

HOW PUNISHMENT AFFECTS CRIME:
AN INTEGRATED UNDERSTANDING OF THE BEHAVIORAL
MECHANISMS OF PUNISHMENT

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Abstract

Legal punishment, at least in part, serves a behavioral function to reduce and prevent offending behavior. The present paper offers an integrated review of the diverse mechanisms through which punishment may affect such behavior. It moves beyond a legal view that focuses on just three such mechanisms (deterrence, incapacitation, and rehabilitation), to also include other socializing, delegitimizing, compliance obstructing, and offence adapting mechanisms in how punishment may influence offending. The paper assesses the quality of existing empirical knowledge about the different effects of punishment and the conditions under which these effects exist. It concludes that punishment has at least thirteen different influences on crime prevention, five positive and eight negative. It shows that such effects are conditional, depending on the offender, offence, punishment, and jurisdiction. Furthermore, it shows that the effects vary in their directness, proximity, onset and longevity. It concludes that our current empirical understanding does not match the complex reality of how punishment comes to shape crime. In light of this, the paper develops a research agenda on the integrated effects of punishment moving beyond limited causal mechanisms to embrace the fuller complexity of how sanctions shape human conduct by adopting a complexity science approach.

Introduction

As one of its core overall purposes, legal punishment (which includes both the law's sanctions as well as the processes through which the law is enforced) serves to ensure that illegal behavior stops, does not reoccur, or is prevented more broadly in the future. To fulfil this behavioral function, punishment must somehow come to influence rule violating behavior. Most legal systems recognize that there are three core behavioral mechanisms through which punishment should seek to do so. First is deterrence, both specific deterrence, preventing recidivism amongst those already punished through the fear of future punishment, and general deterrence, preventing potential offenders committing a crime as they fear punishment that may follow? Second is rehabilitation, entailing a change in the attitude or capacities of the offender so that they will not recommit again? Third is incapacitation where punishment itself obstructs or even disables the offender from committing the offence again?¹

Whether and how punishment affects illegal conduct is a complex empirical question. Many studies from different disciplines, including most notably from criminology, economics, sociology, psychology have sought to address this question. They have done so for different types of punishment, offences, offenders, occurring in different social, economic, legal and political contexts. The massive body of existing work on the behavioral effects of punishment has focused on different mechanisms through which the punishment is thought to affect offending behavior (behavioral mechanisms). A major body of work has for instance focused on whether punishment has a specific (major reviews include Cullen, Jonson, and Nagin 2011, Petrich et al. 2021, Jonson 2010, Loeffler and Nagin 2022, Villettaz, Gillieron, and Killias 2015,

Villettaz, Killias, and Zoder 2006, Roodman 2017) or general deterrent (major reviews include Nagin and Pepper 2012, Chalfin and McCrary 2017, Nagin 2013a, b, Schell-Busey et al. 2016) effects on illegal conduct. Another large body of work has looked at whether punishment can help to rehabilitate offenders (overviews of major reviews in Lipsey and Cullen 2007, Weisburd, Farrington, and Gill 2017, Wilson 2016, Craig, Gannon, and Dixon 2013, McGuire 2013). There has also been empirical work on the incapacitative effects of punishment (reviewed in Travis, Western, and Redburn 2014, Piquero and Blumstein 2007, Bhati and Piquero 2007, Bales and Piquero 2012).

The body of work from across the social and behavioral sciences has shown that the effects of punishment on offending behavior do not neatly fall within the three behavioral purposes of punishment recognized in most legal systems (deterrence, rehabilitation, and incapacitation). Many studies have shown that punishment (whether formal criminal or administrative punishment, or organizational sanctions) activates a much broader range of behavioral mechanisms that come to shape offending behavior (van Rooij and Fine 2021, Van Rooij and Sokol 2021). Studies have shown that punishment affects and interacts with socialization processes as it helps to establish and support new norms and disapprove of deviance from such norms (Andenaes 1965, Vaughan 1997), but may also come to erode and undermine existing social norms and practices (Gneezy and Rustichini 2000), come to activate negative social norms (Cialdini et al. 2006, Schultz et al. 2007), or even worse socialize punished offenders into criminal behavior (Loeffler and Nagin 2022, Villettaz, Gillieron, and Killias 2015, Nagin, Cullen, and Jonson 2009, Villettaz, Killias, and Zoder 2006, Petrich et al. 2021, Roodman 2017, Loughran et al. 2013). Another strand of research has shown how punishment can have potential delegitimizing effects that produce more offending conduct as it can harm people's sense of procedural fairness (Walters and Bolger 2019), cause reactance (Huesmann and Podolski 2013, Minor 1987), or even leave them with a sense of brutalization (Cochran and Chamlin 2000, Shepherd 2005). Research further shows that punishment may have obstructing effects on offenders' socio-economic opportunities, which in of itself will affect their ability to desist from offending behavior (Alexander 2012, Listwan et al. 2013, Kirk 2018, Kirk and Wakefield 2018, Sampson 2011). Finally, punishment may cause adaptation in offending behavior as offenders come to evade detection and sanctions (Plambeck and Taylor 2016) and offences spread more broadly in society (Ryan 1998, Girvan 2009).

Overall, we recognize that punishment will have a range of direct and indirect, both intended and unintended effects on crime. In the traditional legal view on the behavioral functions of punishment, in theory at least, punishment will have a positive effect, in that it can reduce offending behavior through deterrence, rehabilitation, and incapacitation. The broader body of empirical work on punishment shows, however that legal sanctions can also have a negative effect in that they may also spur more offending behavior (Sampson 2011, Kirk and Wakefield 2018).

Thus far, we lack a comprehensive and integrative understanding of the different behavioral effects of punishment. Many empirical studies of the behavioral effects of punishment tend to focus on a singular mechanism (such as deterrence or incapacitation). And when studies combine mechanisms, they mostly do so for a limited set of mechanisms (such as deterrence and opportunity (Nagin, Solow, and Lum 2015), deterrence and incapacitation (Nagin 1998,

Levitt 1998, Kessler and Levitt 1999, Ramirez and Crano 2003), rehabilitation and deterrence (Lipsey and Cullen 2007), deterrence and social and personal norms (Kirchler, Hoelzl, and Wahl 2008), deterrence and criminogenic effects (Loeffler and Nagin 2022, Nagin, Cullen, and Jonson 2009, Villettaz, Gillieron, and Killias 2015, Petrich et al. 2021, Roodman 2017, Walters 2021). Or we have reviews that focus on just the negative consequences of punishment in producing more offending behavior, without linking these systematically to potential positive outcomes in reducing crime (Kirk and Wakefield 2018). There has also been limited integration across disciplinary boundaries, and few criminologists draw on the views of psychologists of how punishment may affect social norms in shaping offending behavior, or vice versa that such psychological studies of social norms incorporate deterrence or incapacitation.

In this regard, Sampson (2011) argued for an integrated policy view of punishment beyond a focus simply on deterrence and incapacitation on the one hand or a view on the negative collateral effects of punishment on the other. He argues for what he calls an “incarceration ledger” that weighs the potential positive and negative effects of punishment. His paper offered a first view of this, but predominantly used criminological insights. The present paper offers an initial cross-disciplinary integrated view of what the potential positive and negative effects of punishment in preventing and reducing offending behavior. We shall discuss the following six features: First, we provide a concise review of empirical research of the main behavioral mechanisms of punishment. Second, we focus both on how punishment itself directly and indirectly affects offending behavior, as well as how the organization of punishment, most importantly law enforcement practices that are an inherent aspect of punishment may affect offending. Third, we seek to understand the effects of punishment both for individual and organizational offending behavior, although the focus will be more on the former as there is far more literature here. Here it will combine the three mechanisms traditionally recognized in legal theory and practice (deterrence, incapacitation and rehabilitation) with other behavioral mechanisms of punishment drawn from a broader literature across the social sciences and discuss aspects of socialization, delegitimation, isolation, and adaptation. Fourth, we provide an overview of what the different mechanisms are, what theoretical and empirical basis there is for their potential effects in reducing or stimulating offending behavior, and what the current quality of knowledge is about when such mechanisms are most likely to have such effects. Fifth, we draw on this, to explore what an integrated view of the effects of punishment could look like by developing a theoretical model of how incarceration may come to affect violent crime. Sixth, the paper closes by showcasing how complexity science may be a useful framework for understanding the mechanisms and effects of punishment.ⁱⁱ

The remainder of this paper is structured as follows. We shall first look at the deterrent effect of punishment, then at incapacitation, followed by a section on rehabilitation. After that we shall look at punishment’s effects in socializing behaviors, how it affects the legitimacy of the legal system, its effects on social-economic opportunities and finally how it is related to criminal adaptation. These sections are then followed by a section that explores how these different insights can be combined into one theoretical model, applied to the effects of incarceration on violent crime.

Deterrence

Over the course of the 20th and 21st centuries there has been a massive body of work about the deterrent effect of punishment, both on specific deterrence (where punishment deters the punished from reoffending) and general deterrence (where punishment also deters others from committing an offence). The most influential and highly cited reviews of this body of work tend to focus on the deterrent effect of imprisonment and capital punishment, and focus on violent and street crime, with a focus on the US. For instance, reviews of studies of the specific deterrent effect of custodial sanctions mostly do not find evidence that they are effective in reducing recidivism (Cullen, Jonson, and Nagin 2011, Petrich et al. 2021, Jonson 2010, Loeffler and Nagin 2022, Villettaz, Gillieron, and Killias 2015, Villettaz, Killias, and Zoder 2006, Roodman 2017). Reviews of research on the effect of capital punishment do not find evidence for general deterrence (Nagin and Pepper 2012, Chalfin and McCrary 2017). Most studies of sentence enhancement, focusing on the effect of the so-called Three Strikes policies that mandates 25-life prison sentences for third offences, also do not find evidence of a general deterrent effect on crime (Zimring, Hawkins, and Kamin 2001, Zimring and Kamin 2001, Marvell and Moody 2001). A review of studies about corporate offending similarly finds no evidence that punitive sanctions on their own deter either individual or company level offending (Schell-Busey et al. 2016).

Most of the influential and highly cited reviews of existing bodies of empirical work on deterrence thus conclude that there is no conclusive evidence that punishment deters (Chalfin and McCrary 2017, Cullen, Jonson, and Nagin 2011, Nagin 2013a, Nagin, Cullen, and Jonson 2009, Nagin and Pepper 2012, Lipsey and Cullen 2007). This does not mean that all reviewed studies find that there is no evidence for deterrence. Two studies did find, for instance, that the Three Strikes did deter, albeit for property crimes and not for rape and murder (Shepherd 2002) or not in a cost-effective manner (Helland and Tabarrok 2007).

Many of the most cited and influential reviews focus on a narrow range of punishments (capital punishment and incarceration) and offences (individual violent and property crimes), and mostly concern the US.ⁱⁱⁱ The most comprehensive view on the broader existing body of work on the deterrent effect of punishment comes from a meta-analysis covering and comparing deterrence effects in 700 studies with 7822 effect estimates across a range of types of punishments, offenders, offences, jurisdictions, and research approaches (Dölling et al. 2009, Rupp 2008). In contrast to the most cited and influential reviews, this larger meta-analysis does find that there is evidence for deterrence. In fact, it finds that with the exception of capital punishment studies, the number of studies that support the deterrence hypothesis exceeds those that falsify it (Dölling et al. 2009: 211-212, 216-217, 219, -220 221-2). However, this review finds that the deterrent effect of punishment is dependent on the type of offence. It finds that the more serious the delinquency the less studies find significant evidence of deterrence. The most significant findings for deterrence concern relatively minor offences such as property crimes, tax evasion or environmental offences (Dölling et al. 2009: 215, 219-220, 222). These findings are in line with another strand of work that finds that deterrence may also vary for different types of offenders. Scholars have found that (potential) offenders have different levels of deterrability (Jacobs 2010, Pogarsky 2002, Thomas, Loughran, and Piquero 2013, Urban 2009, Bouffard, Exum, and Niebuhr 2018),, and that sanctions may differ for some people under certain conditions (Piquero et al. 2011). However, there is no common understanding of what makes an offender more or less deterrable.

There is, thus, mixed evidence that punishment will deter offending behavior, more so for less serious offences and less so for violent crime and capital offences. The core problem with this body of work has been how to establish the causal link between punishment, fear (deterrence) and offending decision making. Several key reviews find that present research simply is unable to demonstrate such link convincingly, especially not for real life criminal decision making and punishment (Nagin 2013a).

Scholars have further come to conclude that of the three core aspects of deterrence (certainty, severity and celerity), certainty of punishment is key (Nagin 2013a). Moreover, studies suggest that deterrence requires a threshold level of certainty before the punishment will have the effect of deterring offending behavior (Nagin 2013a, Brown 1978, Chamlin 1991). This means that to achieve deterrence, it is vital to focus more on detection and thus on policing or relevant enforcement practices outside of criminal law, and less on creating stricter punishment, for instance by investing in expanding the prison system.

Another key insight is that people's perceptions of the certainty and severity of punishment are key in shaping their decisions to offend. Studies have found that many targeted actors do not have a proper understanding of what the sanction certainty and severity is (Apel 2013, Thornton, Gunningham, and Kagan 2005). The implication here is that to achieve deterrence, law enforcement itself is not sufficient, but communication about such enforcement is essential to show potential offenders what the chances are they will be caught and what punishment then awaits them.

We thus cannot draw simple conclusions about deterrence. Deterrence is conditional and depends on the type of offence, offender, the certainty of punishment (and thus more on detection of offenders and policing and law enforcement practices and less on the severity of the sanctions), and on how the punishment is communicated to and perceived by those targeted.

Incapacitation

Punishment can also come to reduce and prevent offending behavior through incapacitation. This happens when the punishment itself makes it practically impossible for the convicted offender to reoffend again. We can think of several forms of such incapacitation. The most extreme is capital punishment, where the execution of the offender should stop the executed from reoffending (Gibbs 1978). Another example is imprisonment, where locking up offenders keeps them from committing crimes in society for the duration of the punishment. There are also other types of incapacitative sanctions, such as restraining orders against intimate partner violence (Strand 2012, Grau, Fagan, and Wexler 2018), license revocations for traffic offenders (Sweedler and Stewart 1993) or unethical lawyers (Zacharias 2003), or mandatory sanctions practically incapacitating offending behavior such as alcohol ignition lock mandates for convicted drunk drivers (Vezina 2002, Bjerre and Thorsson 2008) .

Most scholarly attention about incapacitation has gone out to imprisonment. It may seem that imprisoning an offender automatically has an incapacitative effect for recidivism outside of the prison, as the offender no longer plays a part in society. However, the idea of incapacitation through imprisonment is based on a counter-factual, namely what would have

happened should the offender not be in prison, and how much reoffending is prevented through the imprisonment. Studies of the effects of incapacitation of imprisonment analyze such effects by looking at how increases in rates of imprisonment affect crime rates. Findings have varied very much, depending on issues such as the size of the prison population and the values of the model parameters used (Travis, Western, and Redburn 2014, Piquero and Blumstein 2007).

A major challenge is to distinguish incapacitative effects of serving time in prison from the deterrent effect a larger prison population may have on the overall crime rate (Piquero and Blumstein 2007). Some scholars have sought to address this by trying to discern what the so-called “average crime rate while free,” summarized by the Greek letter λ . The greater the λ , the more crimes imprisonment would incapacitate. The problem has been that it is very difficult to estimate an offender’s crime rate while free (Miles and Ludwig 2007). It is based on a counterfactual, namely what amount and types of crimes would an offender commit if not imprisoned. Scholars have done so through surveying imprisoned offenders about the crimes they committed in the three years prior to incarceration. This has produced highly different rates of offences from 12 to 187 offences per year (excluding frequently occurring drug offences) (Piquero and Blumstein 2007). Here the type of offence matters (as some offences (such as drug offences (880-1300 times per year) and fraud (174-238 per year)) occur much more frequently than others (such as burglaries 76-118 per year or robbery 41-61 per year, let alone violent crime or homicide which are likely much lower) (Piquero and Blumstein 2007). Also there are large differences between offenders, producing highly skewed data with a small group of highly frequent offenders and a larger group who offend far less frequently, producing a higher overall mean (Piquero and Blumstein 2007). Finally, scholars have pointed out that when a committed offender, who would likely reoffend when free, is imprisoned, this does not necessarily mean a reduction in offences as there may be a replacement effect, when others engage in the offending opportunity that still exists (Miles and Ludwig 2007).

Another challenge in estimating λ is that offence rates are not stable and change over time, especially when offenders are in their adolescence or young adulthood. During this period they are more likely to have less self-control, be more risk-prone and have fewer social bonds. And because of this they will commit more crime than when they grow into full adulthood and are most likely to age out of crime (Mulvey et al. 2010, Schubert et al. 2004, Sweeten, Piquero, and Steinberg 2013). Moreover, when the prison population expands this will also affect the average offence rate of the average inmate, as the more people are locked up, the more they will include offenders with lower free offence rates (Johnson and Raphael 2012). Both insights mean that a criminal justice strategy focused on incapacitation through longer prison sentences and with more offenders will have diminishing returns, as longer sentences are less effective as people age out of crime and larger prison populations include more people who are less likely to reoffend (Travis, Western, and Redburn 2014).

Reviewing this body of work, a 2014 National Academy of Science report concludes that existing data do not allow for a proper estimate of the incapacitative effect of imprisonment: “We cannot arrive at a precise estimate, or even a modest range of estimates, of the magnitude of the effect of incarceration on crime rates” (Travis, Western, and Redburn 2014:141-142).

In sum, just like deterrence, existing research has fundamental difficulties in establishing the incapacitative effect of punishment on crime. The evidence we do have on the effects of imprisonment shows that incapacitation depends on the type of offender and offence, and will have diminishing returns the more people are locked up and the longer their sentences.

Research about the incapacitative effect of punishment other than imprisonment is much scarcer. Here we see on the one hand that for some areas where punishment may incapacitate offending behavior, such as license revocations for unsafe drivers, there simply is no research that focuses on such incapacitation, and merely looks at deterrence. (Sagberg and Ingebrigtsen 2018, Sagberg and Sundfør 2019, De Paola, Scoppa, and Falcone 2013). We see that for some potentially incapacitative forms of punishment, such as ignition locks for unsafe drivers evidence is highly consistent and positive evidencing a clear incapacitative effect (Coben and Larkin 1999, Blais, Sergerie, and Maurice 2013, McGinty et al. 2017, Elder et al. 2011). And finally we see that other interventions, such as restraining orders for intimate partner violence, evidence is mixed as these only work on less serious and less committed offenders (Strand 2012, Grau, Fagan, and Wexler 2018).

Rehabilitation

The third core behavioral function of punishment recognized in most legal systems is rehabilitation. Where deterrence seeks to scare (potential) offenders into compliance and incapacitation seeks to obstruct them from offending, rehabilitation serves to support and enable punished offenders to a law-abiding life. Rehabilitation concerns the “readying of prisoners to rejoin society as useful and law-abiding members of the community” (Craig, Gannon, and Dixon 2013: 4). Empirical research on rehabilitation has analyzed the effectiveness of programs, administered during or as part of an offender’s sentence, in curbing recidivism.

An early review by Martinson (1974) painted a bleak picture, wondering whether any rehabilitation program worked at all. As Martinson put it: “All of this seems to suggest that there's not much we know how to do to rehabilitate an offender when he's in an institution” (Martinson 1974:38) Forty years later the state of science has radically changed. There is now a large body of work, many with experimental designs, that has been reviewed across a large number of specialized review papers, which themselves have been reviewed again in reviews of reviews (Lipsey and Cullen 2007, Weisburd, Farrington, and Gill 2017, Wilson 2016, Craig, Gannon, and Dixon 2013, McGuire 2013).

This body of work shows that there is quite a bit of evidence for the effectiveness of prison-based rehabilitation programs. Lipsey and Cullen analyzed eight meta-analyses of existing studies covering 59 different therapies, with each review covering between 13 to 515 studies (Lipsey and Cullen 2007). They found that each of the eight meta-analyses found an overall positive effect of treatments reducing re-offending. They further found that 56 of the 59 therapies had been effective in reducing reoffending. They found that two treatments (vocational training for juveniles and psychodynamic treatment for juveniles) showed no effect. For one treatment, behavioral programs for juveniles, they found mixed findings in different meta-analysis, with one study from 1985 finding a negative effect (in that it increased re-offending by 8 percent), while in three more recent meta-analyses they found positive effects, ranging from 12 to 40% reductions in re-offending. All others were shown to

be effective. Education, vocational and work programs, for instance, were found to reduce offending by 6-20 percent. Juvenile aggression training programs were shown to reduce offending by 18 percent. There was evidence that sex offender programs, both those for adults and juveniles, reduced recidivism by 12-46 percent. And most effective were behavioral and social learning treatment addressing risks and needs programs for juveniles and adults, which were found to reduce re-offending by 60 percent (Lipsey and Cullen 2007).

In 2016, Wilson analyzed 15 systematic reviews covering 36 different forms of correctional treatments, shows a similar trend as Lipsey and Cullen. He found that the strongest evidence for effectiveness in reducing re-offending was found in the following types of programs: group-based cognitive-behavioral programs for general offenders, group-based cognitive-behavioral programs for sex offenders, hormonal medication treatment for sex offenders, and prison-based therapeutic communities for substance abusing offenders. He also found evidence for the effectiveness of educational and vocational programs for general offenders. His review also found promise in other programs, including work programs and group counseling for drug abuse, but without sufficient methodological quality to draw clear conclusions. He finally found programs that were not effective, including insight-oriented therapy for sexual offenders and correctional substance abuse boot camps (Wilson 2016).

A series of reviews conducted by scholars based in the UK of existing work on the efficacy of treatments also show that treatments can be effective to rehabilitate offenders (Craig, Gannon, and Dixon 2013, McGuire 2013). Hollin et al. (2013), for instance, find that offenders who complete cognitive-behavioral programs are less likely to reoffend, and further that such programs are cost-effective. Marshall et al. (2013) find that several, but not all, correctional programs have been effective in treating sexual offenders and reducing both for sexual and non-sexual reoffending. Bouduin et al. (2013) find that different treatments for serious juvenile offenders are effective to reduce reoffending. They found that programs were most effective when they addressed known risk factors, restored and build protective factors individually and socially, and occur within the youth's natural environment. Weekes et al. (2013) review studies that show that different treatment programs (including therapeutic community models, prison-based residential and non-residential approaches) for substance related offending have been effective in addressing substance abuse and recidivism (see also Holloway, Bennett, and Farrington 2008). Mcquire (2013), as part of the same collection of essays on what works in offender rehabilitation, finally reviews 100 prior meta-analyses finds that virtually all find evidence for a positive effect as overall conclusions from the earlier reviews. Just two of the 100 reported a neutral, zero effect, and none reported an overall negative effect of the treatments in preventing reoffending. He further found that the effects found were systematic and replicable. And he found that the impact on recidivism was cost-effective and could help to lower costs in the criminal justice system (McGuire 2013). He concludes that treatments that are rooted in deterrence theory such as "boot camps, scared straight interventions, demanding regimes, intensive surveillance, or other explicitly punitive interventions" are ineffective or even counterproductive (McGuire 2013: 39).

Overall, these reviews show that there is evidence that many correctional programs are effective to reduce different types of recidivism. The key issue is for whom they work and under what conditions they work best (Craig, Gannon, and Dixon 2013). Here a key idea in the literature and correctional practice since the 1990s has been the so-called RNR model, named

for three core conditions for successful treatment: a focus on those with the highest *risk* of future reoffending, treatments that address particular criminogenic *needs* these offenders have to rehabilitate, treatments that are responsive to the diversity of participants in terms of, for instance, their age, gender, ethnicity, sexuality, language, culture and learning styles. (Polaschek 2012, Looman and Abracen 2013, Bonta and Andrews 2007, Andrews and Bonta 2010, McGuire 2013).

Establishing the effectiveness of the rehabilitative effects of treatment is not without methodological challenges including selection bias, inadequate details on the criteria for sample inclusion, small sized samples, variation in treatment contents, lack of detail about treatment protocols, inadequate control group conditions, high rates of treatment drop-outs, and a lack of follow-up evaluation (i.e. Novaco 2013). A key problem of the research is that it has often focused on treatments designed by the researchers, which have not always been in line with treatments most used in criminal justice practice (Lipsey and Cullen 2007).

Rehabilitation has mostly been studied for violent, sexual and drug related offenders. Here we have a massive body of work that has resulted in over 100 meta-analyses, and thus has been reviewed thoroughly and been a basis for treatment practice. Outside of this domain, we cannot say there is a systematic and reviewed body of empirical evidence. There are some studies for instance on the rehabilitation of white collar offenders and corporate offenders (Meeks 2006, Siew et al. 2020, Ndrecka 2020, Pitzer and Sun 2020, Henning 2009) and traffic offenders (Utzelmann and Jacobshagen 1997, Spoerer, Ruby, and Jensch 1997, Botes 1995, Wang et al. 2020), but the amount of work and reflection on the quality and implications of the work is still limited.

Socialization

Direct Socialization: Impunity and Criminogenic Effects

Legal punishment occurs within a broader context where human behavior is socialized. A first aspect of this is that punishment itself may socialize behavior. Punishment expresses the value of the legal norm that offenders break and thus punishment helps to maintain and establish legal norms. So even if punishment would not explicitly deter, incapacitate or rehabilitate, it also plays a vital function in maintaining the value of legal norms. There is not a comprehensive and well-reviewed systematic body of empirical work on this. Some qualitative scholarship has focused on the expressive and communicative function of law generally, but without much direct attention for punishment (Klink 2005, Zeegers, Witteveen, and Klink 2005, Aubert 1967). One study on the effect of punishment in motivating firms to comply with pollution regulation finds that sanctions may reassure those already complying, showing them that they are doing so for good reasons and thus maintain and sustain the legal norm they are complying with (Thornton, Gunningham, and Kagan 2005). So in theory at least, punishment may also help to socialize non-offending behavior by reassuring those who desist from crime.

Most work on the direct effect of punishment to socialize law abiding behavior has focused on what happens when there is a lack of punishment and the law fails to signal the importance of its own norms. Here we can think of work in international human rights law (i.e. Engle 2014, Jochnick 1999, Joyner 1997) and in white collar crime (Pontell, Black, and Geis 2014, Steinzor 2014, Garrett 2014) that both point to the dangers of impunity and the need to hold

offenders accountable. This work has been largely normative and does not assess the effects of impunity on offending behavior empirically. A lack of punishment may thus have a negative socialization effect, in that it may signal that offending such legal norms is not a problem, and thus it may lead to a normalization of deviancy (Vaughan 1997).

Unfortunately, at present we lack a thorough body of empirical work to understand under what conditions punishment does and does not help to socialize compliance with legal norms. To truly test whether punishment can socialize compliance requires a research design that can study such effects while controlling for punishment's other effects on human conduct, including deterrence, incapacitation and rehabilitation.

Punishment may also socialize in a negative manner when it socializes offending behavior. This happens when the punishment itself has a so-called "criminogenic effect." The prime example of punishment having such effect is imprisonment. Incarceration can have a direct negative effect in that offenders are placed together and come to socialize one another in criminal conduct. Several reviews find that there is some evidence for such criminogenic effects (Loeffler and Nagin 2022, Villettaz, Gillieron, and Killias 2015, Nagin, Cullen, and Jonson 2009, Villettaz, Killias, and Zoder 2006, Petrich et al. 2021, Roodman 2017, Loughran et al. 2009). The reviews do qualify these findings. Loeffler and Nagin's most recent review (2022), which focuses two new types of studies (judge instrumental variable studies (with randomized assignment to judges), and regression discontinuity studies (with discontinuities in sentence severity in sentencing grids) especially there is no focus on rehabilitation during imprisonment. There is also some disagreement in the major reviews of this body of work on the quality of evidence for criminogenic effects. Villettaz et al. (2015) find that only studies that lack a rigorous methodological design to control for third variables find criminogenic effects. Yet, Petrich et al. (2021) find evidence for criminogenic effects regardless of the study design rigor.

Indirect Effects on Socialization: Norm erosion, Crowding-Out and Normalization of Deviancy
 People's own morals and social norms play a major role in their offending and compliant behavior. There are large bodies of sociological and psychological work showing the importance of personal morals and social norms (i.e. Anderson 2000, Moore 1973, Nolan and Wallen 2021, Nolan et al. 2008, Schultz et al. 2007, Cialdini and Trost 1998, Cialdini et al. 2006). Parents, schools, friends, colleagues and peers play a major role in socializing people's morals and social norms. Punishment may come to interact with people's socialized morals and social norms. It can do so in two ways, depending on whether the morals and social norms are aligned with the legal norms or when they are opposed.

When people's own sense of morality or when the social norms they perceive are aligned with the law, punishment may come to erode or crowd-out (cf. Titmuss 1970 (reissued in 2018), Frey 1998, 2012, Frey and Jegen 2001) such positive forces towards compliant conduct. The most famous study (Gneezy and Rustichini 2000) to illustrate that this can happen was a field experiment conducted in Israel, introducing a fine in several daycare centers for parents that came late to pick up their children and comparing their pickup times in subsequent weeks with those in a control group of daycare centers without such fine. The study found that parents in the daycares with the fine started coming later, and continued to do so also after the fine was lifted. The fine was thought to transfer a social obligation (to be on time to pick

up your children) into a market transaction, where parents pay to come late. The effect of the fine in eroding the social convention here had a long-term effect, several weeks beyond the duration the fine was in place. Gneezy and Rustichini's study provides a nice illustration of how punishment may come to erode socialized compliance behavior. However, one study is not the same as a reviewed body of work. There have been some attempts at replication, with mixed results. Kornhauser et al. (2020), for instance, were able to replicate these findings in a laboratory experiment, which as a main issue has that the experimental settings are quite artificial, with students playing a game, without being part of a clear community with its own socialized norms. Another study by Metcalf et al. (2020) also tried to replicate the original field experiment, but did so using survey experiments with an online sample, using a daycare scenario and a tax scenario. Their results did not replicate Gneezy and Rustichini's original findings.

Reinders-Folmer (2021) has conducted the most recent review of the different studies on crowding out effects of legal incentives on compliance. He found that game theory experimental studies, conducted in social science laboratories (i.e. Fehr and Rockenbach 2003, Henrich et al. 2001, Xiao and Houser 2011), do show evidence that fines reduce compliance in line with the notion of crowd-out existing norms. However, such studies are unclear about what the exact crowd out processes are here. Reinders-Folmer also reviewed studies on crowding-out effects of sanctions on compliance behavior in different domains, including environmental protection, tax, contracting, and bribery. He finds that the overall body of work is not sufficiently developed to draw strong conclusions or understand exactly how punishment would crowd out compliance. He shows there is some evidence for a negative crowd-out effect of sanctions, for instance in studies on environmental behavior (Rode, Gómez-Baggethun, and Krause 2015), albeit with only slightly marginal significance and for part of the samples. Yet there is also evidence for mixed effects, for instance in taxation (Feld and Frey 2007). For many other domains the body of work on the crowding out effects of punishment is simply not developed sufficiently.

People's morality and social norms may also be opposed to the legal rules. When this is the case, they have been socialized towards offending behavior. Anderson's (2000) ethnographic work in Philadelphia is a good example of how parents and peers socialize children and young adults into norms that come to support property and violent offences. There is a broader body of qualitative work showing how communities and organizations can socialize their members into norms that stand opposed to those in the law (i.e. Moore 1973, Heimer 1999, Grijns and Horii 2018, Van Rooij and Fine 2018). Psychological research on the effect of social norms on rule violating behavior has shown that punishment may come to play a negative role when social norms stand opposed to those of the law. One study conducted by Cialdini (2003) sought to understand theft of petrified wood in a national park in Arizona. They compared the effectiveness of different messages to sway visitors from stealing the beautifully fossilized trees. They compared two signs, one with the message "Please don't remove the petrified wood from the Park, in order to preserve the natural state of the Petrified Forest," combined with a picture of a lone thief stealing, with a red circle-and-bar symbol superimposed over it. The other sign had the message "Many past visitors have removed petrified wood from the Park, changing the natural state of the Petrified Forest," and a picture similar to the first sign but now with three visitors taking wood. The signs had a significantly different effect on theft over the five weeks the study was conducted, with 1.67%

stealing when the first sign was up, and 7,92% stealing when the second sign was there. Cialdini's explanation is that the second sign shows that stealing is normal and thus sets a negative so-called descriptive social norm. This finding is very much in line with a broad body of work, mostly conducted with littering and energy consumption experiments in laboratories and field studies (Schultz et al. 2007, Nolan and Wallen 2021, Cialdini and Trost 1998, Cialdini and Goldstein 2004, Cialdini 2007).

While these studies do not focus directly on punishment, they have direct implications for law enforcement. For enforcement to become an effective deterrent, as we saw earlier, certainty is vital and the perception of such certainty. This means that successful deterrence would require to communicate that offenders have been caught and punished. This means that authorities must communicate how many people have been apprehended and punished. Doing so may not just send a deterrent message, but also indicate how normal rule violations are and activate a negative descriptive social norm (Zimring and Hawkins 1973).

Punishment may have both positive and negative effects as it directly or indirectly affects or interacts with socialization processes. The body of work on punishment and socialization is far too underdeveloped to draw any hard conclusions. Some of the work, for instance the work on impunity and also some of the work on crowding out social norms and activating negative social norms is largely theoretical in nature and either has no empirical support or only support in a small amount of illustrative studies. This means that at this point we can hypothesize that punishment may have positive and negative direct and indirect effects in socializing offending behaviors. Socialization must become a more central topic of study in the field of punishment and a body of work that systematically tests these different potential effects and the conditions under which they may or may not occur and how they interact with one another and also with punishment's other effects discussed here is vital.

Punishment and Legitimacy

The effects of punishment on offending behavior are also related to the legitimacy of the legal rules and their enforcement. Tyler has demonstrated that people's sense of legitimacy of the law plays a major role in their compliance. People who have a higher sense of such legitimacy are more likely to comply with rules (Tyler 1997). In his original survey research amongst Chicago citizens in the mid 1980s he compared the effects of moral alignment with legal rules ("Are rules moral"), the deterrent effect of punishment for transgression of legal rules ("Will you be caught") and the perceived legitimacy such rules in shaping compliance ("Do you respect law") (Tyler 1990). He found that moral alignment had the strongest impact on compliance, while deterrence had very limited impact. He found that the legitimacy also had a positive effect on compliance, far more than deterrence, but less so than moral alignment. He argued that such legitimacy is vital as there are many rules where there will be limited moral alignment, and legitimacy then becomes a prime mechanism to maintain rule following (Tyler 1997).

Tyler's study then further analyzed what constituted such legitimacy. Here his survey had both measures on substantive outcomes (to what extent the rules or their application favored the interests of the respondent, and to what extent are outcomes fair) and procedural fairness (to what extent the respondent saw the processes of making the rules and applying them as fair). He found that legitimacy was mostly related to procedural fairness and he

identified several core elements: voice (being allowed to participate), honesty (in treating citizens in the process), respect (in treating citizens in the process), and neutrality (in maintaining a neutral stance towards those with interests in the process) (Tyler 1997). Tyler thus came to conclude that authorities in making, applying and enforcing rules must ensure that they maintain these four elements of procedural fairness to ensure legitimacy of and thus compliance with their rules.

Tyler's findings and the body of work that developed to further test and expand his work has important implications for punishment. Tyler's work shows that the way law enforcement operates affects people's sense of legitimacy and this should affect their compliance. And as such a vital aspect of punishment, namely the way such punishment is organized through law enforcement (which includes the detection of violations and responding to such violations, including communication with suspected offenders) will affect how citizens view the legitimacy of the legal system and their own sense of duty to comply with such system. When law enforcement acts in a procedural unfair manner, this can delegitimize the law and enhance further offending behavior. A large body of empirical work has sought to understand this for a range of law enforcement activities. Most such work has focused on policing, but there have also been studies about other forms of enforcement, including for instance tax enforcement (Worsham Jr 1996, Murphy 2003, 2005, 2009), nursing home inspections (Makkai and Braithwaite 1996), and environmental authorities (Maxwell and Maxwell 2022, Rorie et al. 2018).

Walters and Bolger (2019) have conducted a meta-analysis of empirical work about the relationship between the procedural fairness of law enforcement, perceptions of legitimacy and compliance with rules, reviewing 64 studies covering 95 sample, and 196 sample sizes. They analyzed whether procedural fairness predicted compliance directly, or indirectly through its influence on perceived legitimacy. Overall, they found significant effects for both direct and indirect effects, yet when they restricted their analysis solely to longitudinal studies with better designs to grasp causality they found that only the indirect effect of procedural justice through legitimacy remained significant across the studies reviewed. This review thus shows evidence for Tyler's original notion that procedural fairness affects legitimacy and that this affects compliance.

Overall, the findings in this meta-analyses are supported in Nagin and Telep's (2017a) narrative review of the procedural justice in policing and compliance literature. They find that there is evidence that perceptions of procedural fairness of policing shape people's perceptions of the legitimacy of the police, and that this in turns shapes compliance. However, they do not find that there is a clear causal link between objective policing practices and people's perceptions of such practices. Moreover, they do not find evidence for the effectiveness of interventions in police practices, seeking to make them more procedurally fair, in changing people's perceptions of procedural fairness of the police and thus the legitimacy of the police and compliance. This led to a debate between both reviewers and Tom Tyler (Tyler 2017, Nagin and Telep 2017b, Nagin and Telep 2021) about whether there are effective interventions to improve compliance.

There is thus common agreement that the way the law is enforced in terms of procedural fairness affects the legitimacy of law enforcement and the law itself, which in turn affects

compliance with the law. The way punishment is organized can therefore influence the legitimacy and the compliance with the law. Here the negative effect is especially important. Punishment that is organized in a perceived procedurally unfair manner will enhance offending behavior. The evidence for this finding is quite consistent and robust. Once this is the case, current research is not in agreement whether or how such undermining of legitimacy can be overcome. In contexts where law enforcement is seen to act in an unfair manner, negative perceptions can develop very early on. A study of Latinx youth in the US have shown for instance that their perceptions of law enforcement begin to decline at age nine, and those of Black kids already at seven (Fine, Padilla, and Tom 2020). The study further found that once people develop a negative perception it is very likely to remain stable. This shows that unfair law enforcement can have a long-lasting damaging effect on offending behavior that is difficult to counter later on. A major take away from this body of work is to ensure that negative perceptions on procedural fairness of law enforcement are never developed in the first place.

Obstruction of Socio-Economic Opportunities

Punishment may also shape offending behavior when it undermines the capacity a punished offender has to lead a law-abiding life. Studies have shown that punishment may have collateral consequences in obstructing offenders in their post-punishment socio-economic opportunities, including employment, education, and housing (cf. Kirk and Sampson 2013, Kirk 2018, Kirk and Wakefield 2018). In a context of systemic racism, such obstruction has an extra destructive effect on racial minorities, at worst creating a form of apartheid where whole racial communities are kept from opportunities (cf. Alexander 2012).

This socio-economic obstructive effect of punishment is not just negative for the offenders and their loved ones. It also may also influence reoffending behavior itself. Studies of macro-level influences on crime have shown that lower levels of income, education and housing predict higher levels of crime (Pratt and Cullen 2005, Lochner and Moretti 2004, Pare and Felson 2014, McCarthy and Hagan 1991, Lens 2014, 2013).

While punishment's collateral effect of socio-economic obstruction may have a large effect on reoffending behavior, the direct evidence for it remains limited. Studies of the effects of punishment on access to employment, education and housing still face large methodological challenges, for instance in establishing causality (Kirk and Wakefield 2018). In addition, only a limited body of work has focused on understanding how these effects of punishment affect reoffending (see for an exception Listwan et al. 2013). Also we do not understand much of what socio-economic obstruction effects may occur for other punishments than incarceration, and across a range of different offenders in different contexts, as most of the existing research focuses on the effects of imprisonment of street and violent offenders, mostly in the US.

A related body of criminological and sociological research offers insight into the societal processes through which punishment may come to reduce socio-economic opportunities and how this affects crime (Lemert 1967, Goffman 1963). This body of work has shown that punishment may result in a stigmatic form of labeling, where the convicted offender is formally or informally labeled as a deviant (Bernburg 2019). Through such labeling convicted offenders are associated with stigma, which reduces them "from a whole and usual person to a tainted, discounted one" (Goffman 1963, 3). The stigmatizing effect of labeling varies depending on the communities' attitudes towards convicted offenders and differs

between social groups (Paternoster and Iovanni 1989). Stigmatic attitudes towards ex-offenders are correlated with the political ideology of the labeler and interpersonal contact with prisoners (Rade, Desmarais, and Mitchell 2016). Furthermore, familiarity with the labeler and the credibility of and trust in the sanctioning agents can result in less negative attitudes towards ex-offenders (Hirschfield and Piquero 2010).

Labeling and the attached stigma can stimulate social exclusion (Bernburg 2019), which may result in lower socio-economic opportunities. Labeled individuals may be rejected or devalued by the community. On a structural level, being labeled with a criminal record can lead to less employment opportunities, restricted housing options, or being stripped from civil rights (Alexander 2012). On a social level, this could lead to discriminatory behaviors from others such as rejection from job opportunities (Feingold 2021). Stigmatic labeling through punishment may lead to social withdrawal due to anticipated rejection which also lowers socio-economic opportunities and stimulates reoffending (Bernburg 2019).

Research has shown that the stigmatic labeling effects of formal punishment result in higher recidivism. Chiricos et al. (2007) analyzed reconviction data of 95,919 men and women and found that indeed, those who are formally labeled were significantly more likely to recidivate in two years than those who were not. Feingold (2021) conducted a systematic review of 31 quantitative articles, distinguishing between four mechanisms through which the individual experience of incarceration-related stigma can occur. The enacted stigma involves the direct experience of discrimination, the perceived stigma refers to the awareness of the public's stereotypes about the group, the anticipated stigma refers to the expectation of rejection and the internalized stigma involves the internalization of the attitudes of the public toward oneself. Although all four mechanisms were associated with behavioral and mental outcomes such as mental health problems and social withdrawal, only the perceived and anticipated stigma were related with reoffending.

Labeling research has several methodological challenges. First, most of the research has been focusing on formal labeling such as criminal records, leaving the informal labeling understudied (Matsueda 1992). Furthermore, the theory suggests that the influence of labeling and stigma on reoffending involves many intermediate processes, but these processes and their interrelations are often not studied (Bernburg 2019). Additionally, much of the quantitative work on stigma lacks construct validity, which endangers the reliability of the results (Feingold 2021).

Adaptation

Another potential effect of punishment itself may incentivize an adaptation of offending behavior. There are two possibilities here. The first is that when there is stricter punishment or better detection of offending behavior, rather than desist from crime, offenders improve evasion techniques and thus reduce the certainty of punishment essential for the sanctions to have a deterrent effect. One study has developed a model that captures the decision making rationale of this approach in the context of corporate social responsibility compliance with labor and environmental standards where suppliers become incentive to hide violations better when there are more audits or reputational sanctions (Plambeck and Taylor 2016). Within criminology, there has been some work on deterrability that focuses on how offenders take care not to get caught and thus reduce the risks of punishment (i.e. Jacobs 2010). Also there has been work on how criminal capital may enable offenders to avoid arrest (i.e. Knowles et al. 2021). Finally there is work across different legal domains on how offenders play a cat and mouse game with regulators and enforcement authorities to evade punishment,

including in money laundering and financial fraud (Dupuis, Gleason, and Wang 2021, Gornall 2010, Ryder 2008) and intellectual property piracy (Sell 2009a, b, Zhao 2016).

The second form of adaptation occurs when the punishment leads to replacement or dispersion effects, when one offender or type of crime is incapacitated only to provide opportunities for other offenders or for other similar offences. Here also there is no clear comprehensive body of work. Scholars have explained this most clearly in the context for drug offences where an arrest of a drug kingpin will not decrease the demand for illicit substances and provide more opportunities for competitors to step in (cf. Miles and Ludwig 2007, Kleiman 1997). And at worse this may lead to a dispersion, or hydra effect, where the arrest of one offender spreads the offending behavior onto a larger group of offenders (Ryan 1998, MoneyMaker 1986). While there is a broad body of work on how criminal activities adapt to changes in criminal opportunity structures through situational crime prevention strategies, including a review of 102 studies, finding a replacement effect in 25% of these (Guerette and Bowers 2009), there is no comparable body of criminal adaptation to law enforcement and punishment.

An Integrated View on Punishment and Crime

Sampson (2011) has argued that policy makers who decide on punishment should make a ledger weighing the positive and negative effects of such sanctions. Sampson here points to a broader weighing of all the costs and benefits punishment may have for society. To enable such a broader cost-benefit analysis requires a first important step: assessing how the punishment will affect criminal behavior. The present paper has sought to combine knowledge from across different social sciences about the potential effects punishment may have on behavior. Table 1 below provides a summary of our findings so far.

Mechanism	Aspects	Potential effect on reducing crime	Punishment	Evidence	Limitations
Deterrence	Specific Deterrence	Positive	All	Inconclusive	Hard to isolate deterrent effect, limited subjective measures
	General Deterrence	Positive	All	Mixed, depending on type of offence	Hard to isolate deterrent effect, limited subjective measures
Incapacitation	Incapacitation	Positive	Imprisonment, Capital Punishment, Factual Restrictions	Inconclusive	Hard to isolate incapacitative effect, difficult to estimate reoffending. Limited study outside of imprisonment
Rehabilitation	Rehabilitation	Positive	Imprisonment and other mandated programs	Mostly supported	Experimental studies lack proper experimental qualities, limited samples, focus mostly on prison programs
Socialization	Ending Impunity	Positive	All	Theoretical	Lack of empirical data
	Criminogenic	Negative	Imprisonment	Mixed	Challenges in establishing causality.
	Crowding out effects	Negative	All	No robust body of work that links it to actual offending	Limited empirical evidence on crowding out effects of punishment on offending behavior.

	Activating Negative Social Norms	Negative	All	No robust body of work	Existing work does not generalize well, nor is there much replication.
Undermining legitimacy	Undermining legitimacy	Negative	All	Mostly supported, but not the full causal chain	Lack of full causal evidence, especially between objective and subjective procedural fairness
Obstruction	Undermining Socio-economic opportunities	Negative	Imprisonment and punishment with obstructing effects	Evidence for two key aspects of obstruction but not the full causal chain	Lack of studies that look at the full causal chain from punishment to obstruction to effects on offending.
	Stigmatic Labeling	Negative	Imprisonment, and punishment with stigmatizing effects	Supported in individual studies but no large reviews.	Limited construct validity, no empirical evidence on relevant intermediary processes, and no empirical data on informal labeling.
Adaptation	Evasion	Negative	All	No robust focused body of work	Lack of work that analyses exactly how punishment stimulates evasion.
	Replacement/Dispersion	Negative	Imprisonment Capital Punishment, Factual Restrictions	No robust focused body of work	Lack of work that analyses exactly how punishment stimulates replacement and dispersion.

Table 1: A summary of existing knowledge about key behavioral mechanisms and aspects of punishment.

A first key insight from an integrated view of the effects of punishment on crime is that punishment has multiple concurrent effects on criminal behavior. As can be seen in the first two columns of Table 1, we here identify seven main mechanisms and thirteen aspects at play within these mechanisms. And as the third column of Table 1 shows, of these thirteen aspects, five are potentially positive in that they may reduce criminal behavior and eight are negative in that they may stimulate more illegal conduct. The key lesson here is that punishment may have both positive and negative effects on crime. This has vital policy implications. Ideally, punishment should be organized in such a way that its positive aspects are strengthened and that its negative aspects are kept to a minimum. This requires awareness of what the potential effects of punishment are and understanding what the positive and negative aspects at play are and what may activate these. Here much more academic research is needed to pinpoint exactly how the different positive and negative aspects of different types of punishment play out and affect one another. This will require a truly integrative view that moves across the theoretical and disciplinary boundaries in which most of these mechanisms and aspects have been studied traditionally.

A second integrative insight is that the effects of punishment on crime are conditional. Table 1, in column 3, shows, for instance, that not all mechanisms and aspects are relevant for every type of punishment. As we can see, some, like general and specific deterrence, ending impunity, and evasion, may apply to all kinds of punishment. But others, such as for instance, incapacitation, criminogenic effects, and undermining socio-economic opportunities are mostly at play with a smaller set of punishments, most notably imprisonment. Similarly, the potential effects of a punishment are also conditional on the type of crime at play. Crimes of passion, committed in highly emotional states, may be far less deterrable for instance than calculated offences (van Gelder and de Vries 2013). Also some crimes may be more visible or detectable, or more prone to be reported on, enhancing the certainty of the punishment and thus its potential deterrent effect. And social and moral views on different crimes may be

different affecting the way social norms play a role. There can also be large jurisdictional variation that affects whether different mechanisms and aspects are likely to be at play. Criminogenic effects and rehabilitation very much depend on the way the prison and parole systems operate. There is likely a marked difference between the US system, with high dangerous conditions and gangs within prisons (Western 2021) compared to, for instance, the Netherlands with relative safety and much attention for rehabilitative support (Van Ginneken et al. 2018, Subramanian and Shames 2014, Midtlyng 2022, Johnsen, Granheim, and Helgesen 2011). Finally, the potential effects of punishment on crime also depend on the type of offender. Consider, for instance, how adolescents are more susceptible to peer pressure, and thus social norms, than adults (Scott and Steinberg 2008). Another example is how obstruction of socio-economic opportunities may have a very different effect on a rich white collar offender with good education and social capital than on a high school drop-out with limited economic and social resources. The conditional nature of how punishment affects crime has key policy implications. When designing or operating punishment the type of crime, offender and jurisdictional conditions should be considered for each of the potential mechanisms and aspects discussed here. Academically, this calls for much more specific research that looks into the different mechanisms and aspects of punishment across different types of sanctions, offences, offenders, and jurisdictions.

A third integrative insight is that there are large limitations and even gaps in our empirical knowledge. Unfortunately, while we can theoretically distinguish the behavioral effects of punishment in thirteen different aspects, we do not have sound empirical evidence for all of them. As shown in Table 1, there is no clear empirical work for how punishment helps to end impunity and establish a norm, while there are no robust bodies of work for four other aspects. For instance, there is no large body of empirical work on crowding out effects and negative social norms that links the general psychological work to actual instances of legal punishment and criminal conduct. And for most of the aspects where there are larger bodies of work we do not have conclusive or one-directional findings. For specific and general deterrence, incapacitation, and criminogenic effects for instance, where there are large and reviewed bodies of work, the data simply do not allow us to make strong conclusions, as the data are either mixed or lack sufficient quality to establish a clear link between punishment, the behavioral mechanism and crime. The only mechanism for which there is clear support in the empirical literature is for the rehabilitative effects of mandated treatment.

Meanwhile, as discussed earlier and outlined also in Table 1, for all mechanisms and aspects where we do have empirical work methodological challenges remain. The main issue is to establish the causal chain between punishment, the mechanism (or aspect of such mechanism) at hand, and criminal conduct. A second issue is that much of the data we have comes from particular jurisdictions, particular forms of punishment, and particular forms of illegal or deviant behavior. Most bodies of study are focused on those empirical objects that are most central to their dominant disciplines. So criminological studies of deterrence, incapacitation, rehabilitation, and criminogenic effects for instance focus most on how incarceration in the US (and to some extent UK and EU) affect violent crime. As such, psychological and behavioral economics tend to focus on how fines, threats of fines or lab-based financial disincentives affect minor digressions (such as littering or unethical conduct) in either a population of undergraduate students in research labs or general populations on the street. This makes it very difficult to generalize findings beyond their original empirical

contexts and develop a structural understanding of how the different mechanisms do or do not play out in a variety of populations, types of crime and types of punishment.

A fourth integrative insight is that punishment does not just directly affect crime but also works indirectly by affecting other influences on offending behavior. To illustrate this, Figure 1, below sketches out what the potential effects of imprisonment are on violent crime. The magenta boxes show mechanisms (or aspects thereof) with intended effects of punishment (rehabilitation, deterrence, incapacitation and ending impunity). The blue boxes show non-punitive mechanisms that affect crime. And the grey boxes show unintended indirect effects of punishment that interact with the magenta or blue boxes. We can read the figure by following the lines that lead from imprisonment towards violent crime. If we do so, we see three pathways (through rehabilitation, deterrence, and incapacitation) that move directly to violent crime. All the other pathways work indirectly. There are two types of indirect pathways. The first are pathways where the punishment affects another core influence on offending behavior (one of the blue boxes), namely capacity to desist from crime, legitimacy, or law-abiding socialization. Secondly, the model articulates pathways where a behavioral aspect of punishment affects a different aspect of such punishment. Deterrence does not just directly affect crime but also influences rehabilitation. Similar, but a little more complex, incapacitation does not just have a direct effect on crime but may also cause a replacement effect, which may affect deterrence. This means that the effects of punishment on crime are not just direct for each aspect on its own but should be seen in their mutual interactions.

A related insight to this is that the effects of punishment are not the same in their timing in affecting criminal conduct. Some may work more immediate while others take a longer time to develop an impact on crime. And some may work in the short run, while others may have a long-lasting effect. Consider for instance how specific deterrence, in theory, works immediately upon the ending of the punishment, but its effect may also decay as the recollection of such experience fades. Conversely the effect of obstruction of socio-economic opportunities, for instance because an offender lacks access to education after imprisonment, may take a longer time to on-set, and their effects may last a lifetime. Long term effects may even become intergenerational as parents may, for instance, educate their own children in the negative procedural fairness perception they have of police.

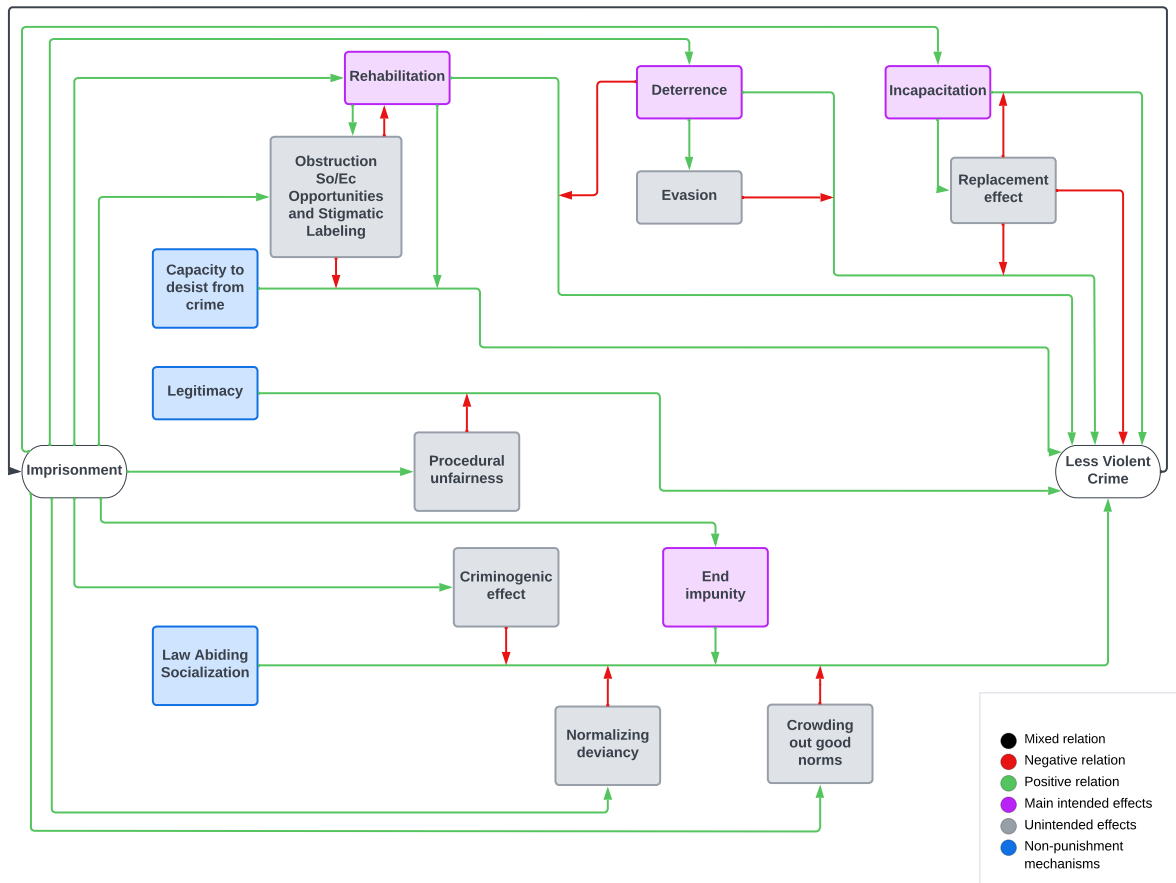


Figure 1: A schematic model of main intended and unintended and indirect effects of imprisonment on violent offences and some of the core interactions.

The fact that the effects of punishment on crime differs in its directness, proximity and timing has major implications. Most policy and political discussions on punishment focus on the immediate and direct effects and do not take the indirect and more distant influences into consideration. This leads to short-sighted policy that fails to ensure the long-term view on how best to deploy punishment effectively. Academically, there has not been much attention to directness, proximity, onset and longevity of the effects of punishment on crime, as most empirical work has focused on the more immediate and direct relationships. There is thus a need for empirical work that tries to capture the more complex interactions, such as some of those in Figure 1, while using a longitudinal design that both captures interactions as well as timing effects.

Conclusion: Towards Complexity Science

Decades of empirical and theoretical work have produced a wealth of knowledge about how punishment may affect criminal behavior. There has been much frustration amongst scholars that their work has not had a stronger effect on policy (i.e. McGuire 2013, Cullen, Jonson, and Nagin 2011). An important reason for this may be that the existing knowledge has so far remained too fragmented along disciplinary, conceptual, and methodological domains. For policy makers who are truly interested in how punishment can better help to reduce crime, an integrated view from across these domains is essential. The present paper has assessed to what extent such integrated view is possible at present.

It finds that, when combined, the literature shows that there are thirteen different aspects from seven main mechanisms through which punishment comes to shape criminal conduct; five with a potential positive and eight with a potential negative effect. The paper further finds that punishment is conditional and varied depending on the type of crime, offender, punishment, and jurisdiction. And it shows that punishment's effects on crime vary in terms of their directness, proximity, onset, and longevity. Existing empirical knowledge about each of these aspects is limited as for some we lack data, for most we lack clear conclusions, and for most we have severe methodological challenges of generalization and causation.

The present paper points towards a clear research agenda about punishment and crime. First, it shows that there is a continued need for research about the effects of crime. Well-researched areas require further study to enable necessary generalization in a greater variation of jurisdictions, offender populations, offences, and types of punishment. Here findings from psychological research, for instance, should be tested beyond the confines of labs or public space experiments to address direct linkages also to more serious forms of real crime. In relation to this, we also need a broader body of reviews that directly compares studies about particular punishment mechanisms across different settings to see what variation or similarities there are. Second, there is a need for more integrated research designs that capture as many potential behavioral effects of punishment. This means that scholars should move away from trying to demonstrate one concept or theory as right or wrong, or comparing just two concepts, to focus on how a broad range of different potential effects are interacting and shaping one another. Third, there is a need for research that can guide policy makers to understand how different effects of punishment may interact in the short and longer term and how different policy options come to affect such interaction and the ultimate effectiveness of punishment.

In all this, the key challenge will be how to capture the complex reality of punishment comes to shape crime. Existing approaches to study the effects of punishment have been focused on isolating the causal effect of association of one mechanism (for instance deterrence) while controlling for other relevant co-variables, or they have sought to understand interactions between a limited number of potential mechanisms. But once we realize that punishment has a large range of potential effects and that these effects shape one another as well as shape crime and be shaped by crime the traditional analytical approaches do not suffice. The interactions that take place in punishment mechanisms and crime call for a complexity science approach (Barabási 2007). Under such approach we try to understand interactions between a larger set of relevant variables that directly and indirectly shape one another.

One way to study the effects of punishment through a complexity approach is to estimate relevant behavioral mechanisms and crime itself into one network (Barabási 2003, 2014). Here we can draw on insights in psychological network theory that has developed statistical tools to estimate networks of variables derived from survey data (Borsboom 2017, Borsboom and Cramer 2013, Borsboom et al. 2021, Chambon, Dalege, Elberse, et al. 2022, Dalege et al. 2017, Lunansky et al. 2022). Several studies have applied this to studying compliance with social distancing mandates during the Covid-19 epidemic (Chambon, Dalege, Elberse, et al. 2022, Chambon, Dalege, Waldorp, et al. 2022, Kuiper et al. 2023). A similar approach could be used to study the effects of punishment of crime.

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ⁱ Many systems also recognize other purposes of punishment, most notably retribution and restoration, but these are not behavioral in the sense that they do not serve to reduce or prevent offending conduct.

ⁱⁱ The present paper does not attempt to provide a full review of all literature for all relevant processes. Given the scope of the potential effects of punishment this would be impossible in a singular paper. Instead, it seeks to highlight existing knowledge for each of the potential influences identified by discussing the most relevant reviews, or where no such work exists the most important studies. This does lead to a major limitation of this

paper, namely that work discussed does not apply to all forms of punishments, all types of offenders and offenders or to all jurisdictions. The paper will discuss this limitation when outlining a research agenda for an integrated view on the behavioral effects of punishment.

ⁱⁱⁱ We have not included reviews on focused deterrence here. Focused deterrence is a law enforcement approach that combines a targeted form of swift and severe punishment with rehabilitative and crime desisting interventions such as employment counseling and life coaching. We do not discuss this approach here in our main text because it does not just cover deterrence. Several reviews have found that this approach can be quite effective for addressing gang related violence (Braga and Weisburd 2012b, Braga, Weisburd, and Turchan 2018, 2019, Braga and Weisburd 2012a, Clark-Moorman, Rydberg, and McGarrell 2019).