Prison as Punishment: A Behavior-Analytic Evaluation of Incarceration

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Abstract The USA currently imprisons over 2.2 million people (Glaze and Kaeble, 2014). Of those, about 70 % will be rearrested within 3 years of release (Durose, Cooper, & Synder, 2014). If prison is viewed as a large-scale intervention, it lacks empirical support of effectiveness. The present paper reviews criminological data related to incarceration and evaluates components of imprisonment in light of behavior-analytic research on punishment. These factors include elements such as the individual's learning history and aspects of the punisher (e.g., intensity and immediacy). Partnering with other professionals, behavior analysts interested in this area could apply their skills in research and practice to help mitigate a large-scale problem of great social significance.

Keywords Behavior analysis · Crime · Prison · Punishment · Recidivism

Nature and Scope of the Issue

Since 2010, between 18 and 27 million crimes have occurred each year in the USA (Truman, 2011; Truman & Langton, 2014; Truman, Langton, & Planty, 2013; Truman & Planty, 2012). In 2013, for example, over 6 million violent crimes were reported, including approximately 17,000 murders (Center for Disease Control, 2016), 300,000 rapes, 650,000 robberies, and 5 million assaults. The same year saw almost 17 million property crimes, including 3 million burglaries, 650,000 motor vehicle thefts, and

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almost 13 million other thefts (Truman & Langton, 2014). Thus, criminal behavior victimizes millions of citizens of the US annually in ways that challenge community safety and personal quality of life.

In the US criminal justice system, individuals who are found guilty of committing a serious crime typically are sentenced to jail or prison time. This happens with remarkable frequency. The USA currently holds over 2.2 million people in prisons and local jails, 1 for every 110 people in the country (Glaze & Kaeble, 2014). The USA imprisons more people than any other nation, resulting in a per-capita rate that is over four times the global average (National Council on Crime and Delinquency, 2006). The USA also incarcerates more citizens per crime committed (in the case of homicide and robbery) than any other country except Russia. Schlosser (1998) noted that most US prisoners are nonviolent offenders who would, in most countries in the world, receive community service or fines, if their behavior was considered criminal at all.

The USA's overwhelming rate of incarceration has enormous costs. Each person in prison is incarcerated for an average of about 2.5 years (Bonczar, 2011). This costs over US\$28,000 per year per person, amounting to about US\$37 billion annually in services, prison construction, upkeep, and employee costs (Kyckelhahn, 2012). In addition to the financial burden, placing individuals in prison creates significant problems for their families. When individuals enter prison, their families suffer from material hardship (e.g., a lack of sufficient food) and financial strain (e.g., inability to pay for housing or other expenses), exacerbating socioeconomic problems that contribute to criminal behavior (Schwartz-Soicher, Geller, & Garfinkel, 2011). Families may also have to cope with stigma related to the family member's imprisonment and a loss of social support from their father, mother, child, or spouse. People with an incarcerated family member are at risk of a number of complications, such as negative health outcomes (Lee, Wildeman, Wang, Matusko, & Jackson, 2014) and committing a crime themselves (Van de Rakt, Nieuwebeerta, & Apel, 2009). Many communities are also disproportionately affected by mass incarceration, which depletes the labor supply, disrupts social networks, diminishes the purchasing power of families, and exacerbates racial and socioeconomic inequality. Morenoff and Harding (2014) described how a "feedback loop" is created in poor, urban communities, wherein mass imprisonment undermines the social structure of the community, creating conditions that further promote crime. Thus, imprisonment, as it is currently used, is an issue of great social significance.

Evaluating the Effectiveness of Imprisonment

In the terminology of the legal system, incarceration is referred to as "punishment" (Newman, 1985), although this usage entangles two meanings. The first meaning implies societal retribution; in essence, those who have made others suffer are, in the interest of fairness, made to suffer as well. The second meaning implies rehabilitation, or a lessening of odds that the individual will engage in future criminal behavior. It is in this usage that legal punishment is intended to function as operant punishment, a consequence that reduces the probability of occurrence of the behavior on which it is contingent. The purpose of the present article was to evaluate the efficacy of legal punishment, as it is practiced in the USA, as operant punishment.

Given the dramatic rates of incarceration in the USA, if incarceration actually functions as operant punishment, the rate of criminal behavior should be relatively low, but statistics presented above show that is not the case. Following imprisonment, individuals who have been incarcerated are often unsuccessful in transitioning back to public life and are likely to commit future crimes (i.e., recidivate). Indeed, America has an overwhelmingly high recidivism rate. A review of data from 30 states found that 70 % of prisoners released in 2005 were rearrested for a new crime within 3 years, and about 75 % were rearrested for a new crime within 5 years (Durose, Cooper, & Synder, 2014). For 50 % of these prisoners, re-arrest led to incarceration within 3 years, and for 55 %, re-arrest led to incarceration within 5 years. Schlosser (1998) suggested that brief stays in prison followed by re-arrest creates an environment where criminals can learn from each other about how to engage in criminal behavior. Clearly, as typically practiced in the USA, incarceration qualifies as a poor intervention for improving criminal behavior. In the following section, we use the scientific literature on operant punishment to explore factors that may lead to the ineffectiveness of this system.

Behavior-Analytic Punishment and Criminal Justice

Research shows that the effectiveness of punishment-based interventions depends on a variety of factors, the following of which will be discussed in the present section: punishment intensity, punishment probability, punishment immediacy, contemporary reinforcement, and the availability of alternative reinforcement.

Punishment Intensity

The issue of punishment intensity (defined as duration of prison sentence) dominates societal discussions of incarceration effectiveness (e.g., Schlosser, 1998). With the emergence of a “war on crime” or a “war on drugs,” longer sentences are typically seen as a tool to enhance deterrence (Schlosser, 1998). Some government officials and members of the public have advocated for long prison sentences under the assumption that they will reduce the crime rate, with sentences averaging 81, 51, and 58 months for violent, property, and drug offenses, respectively (Bonczar, 2011). Research, however, reveals that longer sentences typically do not have a significant impact on crime rate, especially when compared to the effects of punishment certainty (Dölling, Entorf, Hermann, & Rupp, 2009; Nagin, 2013). A meta-analysis of 391 studies on the deterrent effect of punishment on criminal behavior found that while lengthy sentences deter some crimes, such as tax evasion and environmental offenses, they have a limited deterrent effect on other crimes, such as assault or rape (Dölling et al., 2009). In fact, “the deterrence hypothesis [the assertion that intense punishments decrease the likelihood of crime] is rarely confirmed in the case of more serious offenses” (Dölling et al., 2009, p. 215). Disconcertingly, most of the crimes which result in prison sentences are the same crimes for which severe punishment has a weak deterrent effect (Carson, 2014), adding even more doubt to the notion that longer sentences are an effective method of deterring crime.

Nevertheless, state and federal governments continue to apply lengthy prison sentences as a way of making sure that they are punishing offenders satisfactorily

and showing that they are “tough on crime” (Listwan, Sullivan, Agnew, Cullen, & Colvin, 2013; MacKenzie, 2013; Schlosser, 1998), and some even advocate for intentionally harsh conditions during incarceration under the philosophy that they deter offenders from committing future crimes. Thus, the typical prisoner experiences the grim ramifications of “tough on crime” ideology in daily life while incarcerated. According to Ross (2012), being incarcerated is increasingly “like a death sentence” (p. 1) due to inadequate healthcare, unsanitary living environments, and extreme violence. But, in the research literature, there is no compelling evidence that harsher conditions lead to better outcomes. Listwan et al. (2013), for example, found that prisoners who experienced more intense conditions (e.g., direct victimization from other inmates and a negative prison environment) had significantly *higher* rates of re-arrest and incarceration. Quasi-experimental research has also found that more severe prison conditions (as measured by security level) are associated with increased rates of recidivism (a 30 % increase), even when risk levels are matched between groups of prisoners (Gaes & Camp, 2009).

Arguably, the most extreme sentence that can be bestowed upon an offender is the death penalty. The death penalty is currently legal in 31 states, with about 3000 individuals held under the penalty of death for at least a year since 2005 and 46 of those actually being executed in 2010 (Snell, 2011). Studies of whether the death penalty has a deterrent effect on crime remain largely inconclusive (Chalfin, Haviland, & Raphael, 2013). For example, Dezhbakhsh and Shepherd (2006) compared murder rates both before and after changes in death penalty legislation and determined that, when capital punishment was withdrawn, murder rates increased significantly. When capital punishment was reinstated, the murder rate decreased (although this effect was not as strong as with the removal of the death penalty). Dezhbakhsh and Shepherd concluded that there was strong evidence for a deterrent effect of capital punishment. Offering an opposing view, Kovandzic, Vieraitis, and Boots (2009) found no support for the deterrent hypothesis based on state panel data from 1977 to 2006. They argued that the death penalty is not a salient threat when potential offenders are contemplating a crime, which largely nullifies any effect that the death penalty could have on the homicide rate. Similarly, in a review of 52 longitudinal, cross-sectional, and panel data studies on the death penalty, Dölling et al. (2009) ascertained that a majority (70 %) failed to support the deterrent hypothesis. They concluded that the death penalty had little, if any, impact on the crime rate in most studies and that other variables, such as unemployment, contributed to the crime rate to a much greater extent. Yet a minority of studies appeared to support the deterrent hypothesis. Chalfin et al. (2013) have argued that these mixed results are impossible to interpret because of methodological, statistical, and inferential errors in almost every relevant study. From an evidence-based practice perspective, the critical review of Chalfin et al. revealed no sound evidence for the deterrent effect of capital punishment, and policy decisions should reflect this.

Generally, basic research in behavior analysis research has found that more intense punishers (e.g., higher voltage electric shock) produce a more dramatic and long-lasting decrease in problem behavior compared to less intense punishers (Azrin, Holz, & Hake, 1963; Azrin & Holz, 1966; Cooper, Heron, & Heward, 2007; Lerman & Vorndran, 2002; Lerman & Toole, 2011). This body of research also suggests that, once punisher intensity is selected, it is important that the intensity is not repeatedly increased in a quest for a greater degree of behavioral suppression. The efficacy of a punisher is

substantially undermined when its intensity is increased gradually over time (e.g., Miller, 1960). Thus, a punisher of appropriate intensity should be selected as soon as possible, lest subsequent attempts to increase the punishers' intensity actually increase the level of problem behavior.

Results of applied behavior analysis research on punishment intensity are less clear. Some studies have found that the intensity of punishment influences response suppression (e.g., Richman, Lindauer, Crosland, McKerchar, & Morse, 2001) while others have not (e.g., Cole, Montgomery, Wilson, & Milan, 2000; Singh, Dawson, & Manning, 1981). Given that punishment intensity does not seem to consistently contribute to its effectiveness (e.g., Lerman & Toole, 2011), a focus on other variables is warranted.

Punishment Probability

The probability of a potential offender's punishment is affected by numerous factors, including the type of crime and the presence and response of law enforcement (Nagin, 2013). Overall, however, an offender's probability of incarceration is relatively low. According to analysis of archival data (Hennessy, Rao, Vilhauer, & Fensterstock, 1999), the probability of being incarcerated for homicide is .498. For rape, the probability is .173. For other crimes (e.g., robbery, assault, and motor vehicle theft), the probabilities are even lower (.065, .044, and .01, respectively). Given how unlikely it is that an offender is caught, convicted, and incarcerated, offenders may assume that their criminal behavior will not be consequated. This is especially problematic given the research findings in this area. Most researchers have found a moderate to strong negative correlation between the certainty of imprisonment and the crime rate (Killias, Scheidegger, & Nordenson, 2009; Logan, 1972; Loughran, Paternoster, Piquero, & Pogarsky, 2011; Nagin, 2013) and that this relation is much stronger than the one between punishment intensity and crime rate (Dölling et al., 2009; Durlauf & Nagin, 2011; Logan, 1972; Nagin, 2013).

To increase the probability that a potential offender will contact punishment, increasing the presence of law enforcement is the most apparent solution (Nagin, 2013). Police officers have the ability to reduce crime twofold: by arresting those who engage in crime and by deterring individuals from engaging in crime in the first place. As such, reviews of panel data and interrupted time series studies describing the effects of budget cuts and other crises reveal that higher levels of policing result in lower levels of crime, while breaks in policing lead to surges of criminal activity (Nagin, 2013; Shi, 2009). Given the fiscal realities in which law enforcement is operating, however, building larger police forces may not be viable.

One alternate tactic with considerable empirical support is "hot spot" policing (United States Department of Justice, 2008). "Hot spot" policing is based on the observation that certain areas disproportionately contribute to a region's crime; one intersection, for example, could account for 50 % of a city's crime. As part of the strategy, the police force is concentrated in the "hot spots," creating an extremely high probability of punishment in those areas. Subsequently, potential offenders are deterred from criminal activity, and those who do engage in crime are much more likely to face repercussions. Perhaps surprisingly, the criminal activity reduced as a result of "hot

spot” policing does not simply relocate to other areas; in fact, surrounding areas typically experience a decrease in crime as well.

Punishment Immediacy

Research in behavior analysis has found that immediacy is a crucial factor in punishment effectiveness (e.g., Banks & Vogel-Sprott, 1965; Solomon, Turner, & Lessac, 1968). For offenders, the time between committing a crime, being arrested, and serving a sentence is likely to be extensive. The delay between arrest and sentencing is, on average, almost 9 months (Sourcebook of Criminal Justice Statistics, 2011). Violent offenses average a nearly 9-month delay period, while property and drug offenses average 8 and 9 months, respectively. Behavior analysts might suggest that months of delay between the occurrence of a crime and the punishment would have a detrimental impact on its effectiveness, but the criminological research literature suggests otherwise (but see Tarr, 1978, for an exception). Multiple authors have found that increasing the speed with which police respond to calls for service has no impact on criminal activity. In a study of police response time in Missouri, the National Institute of Justice (1980) asserted that a vast majority of crimes are discovered after they have been completed, rendering police response times irrelevant. In cases where police response time is important, citizens often delay too long in reporting a crime, again negating the effects of speedy police arrival. Spelman and Brown (1981) similarly studied the effects of rapid response to police calls. They confirmed the results of the National Institute of Justice (1980), finding a minimal impact of swift police response. They estimated that police response times matter in only about 25 % of cases and that police have little control over response time in the other 75 %. The research still supports delay as an important factor in punishment effectiveness (in agreement with behavior analysis), but suggests that law enforcement departments have relatively little power to decrease delays.

Contemporary Reinforcement

From the perspective of a behavior analysis, offenders engage in criminal behavior because there is reinforcement promoting that behavior. While the contingencies sustaining criminal behavior are likely unique for each individual, some consequences, such as the access to goods or money, may function as reinforcers for many people. Social reinforcers also seem to influence the likelihood of criminal behavior occurring. Though some communities and social circles strongly disapprove of criminal behavior, others tolerate or even encourage it (Nagin, 2013; Wood, 2007). Criminological research has found that a person is much more likely to engage in criminal behavior when peers have positive attitudes about crime and somewhat more likely if peers have committed crimes themselves (Megens & Weerman, 2012). Henggeler and Schoenwalder (2011) suggested that ineffective techniques used in the juvenile justice system (e.g., residential placement) often encourage contact between groups of youth who have engaged in criminal behavior, making peer contagion more likely.

Since all behavior recurs as a result of reinforcement, it is important to examine the contingencies already in place when designing a punishment-based intervention. Reinforcement contingencies that sustain a behavior not only have the potential to

interfere with treatment initially but also could continue to support a target behavior, potentially creating a situation in which behavior is concurrently reinforced and punished (Lerman & Vorndran, 2002). To deal with that problem, extinction is often used in conjunction with punishment procedures (e.g., Azrin & Holz, 1961). In the naturalistic settings in which criminal behaviors occur, extinction might not be possible because for some illegal acts the reinforcers are automatic (e.g., stealing yields money and other preferred commodities). Thus, the strengthening of competing (i.e., noncriminal) responses might be a more effective strategy.

Strength of Competing Responses

Providing alternative reinforcement makes punishment procedures more effective (Cooper, Heron, & Heward, 2007; Lerman & Toole, 2011). Prisoners face immense obstacles obtaining alternative reinforcement both within confinement and following their release. While in prison, incarcerated individuals suffer from a harsh environment (Ross, 2012), limited activities (Seiter & Kadela, 2003), and weakened ties with family (i.e., decreased social reinforcement; Lynch & Sabol, 2004). Maintaining contact with loved ones, for example, is extremely difficult for offenders (La Vigne, Naser, Brooks, & Castro, 2005) as they are often incarcerated far from their homes, making visits with family challenging (cf. Schlosser, 1998). Telephone calls to offenders are also expensive, compounding the barriers between an offender and the outside world. This is problematic because family interaction during imprisonment is associated with lower rates of recidivism, and strong family bonds maintained following release help ex-offenders engage in prosocial behavior (Hairston, 1988). But with the prison system structured in a way that discourages or prevents familial contact, offenders are deprived of alternative social reinforcement that could potentially help them refrain from criminal acts.

While prisoners in general confinement may have little to no access to the alternative reinforcement of family or recreational activities, offenders in solitary confinement have even less. In the USA, at any given time, about 80,000 prisoners reside in solitary confinement (Browne, Cambier, & Agha, 2011), where access to alternative reinforcement is virtually nonexistent. Prisoners typically spend 23 h each day isolated in a cell of 60 to 80 ft² (Cloud, Drucker, Browne, & Parsons, 2015). Inmates are routinely deprived of natural sunlight and are subjected to harsh fluorescent lighting throughout the night. Cells can be deafeningly loud, or completely silent. Individuals in solitary confinement have little to no human contact or access to treatment or reentry programs. Solitary confinement is sometimes imposed for legitimate reasons: as disciplinary action for an in-prison rule violation or for the safety of the target individual, officers, and other inmates. However, solitary confinement is often doled out arbitrarily (Steinbuch, 2014). As there is little regulation on solitary confinement and a prisoner can be placed in solitary confinement without due process (Steinbuch, 2014), many individuals remain in solitary confinement for months or years on end (Browne, Cambier, & Agha, 2011). This means that these prisoners have no opportunity to engage in adaptive behaviors for prolonged periods of time, which is detrimental to their physical and mental health (Cloud et al., 2015). It also means that prisoners might later have severe difficulty adjusting to the free world in which they are not isolated in a small space most of the day. As might be expected, individuals who experience solitary

confinement have a higher rate of recidivism than those that do not, perhaps as a result of not having any adaptive behaviors which lead to reinforcement in their repertoire (Steinbuch, 2014). The lack of development of alternative behaviors seems to be a limitation of the current criminal justice system that may contribute to its ineffectiveness.

Evidence-Based Mechanisms for Improvement

Based on the behavior analysis and criminology literature reviewed above, it seems that high-probability, moderately severe punishment would be most effective for reducing criminal behavior, especially when coupled with the opportunity to access alternative reinforcement and build prosocial (i.e., noncriminal) behavior. While this may be an empirically supported approach, it is not necessarily the way the criminal justice system presently is structured, as described above. Historically, the evidence-based practice movement had little impact on the criminal justice system, but that is beginning to change (cf. Drake, Aos, & Miller, 2009; Henggeler & Schoenwald, 2011). In what follows, we describe two interventions that have empirical support.

Token Economies

Most behavior-analytic crime interventions have involved contingency management in the form of token economies (for a review, see Gendreau, Listwan, Kuhns, & Exum, 2014). These token economies have most often been used to improve the functioning of prisons, but have not focused on building prisoner skills for life after incarceration. Token economies have been employed to mitigate structural problems that frequently occur in correctional institutions, such as prisoners' lack of access to reinforcement (Dean & Reppucci, 1974), unclear or inconsistent rules, or problem behaviors which occur at an extremely high frequency (Nay, 1974). Correctional programs have used token economies to successfully increase the rate of a wide variety of behaviors, such as promptness (Nay, 1974), rule compliance (Hobbs & Holt, 1976; Nay, 1974), interacting with peers (Hobbs & Holt, 1976), watching the news (Bassett, Blanchard, & Koshland, 1975), chore completion (Comaty, Stasio, & Advokat, 2001; Dean & Reppucci, 1974; Hobbs & Holt, 1976), following the rules of organized sports (Hobbs & Holt, 1976), dressing neatly (Comaty et al., 2001; Milan & McKee, 1974), walking in a straight line (Hobbs & Holt, 1976), attending remedial education classes (Bassett et al., 1975; Milan & McKee, 1974), and passing academic achievement tests (Kandel, Ayllon, & Roberts, 1976). Token economies have also been used to decrease inappropriate behavior, such as incidents of violence (Comaty et al., 2001; Dean & Reppucci, 1974) and intense behavioral episodes (Field, Nash, Handwerk, & Friman, 2004).

Although the use of token economies in correctional facilities does have empirical support, much of the research literature is quite old, with over 80 % of it published before 1976 (Gendreau et al., 2014). Furthermore, some target behaviors in such studies (e.g., watching the news) may have limited generality to "real-world" behavior. So, while token economies may have improved the day-to-day operations of prisons, research is needed on the extent to which this class of interventions influences post-incarceration behavior.

Post-incarceration Transitions

After being released, prisoners face major challenges in obtaining alternative reinforcement in the form of long-term employment, housing, and constructive social relationships (Raphael, 2011; Visser & Travis, 2011). Many employers are unwilling to hire former offenders, and individuals who have been incarcerated are likely to be victims of discrimination in the hiring process. The experience of incarceration can reduce a person's lifetime earnings by 10–20 % and reduce the rate of wage growth by 30 % (Western, 2002). Previously incarcerated individuals may also face stigma or hostility from their families or local institutions, preventing them from reintegrating themselves into society. This problem is exacerbated by the fact that, when prisoners return to their previous environments, reinforcers (such as drugs or interactions with friends) that previously supported criminal behavior will likely still be present. As such, ex-offenders are exposed to situations that are conducive to crime (Morenoff & Harding, 2014). Without a change in the environment or the acquisition of new ways to access alternative reinforcement, criminal activity is likely to reoccur.

Many prison programs are designed to ease the transition from incarceration to the free world and provide offenders with alternative reinforcement. Numerous evaluations have found that prisoner reentry programs, those that help a prisoner transition into the greater community (both during prison and thereafter), are beneficial to individuals who have been incarcerated (Jensen & Reed, 2006; Tripodi, Bledsoe, Kim, & Bender, 2011; Vacca, 2004; Wright, Zhang, Farabee, & Braatz, 2014). Reentry programs can involve a range of services from employment assistance to drug counseling. These services allow prisoners to engage in noncriminal behaviors that earn reinforcement (e.g., working at a post office to earn money for food). According to recent reviews of reentry research, most types of programs show at least some degree of success in reducing the recidivism and revocation rates of individuals that were previously imprisoned. Housing assistance (Wright et al., 2014), educational programs (Jensen & Reed, 2006; Vacca, 2004), vocational programs (Jensen & Reed, 2006; Tripodi et al., 2011), and drug rehabilitation programs (Tripodi et al., 2011) all have successfully kept offenders from being rearrested and reincarcerated.

Unfortunately, only a minority of prisoners are able to access comprehensive reentry programs due to a prevalent “tough on crime” attitude, low levels of funding, and an exploding prison population (Seiter & Kadela, 2003). Programs also vary widely in the degree to which they prepare offenders for the outside community. While some programs offer “excellent preparation for the challenges that face offenders... [others] are only a few hours of orientation” (Seiter & Kadela, 2003, p. 369), while still others simply provide a confusing and lengthy reentry handbook to help prisoners navigate through the free world (Mellow & Christian, 2008). In some cases, individuals previously held in an isolation unit are released with a bus ticket and US\$200 (Schlosser, 1998).

Post-incarceration transitional services constitute an area of potential intervention for behavior analysts. Since behavior analysts have empirically supported techniques to identify skill deficits and effectively teach a wide array of learners, they are well positioned for work in this area. Behavioral skills training, the identification of potent reinforcers, and functional analysis all represent potent technologies that could be used to intervene for individuals transitioning out of prison environments. The community

reinforcement approach (CRA; e.g., Myers, Roozen, & Smith, 2011), an empirically supported intervention to reduce problem behavior, might provide a good model for this work. The CRA facilitates the rearrangement of consequences so that reinforcement is provided contingent upon engaging in behavior that is not the problem behavior of interest. The main components include a functional analysis of the problem behavior, an allowance for occasional occurrences of problem behavior, goal setting based on the aspects of an individual's life that give them joy, behavior skills training, relapse prevention, and relationship counseling. The treatment package has been effective in decreasing substance use and improving outcomes related to work and family. While the CRA has been used primarily for substance abuse, it provides a template for how reinforcement for noncriminal behavior might be arranged in a realistic manner as part of transitional services. Additional research exploring the mechanisms and generality of this intervention package is warranted.

Conclusions and Recommendations

Criminal behavior and the current practices associated with imprisonment have high costs for the American society. The available recidivism data suggested that, as it is currently structured, the prison system fails to function as a punisher or teach alternative responses (i.e., noncriminal behavior) for a large proportion of individuals involved in this system. The clarity which behavior-analytic principles might be able to provide when considering issues associated with incarceration and recidivism suggests the potential for action by behavior analysts to help modify the current cultural practices (cf. Biglan, 1995, 2011, 2015; Glenn, 2004). Such an application would be consistent with Baer, Wolf, and Risley's (1968, 1987) goals for applied behavior analysis.

Despite exhibiting a historical interest in selected issues associated with criminal justice (e.g., Fraley, 2013; Morris, 1980; Nietzel & Himelein, 1987), behavior analysts have not systematically engaged with the issue of incarceration, even as the prison system has come to involve progressively larger proportions of the population. Behavior analysts may be capable of devising effective solutions to the challenges faced in the prison system, but before those solutions are likely to be taken seriously, more behavior analysts will have to gain credibility within the broader criminal justice system. Understanding what is already known about the relevant problems is a first step, one that the present article sought to help readers take.

To make contact with the criminal justice field, working with individuals who have had criminal justice involvement might provide an initial starting point. For example, behavior analysts could help identify sources of reinforcement for noncriminal behavior and develop prosocial skills that benefit both individuals and their communities. While practitioners involved in contingency management (e.g., Petry, 2000) and community reinforcement (e.g., Myers et al., 2011) are already working with these populations to some extent, efforts could be expanded. Working with these individuals provides a fertile ground for clinical innovation, basic, applied, and conceptual research, cross-disciplinary collaboration, and the possibility of novel funding streams for behavior-analytic work.

The present article is a step toward the identification of ways in which behavior analysts might contribute toward solving the problems associated with reducing

criminal behavior and recidivism. Fortunately, much of the research from criminology is easily translated into behavioral terms. However, in evaluating the extent to which the field can contribute in this area, the burden of proof rests firmly with the behavior analysts. The development and dissemination of empirically supported behavioral technology to a domain as massive and culturally entrenched as the prison system is a gargantuan task, but one that cannot be ignored if behavior analysis is to achieve the broad social impact that Skinner (1953, 1974) saw as its destiny.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflicts of interest.

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References

- Azrin, N. H., & Holz, W. C. (1961). Punishment during fixed-interval reinforcement. *Journal of the Experimental Analysis of Behavior*, 4(4), 343–347. doi:10.1901/jeab.1961.4.343.
- Azrin, N. H., & Holz, W. C. (1966). Punishment. In W. K. Honig (Ed.), *Operant behavior: areas of research and application* (pp. 380–447). New York: Meredith Corporation.
- Azrin, N. H., Holz, W. C., & Hake, D. F. (1963). Fixed-ratio punishment. *Journal of the Experimental Analysis of Behavior*, 6(2), 141–148. doi:10.1901/jeab.1963.6.141.
- Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, 1(1), 91–97. doi:10.1901/jaba.1968.1.91.
- Baer, D. M., Wolf, M. M., & Risley, T. R. (1987). Some still-current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, 20(4), 313–327. doi:10.1901/jaba.1987.20.313.
- Banks, R. K., & Vogel-Sprott, M. (1965). Effect of delayed punishment on an immediately rewarded response in humans. *Journal of Experimental Psychology*, 70(4), 357–359. doi:10.1037/h0022233.
- Bassett, J. E., Blanchard, E. B., & Koshland, E. (1975). Applied behavior analysis in a penal setting: targeting free world behaviors. *Behavior Therapy*, 6(5), 639–648. doi:10.1016/S0005-7894(75)80186-9.
- Biglan, A. (1995). *Changing cultural practices: a contextualist framework for intervention research*. Reno, NV: Context Press.
- Biglan, A. (2011). Corporate externalities: a challenge to the further success of prevention science. *Prevention Science*, 12(1), 1–11. doi:10.1007/s11212-010-0190-5.
- Biglan, A. (2015). *The nurture effect: how the science of human behavior can improve our lives and our world*. Oakland, CA: New Harbinger Publications.
- Bonczar, T. (2011). National corrections reporting program: time served in state prison, by offense, release type, sex, and race. Bureau of Justice Statistics. <http://www.bjs.gov/index.cfm?ty=pbdetail&iid=2045>. Accessed 15 Nov 2015.
- Browne, A., Cambier, A., & Agha, S. (2011). Prisons within prisons: the use of segregation in the United States. *Federal Sentencing Reporter*, 24(1), 46–49. doi:10.1525/fsr.2011.24.1.46.
- Carson, E. A. (2014). *Prisoners in 2013 (report no. NCJ 247282)*. Bureau of Justice Statistics. <http://www.bjs.gov/content/pub/pdf/p13.pdf>. Accessed 15 Nov 2015.
- Center for Disease Control. (2016). *National violent death reporting system. [Fact sheet]*. http://www.cdc.gov/violenceprevention/pdf/nvdrs_factsheet-a.pdf. Accessed 15 Nov 2015.

- Chalfin, A., Haviland, A., & Raphael, S. (2013). What do panel studies tell us about a deterrent effect of capital punishment? A critique of the literature. *Journal of Quantitative Criminology*, 29(1), 5–43. doi:[10.1007/s10940-012-9168-8](https://doi.org/10.1007/s10940-012-9168-8).
- Cloud, D. H., Drucker, E., Browne, A., & Parsons, J. (2015). Public health and solitary confinement in the United States. *American Journal of Public Health*, 105(1), 18–26. doi:[10.2105/AJPH.2014.302205](https://doi.org/10.2105/AJPH.2014.302205).
- Cole, G. A., Montgomery, R. W., Wilson, K. M., & Milan, M. A. (2000). Parametric analysis of overcorrection duration effects: is longer really better than shorter? *Behavior Modification*, 24(3), 359–378. doi:[10.1177/0145445500243004](https://doi.org/10.1177/0145445500243004).
- Comaty, J. E., Stasio, M., & Advokat, C. (2001). Analysis of outcome variables of a token economy system in a state psychiatric hospital: a program evaluation. *Research in Developmental Disabilities*, 22(3), 233–253. doi:[10.1016/S0891-4222\(01\)00070-1](https://doi.org/10.1016/S0891-4222(01)00070-1).
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Upper Saddle River: Merrill.
- Dean, C. W., & Reppucci, N. D. (1974). Juvenile correctional institutions. In D. Glaser (Ed.), *Handbook of criminology* (pp. 865–908). Chicago: Rand McNally College Publishing Company.
- Dezhbakhsh, H., & Shepherd, J. M. (2006). The deterrent effect of capital punishment: evidence from a “judicial experiment”. *Economic Inquiry*, 44(3), 512–535. doi:[10.1093/ei/cbj032](https://doi.org/10.1093/ei/cbj032).
- Dölling, D., Entorf, H., Hermann, D., & Rupp, T. (2009). Is deterrence effective? Results of a meta-analysis of punishment. *European Journal on Criminal Policy & Research*, 15(1/2), 201–224. doi:[10.1007/s10610-008-9097-0](https://doi.org/10.1007/s10610-008-9097-0).
- Drake, E. K., Aos, S., & Miller, M. G. (2009). Evidence-based policy options to reduce crime and criminal justice costs: implications in Washington state. *Victims and Offenders*, 4, 170–196. doi:[10.1080/15564880802612615.6im-](https://doi.org/10.1080/15564880802612615.6im-).
- Durlauf, S. N., & Nagin, D. S. (2011). Imprisonment and crime. *Criminology & Public Policy*, 10(1), 13–54. doi:[10.1111/j.1745-9133.2010.00680.x](https://doi.org/10.1111/j.1745-9133.2010.00680.x).
- Durose, M. R., Cooper, A. D., & Synder, H. N. (2014). *Recidivism of prisoners released in 30 states in 2005: patterns from 2005 to 2010 (report no. NCJ 244205)*. Bureau of Justice Statistics. <http://www.bjs.gov/content/pub/pdf/rpts05p0510.pdf>. Accessed 15 Nov 2015.
- Field, C. E., Nash, H. M., Handwerk, M. L., & Friman, P. C. (2004). A modification of the token economy for nonresponsive youth in family-style residential care. *Behavior Modification*, 28(3), 438–457. doi:[10.1177/0145445503258995](https://doi.org/10.1177/0145445503258995).
- Fraley, L. E. (2013). *Behaviorological rehabilitation and the criminal justice system*. Canton: Applied Behaviorology Consultants.
- Gaes, G. G., & Camp, S. D. (2009). Unintended consequences: experimental evidence for the criminogenic effect of prison security level placement on post-release recidivism. *Journal of Experimental Criminology*, 5(2), 139–162. doi:[10.1007/s11292-009-9070-z](https://doi.org/10.1007/s11292-009-9070-z).
- Gendreau, P., Listwan, S. J., Kuhns, J. B., & Exum, M. L. (2014). Making prisoners accountable: are contingency management programs the answer? *Criminal Justice and Behavior*, 41(9), 1079–1102. doi:[10.1177/0093854814540288](https://doi.org/10.1177/0093854814540288).
- Glaze, L. E., & Kaeble, D. (2014). *Correctional populations in the United States, 2013 (report no. NCJ 248479)*. Bureau of Justice Statistics. <http://www.bjs.gov/content/pub/pdf/cpus13.pdf>. Accessed 15 Nov 2015.
- Glenn, S. S. (2004). Individual behavior, culture, and social change. *The Behavior Analyst*, 27(2), 133–151.
- Hairston, C. F. (1988). Family ties during imprisonment: do they influence future criminal activity? *Federal Probation*, 52(1), 48–52.
- Henggeler, S. W., & Schoenwald, S. K. (2011). Evidence-based interventions for juvenile offenders and juvenile justice policies that support them. *Sharing Child and Youth Development Knowledge*, 25(1), 1–20.
- Hennessy, J. J., Rao, V. P., Vilhauer, J. S., & Fensterstock, J. N. (1999). Crime and punishment: infrequently imposed sanctions may reinforce criminal behavior. *Journal of Offender Rehabilitation*, 29(1/2), 65–75.
- Hobbs, T. R., & Holt, M. M. (1976). The effects of token reinforcement on the behavior of delinquents in cottage settings. *Journal of Applied Behavior Analysis*, 9(2), 189–198. doi:[10.1901/jaba.1976.9-189](https://doi.org/10.1901/jaba.1976.9-189).
- Jensen, E. L., & Reed, G. E. (2006). Adult correctional education programs: an update on current status based on recent studies. *Journal of Offender Rehabilitation*, 44(1), 81–98. doi:[10.1300/J076v44n01_05](https://doi.org/10.1300/J076v44n01_05).
- Kandel, H. J., Ayllon, T., & Roberts, M. D. (1976). Rapid educational rehabilitation for prison inmates. *Behaviour Research and Therapy*, 14(5), 323–331. doi:[10.1016/0005-7967\(76\)90019-X](https://doi.org/10.1016/0005-7967(76)90019-X).
- Killias, M., Scheidegger, D., & Nordenson, P. (2009). The effects of increasing the certainty of punishment. *European Journal of Criminology*, 6(5), 387–400. doi:[10.1177/1477370809337881](https://doi.org/10.1177/1477370809337881).
- Kovandzic, T. V., Vieraitis, L. M., & Boots, D. P. (2009). Does the death penalty save lives? *Criminology & Public Policy*, 8(4), 803–843. doi:[10.1111/j.1745-9133.2009.00596.x](https://doi.org/10.1111/j.1745-9133.2009.00596.x).

- Kyckelhahn, T. (2012). *State corrections expenditures, FY 1982–2010 (report no. NCJ 239672)*. Bureau of Justice Statistics. <http://www.bjs.gov/content/pub/pdf/scsfy8210.pdf>. Accessed 15 Nov 2015.
- La Vigne, N. G., Naser, R. L., Brooks, L. E., & Castro, J. L. (2005). Examining the effect of incarceration and in-prison family contact on prisoners' family relationships. *Journal of Contemporary Criminal Justice*, 21(4), 314–335. doi:10.1177/1043986205281727.
- Lee, H., Wildeman, C., Wang, E. A., Matusko, N., & Jackson, J. S. (2014). A heavy burden: the cardiovascular health consequences of having a family member incarcerated. *American Journal of Public Health*, 104(3), 421–427. doi:10.2105/AJPH.2013.301504.
- Lerman, D. C., & Toole, L. M. (2011). Developing function-based punishment procedures for problem behavior. In W. W. Fisher, C. C. Piazza, & H. S. Roane (Eds.), *Handbook of applied behavior analysis* (pp. 348–369). New York: Guilford.
- Lerman, D. C., & Vorndran, C. M. (2002). On the status of knowledge for using punishment: implications for treating behavior disorders. *Journal of Applied Behavior Analysis*, 35(4), 431–464. doi:10.1901/jaba.2002.35-431.
- Listwan, S. J., Sullivan, C. J., Agnew, R., Cullen, F. T., & Colvin, M. (2013). The pains of imprisonment revisited: the impact of strain on inmate recidivism. *Justice Quarterly*, 30(1), 144–168. doi:10.1080/07418825.2011.597772.
- Logan, C. H. (1972). General deterrent effects of imprisonment. *Social Forces*, 51(1), 64–73.
- Loughran, T. A., Paternoster, R., Piquero, A. R., & Pogarsky, G. (2011). On ambiguity in perceptions of risk implications for criminal decision making and deterrence. *Criminology*, 49(4), 1029–1061. doi:10.1111/j.1745-9125.2011.00251.x.
- Lynch, J. P., & Sabol, W. J. (2004). Assessing the effects of mass incarceration on informal social control in communities. *Criminology & Public Policy*, 3(2), 267–293.
- MacKenzie, D. (2013). First do no harm: a look at correctional policies and programs today. *Journal of Experimental Criminology*, 9(1), 1–17. doi:10.1007/s11292-012-9167-7.
- Megens, K. M., & Weerman, F. M. (2012). The social transmission of delinquency: effects of peer attitudes and behavior revisited. *Journal of Research in Crime & Delinquency*, 49(3), 420–443. doi:10.1177/0022427811408432.
- Mellow, J., & Christian, J. (2008). Transitioning offenders to the community: a content analysis of reentry guides. *Journal of Offender Rehabilitation*, 47(4), 339–355.
- Milan, M. A., & McKee, J. M. (1974). Behavior modification: principles and applications in corrections. In D. Glaser (Ed.), *Handbook of criminology* (pp. 865–908). Chicago: Rand McNally College Publishing Company.
- Miller, N. E. (1960). Learning resistance to pain and fear: effects of overlearning, exposure, and rewarded exposure in context. *Journal of Experimental Psychology*, 60(3), 137–145. doi:10.1037/h0043321.
- Morenoff, J. D., & Harding, D. J. (2014). Incarceration, prisoner reentry, and communities. *Annual Review of Sociology*, 40, 411–429. doi:10.1146/annurev-soc-071811-145511.
- Morris, E. K. (1980). Applied behavior analysis for criminal justice practice: some current dimensions. *Criminal Justice & Behavior*, 7(2), 131–145.
- Myers, R. J., Roozen, H. G., & Smith, J. E. (2011). The community reinforcement approach. *Alcohol Research & Health*, 33(4), 380–388.
- Nagin, D. S. (2013). Deterrence in the twenty-first century. *Crime & Justice*, 42(1), 199–263.
- National Council on Crime and Delinquency. (2006). *US rates of incarceration: a global perspective. [Fact sheet]*. http://www.nccdglobal.org/sites/default/files/publication_pdf/factsheet-us-incarceration.pdf. Accessed 15 Nov 2015.
- National Institute of Justice. (1980). *Response time analysis*. Washington, DC: U.S. Department of Justice, National Institute of Justice.
- Nay, W. R. (1974). Comprehensive behavioral treatment in a training school for delinquents. In K. S. Calhoun, H. E. Adams, & K. M. Mitchell (Eds.), *Innovative treatment methods in psychopathology* (pp. 203–243). Athens: Wiley.
- Newman, G. (1985). *The punishment response*. Albany: Harrow and Hetson.
- Nietzel, M. T., & Himelein, M. J. (1987). Crime prevention through social and physical environmental change. *The Behavior Analyst*, 10(1), 69–74.
- Petry, N. M. (2000). A comprehensive guide to the application of contingency management procedures in clinical settings. *Drug and Alcohol Dependence*, 58(1–2), 9–25. doi:10.1016/S0376-8716(99)00071-X.
- Raphael, S. (2011). Incarceration and prisoner reentry in the United States. *Annals of the American Academy of Political and Social Sciences*, 635, 192–215. doi:10.1177/0002716210393321.

- Richman, D. M., Lindauer, S. E., Crosland, K. A., McKerchar, T. L., & Morse, P. S. (2001). Functional analysis and treatment of breath holding maintained by nonsocial reinforcement. *Journal of Applied Behavior Analysis*, 34(4), 531–534. doi:10.1901/jaba.2001.34-531.
- Ross, J. I. (2012). Why a jail or prison sentence is increasingly like a death sentence. *Contemporary Justice Review*, 15(3), 309–321. doi:10.1080/10282580.2012.707427.
- Schlosser, E. (December, 1998). The prison-industrial complex. *The Atlantic Monthly*. <http://www.theatlantic.com/magazine/archive/1998/12/the-prison-industrial-complex/304669/>. Accessed 15 Nov 2015.
- Schwartz-Soicher, O., Geller, A., & Garfinkel, I. (2011). The effect of paternal incarceration on material hardship. *Social Service Review*, 85(3), 447–473.
- Seiter, R. P., & Kadela, K. R. (2003). Prisoner reentry: what works, what does not, and what is promising. *Crime & Delinquency*, 49(3), 360–388.
- Shi, L. (2009). The limits of oversight in policing: evidence from the 2001 Cincinnati riots. *Journal of Public Economics*, 93, 99–113. doi:10.1016/j.pubeco.2008.07.007.
- Singh, N. N., Dawson, M. J., & Manning, P. J. (1981). The effects of physical restraint on self-injurious behaviour. *Journal of Mental Deficiency Research*, 25(3), 207–216.
- Skinner, B. F. (1953). *Science and human behavior*. New York: Macmillan.
- Skinner, B. F. (1974). *About behaviorism*. New York: Knopf.
- Snell, T. L. (2011). *Capital punishment, 2010—statistical tables (report no. NCJ 236510)*. Bureau of Justice Statistics. <http://www.bjs.gov/content/pub/pdf/cp10st.pdf>. Accessed 15 Nov 2015.
- Solomon, R. L., Turner, L. H., & Lessac, M. S. (1968). Some effects of delay of punishment on resistance to temptation in dogs. *Journal of Personality & Social Psychology*, 8(3), 233–238.
- Spelman, W. & Brown, D. K. (1981). *Calling the police: citizen reporting of serious crime*. National Institute of Justice, Rockville, MD.
- Steinbuch, A. T. (2014). The movement away from solitary confinement in the United States. *New England Journal on Criminal & Civil Confinement*, 40(2), 499–533.
- Tarr, D. P. (1978). Analysis of response delays and arrest rates. *Journal of Police Science & Administration*, 6(4), 429–451.
- Sourcebook of Criminal Justice Statistics. (21 February 2001). *Time between arrest and sentencing for felons convicted in state courts*. <http://www.albany.edu/sourcebook/pdf/t5502006.pdf>. Accessed 15 Nov 2015.
- Tripodi, S. J., Bledsoe, S. E., Kim, J. S., & Bender, K. (2011). Effects of correctional-based programs for female inmates: a systematic review. *Research on Social Work Practice*, 21(1), 15–31. doi:10.1177/1049731509352337.
- Truman, J. L. (2011). *Criminal victimization, 2010 (report no. NCJ 235508)*. Bureau of Justice Statistics. <http://www.bjs.gov/content/pub/pdf/cv10.pdf>. Accessed 15 Nov 2015.
- Truman, J. L., & Langton, L. (2014). *Criminal victimization, 2013 (report no. NCJ 247648)*. Bureau of Justice Statistics. <http://www.bjs.gov/content/pub/pdf/cv13.pdf>. Accessed 15 Nov 2015.
- Truman, J. L. & Planty, M. (2012). *Criminal victimization, 2011 (report no. NCJ 239437)*. Bureau of Justice Statistics. <http://www.bjs.gov/content/pub/pdf/cv11.pdf>. Accessed 15 Nov 2015.
- Truman, J. L., Langton, L., & Planty, M. (2013). *Criminal victimization, 2012 (report no. NCJ 243389)*. Bureau of Justice Statistics. <http://www.bjs.gov/content/pub/pdf/cv12.pdf>. Accessed 15 Nov 2015.
- United States Department of Justice. (2008). *Police enforcement strategies to prevent crime in hot spot areas*. Washington, DC: U.S. Department of Justice Office of Community Oriented Policing Services.
- Vacca, J. S. (2004). Educated prisoners are less likely to return to prison. *Journal of Correctional Education*, 55(4), 297–305.
- Van de Rakt, M., Nieuwebeerta, P., & Apel, R. (2009). Association of criminal convictions between family members: effects of siblings, fathers and mothers. *Criminal Behaviour & Mental Health*, 19(2), 94–108. doi:10.1002/cbm.715.
- Visher, C. A., & Travis, J. (2011). Life on the outside: returning home after incarceration. *The Prison Journal*, 91(3), 102S–119S. doi:10.1177/0032885511415228.
- Western, B. (2002). The impact of incarceration on wage mobility and inequality. *American Sociological Review*, 67(4), 526–546.
- Wood, P. (2007). Exploring the positive punishment effect among incarcerated adult offenders. *American Journal of Criminal Justice*, 31(2), 8–22. doi:10.1007/s12103-007-9000-4.
- Wright, B. J., Zhang, S. X., Farabee, D., & Braatz, R. (2014). Prisoner reentry research from 2000 to 2010: results of a narrative review. *Criminal Justice Review*, 39(1), 37–57. doi:10.1177/0734016813501192.