivism. Such bonds would, of course, be correlated with prior record and in-prison behavior. To the degree that they are, matching on these variables thus should take into account pre-existing differences in pre-incarceration social bonds between visited inmates and their matched counterparts.

⁵ Population data are presented in table 1 and so no statistical significance tests are presented.

⁶ Across the four models, the following covariates were consistently statistically significant and predictive of visitation: age, sex, race, ethnicity, violent offense, property offense, prior convictions, prior commitments, disciplinary reports for drugs, and disciplinary reports for disorderly conduct. To conserve space, we focus here on presenting the estimated treatment effects emanating from the propensity score analyses (see table 2). The results from the models, as well as the balance tests (discussed below), are, however, available upon request.

⁷ In general, the same measures that predicted visitation were those (discussed above) that were out of balance before matching. Following Apel and Sweeten (2010:554), we used an absolute SB value of 10 or more to indicate bias. A SB value of 20 is more conventional for determining whether bias is large (p. 549); using the lower threshold thus provides a more stringent test of balance. In the present study, after matching, all covariates had an SB value of less than 20, and all but one had a SB value of less than 10. (Results available upon request.)

⁸ As with any type of quasi-experimental design, the accuracy of estimated treatment effects is a function of both included covariates and excluded, unobserved measures. Obtaining balance on included covariates is a critical condition for proceeding with comparisons of treated and matched comparison groups. However, doing so does not preclude the possibility that the two groups may vary with respect to unobservables, or, put differently, that assignment to treatment may not be ignorable (Winship and Morgan 1999; Morgan and Harding, 2006; Caliendo and Kopeinig 2008; Guo and Fraser 2010). In the present study, the inclusion of such measures as

prior convictions and in-prison conduct, which could be construed as strong controls, lends confidence that the omission of unobservables may not have unduly biased the results.

⁹ We thank one of the anonymous reviewers for drawing attention to this distinction.

¹⁰ We present one-way tests of statistical significance because theoretical arguments that have been presented in the literature for visitation effects uniformly suggest that the effect should be beneficial (see, e.g., Hairston et al. 2004; Bales and Mears 2008). No arguments have been presented, to the best of our knowledge, that visitation should increase recidivism.

¹¹ As DiPrete and Gangl (2004:291) emphasize in an example that parallels the results here, a Γ of any given value “does not mean that there is no true effect.” Rather, “this result means that the confidence interval would include zero if an unobserved variable caused the odds ratio of treatment assignment to differ between treatment and control groups by 1.15 *and if this variable’s effect on [the outcome] was so strong as to almost perfectly determine whether the [outcome] would be bigger for the treatment or control case in each pair of matched cases in the data*” (p. 291; emphasis in the original).

¹² The generalized propensity score model coefficients, with standard errors in parentheses, were as follows: $Y = -.043 (.442)$ intercept $-.075 (.094)$ visits $- 1.827 (5.478)$ pscore $+ .397 (1.204)$ visits*pscore. The model results are used in estimating the dose-response function. Beyond that, as Hirano and Imbens (2004:82) have emphasized, “there is no direct meaning to the estimated coefficients in [these models]” (see also Bia and Mattei 2008:359).

¹³ To conserve space, the comparisons of the covariates for each dose level are not included here but are available upon request.

¹⁴ The two sets of analyses are not, strictly speaking, directly comparable. Table 2 compares inmates who received any amount of visitation with matched counterparts. Figure 1 presents results that estimate visitation dose effects among the treated only; the basis of comparison is to other “treated” inmates, not to the matched counterparts from the binary treatment analyses. The strength of this approach is that it recognizes that visited inmates, as a group, may differ from

non-visited inmates in ways that may not be fully captured by the traditional binary propensity score matching. By contrast, the matched counterparts in table 2 are matched to all visited inmates, regardless of the amount of visitation. Regardless, the substantive interpretation in the text remains—that is, in general, visitation reduces recidivism (table 2) and that more visitation results in greater, but nonlinear, reductions in recidivism (figure 1).

¹⁵ The main limitation with subclassification was the need to truncate the visitation measure more severely to have a sufficient number of cases distributed across all dose categories.

¹⁶ We thank one of the anonymous reviewers for highlighting this idea.

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Table 1. Descriptive Statistics, by Visitation Status

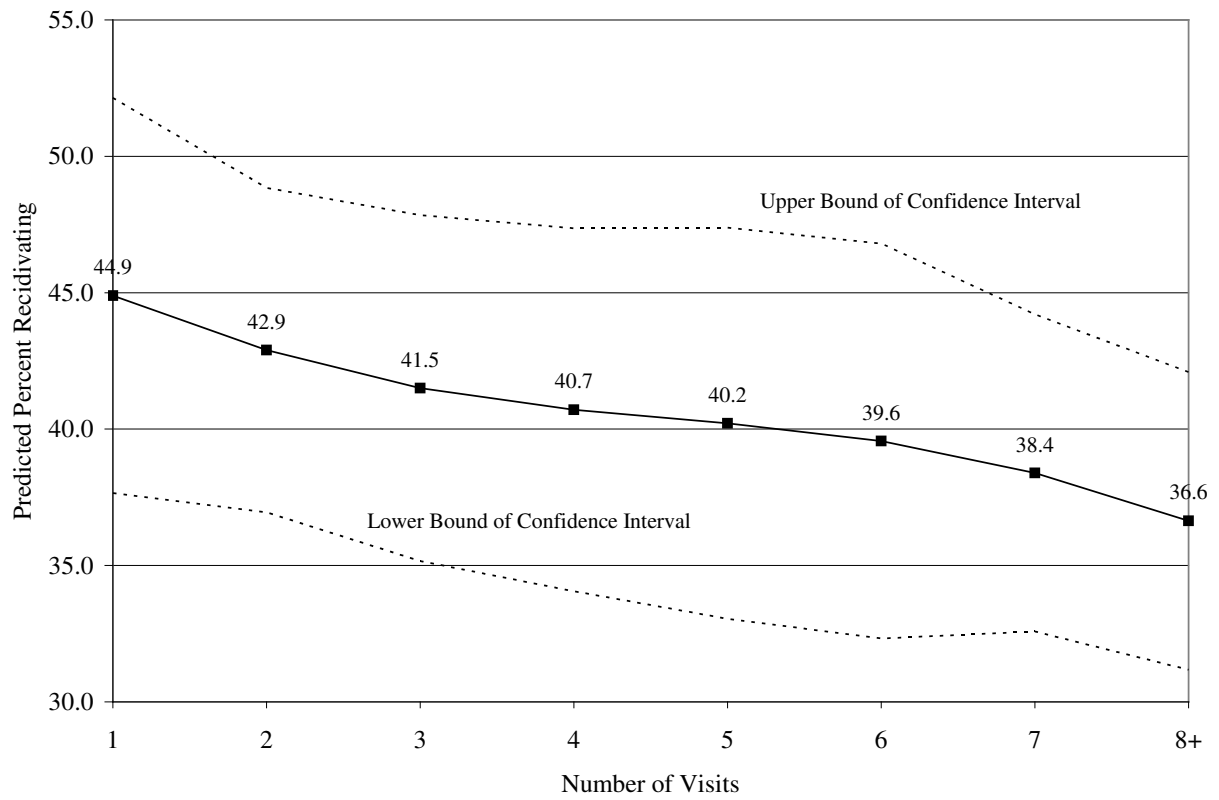
	Not Visited		Any Visit		Spouse/Significant Other Visit		Family Visit		Friend Visit	
	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>	<u>Mean</u>	<u>S.D.</u>
<u>Dependent Variables (Reconviction, 3 Years)</u>										
Any Recidivism (1=yes, 0=no)	0.46	0.50	0.40	0.49	0.38	0.49	0.42	0.49	0.37	0.48
Violent Recidivism (1=yes, 0=no)	0.10	0.29	0.07	0.25	0.06	0.24	0.07	0.26	0.05	0.21
Property Recidivism (1=yes, 0=no)	0.18	0.39	0.16	0.36	0.14	0.35	0.17	0.38	0.15	0.36
Drug Recidivism (1=yes, 0=no)	0.23	0.42	0.20	0.40	0.20	0.40	0.19	0.39	0.21	0.41
<u>Matching Variables</u>										
Age	33.28	9.90	29.72	9.02	30.46	8.66	28.71	8.76	30.14	9.83
Male	0.87	0.33	0.86	0.35	0.90	0.30	0.87	0.34	0.76	0.43
Female	0.13	0.33	0.14	0.35	0.10	0.30	0.13	0.34	0.24	0.43
White	0.38	0.48	0.57	0.50	0.47	0.50	0.57	0.49	0.65	0.48
Black	0.55	0.50	0.35	0.48	0.45	0.50	0.34	0.48	0.27	0.45
Hispanic	0.07	0.25	0.08	0.27	0.08	0.27	0.08	0.27	0.08	0.27
Sentence Length (Months)	19.35	23.83	19.40	22.99	19.99	31.38	19.90	26.09	22.60	42.27
Offense: Violent	0.21	0.41	0.20	0.40	0.20	0.40	0.21	0.41	0.25	0.43
Offense: Property	0.32	0.47	0.30	0.46	0.26	0.44	0.30	0.46	0.27	0.44
Offense: Drugs	0.34	0.47	0.34	0.47	0.37	0.48	0.34	0.47	0.32	0.47
Offense: Other	0.13	0.33	0.15	0.36	0.17	0.38	0.15	0.35	0.17	0.37
No. Prior Convictions	5.80	6.26	5.41	5.67	6.12	6.00	5.06	5.58	5.31	5.71
No. Prior Prison Commitments	0.90	1.42	0.48	1.00	0.68	1.20	0.36	0.82	0.44	0.97
No. Disciplinary Reports: Violence	0.10	0.46	0.07	0.38	0.06	0.34	0.06	0.36	0.05	0.23
No. Disciplinary Reports: Property	0.07	0.33	0.07	0.28	0.05	0.23	0.06	0.27	0.08	0.34
No. Disciplinary Reports: Drugs	0.01	0.10	0.03	0.21	0.03	0.18	0.03	0.22	0.02	0.15
No. Disciplinary Reports: Disorder	0.57	1.57	0.44	1.15	0.35	0.78	0.45	1.19	0.44	1.16
Supervised Following Release	0.20	0.40	0.19	0.39	0.17	0.37	0.19	0.39	0.20	0.40
N =	2,959		944		394		686		210	

Table 2. Average Effect of Visitation on Three-Year Recidivism Outcomes, 1-to-1 Nearest Neighbor Matching without Replacement

	Treated	Matched Control	Percent Difference	S.E.	t-Value	Gamma
<u>Any Visitation vs. No Visitation</u>						
Any Recidivism	40.4	45.1	-4.7	2.3	-2.02*	1.05
Violent Recidivism	6.7	8.6	-1.8	1.2	-1.49	—
Property Recidivism	15.6	18.5	-2.9	1.8	-1.67*	1.05
Drug Recidivism	20.0	21.3	-1.3	1.9	-0.69	—
<u>Spouse/S.O. Visitation vs. No Visitation</u>						
Any Recidivism	37.5	47.0	-9.6	3.5	-2.70**	1.20
Violent Recidivism	5.9	7.0	-1.0	1.8	-0.58	—
Property Recidivism	13.2	19.1	-5.9	2.6	-2.25*	1.15
Drug Recidivism	19.1	21.4	-2.3	2.9	-0.80	—
<u>Family Visitation vs. No Visitation</u>						
Any Recidivism	41.6	44.3	-2.7	2.7	-0.99	—
Violent Recidivism	7.6	8.1	-0.6	1.5	-0.40	—
Property Recidivism	16.6	20.4	-3.9	2.1	-1.82*	1.05
Drug Recidivism	19.3	19.1	0.1	2.1	0.07	—
<u>Friend Visitation vs. No Visitation</u>						
Any Recidivism	37.3	45.6	-8.3	4.9	-1.71*	1.05
Violent Recidivism	4.9	9.3	-4.4	2.5	-1.74*	1.00
Property Recidivism	14.7	20.1	-5.4	3.8	-1.44	—
Drug Recidivism	21.6	21.1	0.5	4.1	0.12	—

* p < .05 ** p < .01 (one-tailed test)

Figure 1. Generalized Propensity Score Analysis of Visitation Dose Effects on Recidivism



Note: Confidence bounds at 95 percent level.