White Rose Research Online

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk
Universities of Leeds, Sheffield and York

Deposited via The University of Sheffield.

White Rose Research Online URL for this paper:
https://eprints.whiterose.ac.uk/id/eprint/223102/

Version: Accepted Version

Article:
Stevens, A. (2020) Critical realism and the 'ontological politics of drug policy'. International Journal of Drug Policy, 84. 102723. ISSN: 0955-3959

https://doi.org/10.1016/j.drugpo.2020.102723

Article available under the terms of the CC-BY-NC-ND licence (https://creativecommons.org/licenses/by-nc-nd/4.0/).

Reuse
This article is distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND) licence. This licence only allows you to download this work and share it with others as long as you credit the authors, but you can't change the article in any way or use it commercially. More information and the full terms of the licence here: https://creativecommons.org/licenses/

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

UNIVERSITY OF LEEDS
University of Sheffield
UNIVERSITY of York

Critical realism and the 'ontological politics of drug policy'

Alex Stevens, University of Kent

Preprint of article accepted for publication in International Journal of Drug Policy, 2020

Abstracts

This article explores the question of what we can consider to be real in drug policy. It examines two increasingly common aspects of drug policy analysis; radical constructionist critique and successionist data science. It shows how researchers using these assumptions have produced interesting findings, but also demonstrates their theoretical incoherence, based on their shared 'flat ontology'. The radical constructionist claim that reality is produced within research methods – as seen in some qualitative studies - is shown to be unsustainably self-defeating. It is analytically 'paralyzing'. This leads to two inconsistencies in radical constructionist studies; empirical ambivalence and *ersatz* epistemic egalitarianism. The Humean successionist approach of econometric data science is also shown to be unsustainable, and unable to provide explanations of identified patterns in data. Four consequent, limiting characteristics of this type of drug policy research are discussed: causal inference at a distance, monofinality, limited causal imagination, and overly confident causal claims. The article goes on to describe the critical realist approach towards 'depth ontology' and 'generative causation'. It provides examples of how this approach is deployed in critical realist reviews and discourse analysis of drug policy. It concludes by arguing that critical realism enables more deeply explanatory, methodologically eclectic and democratically inclusive analysis of drug policy development and effects.

Keywords: Critical realism; ontology; constructionism; data science; drug policy

Introduction

Theory matters. As drug policy researchers, we base our work on assumptions about what the world in which drug policies operate is. And so we must consider ontology. The importance of this topic has been raised by authors who have written of the 'ontological politics' of drug policy. With this phrase, Robin Dwyer and David Moore (2013: 205) – citing Law (2004) - referred to the processes through which 'the "real" is made more or less possible, more or less probable, more or less real'. The question addressed by this article is: what can we consider to be real in drug policy? The reason this is a *political* question is that how we answer it will be influenced by – and will go on to influence - distributions of power, in part by affecting who gets to have a say on drug policy. As Law (2004:8) put it, '[s]ince social (and natural) science investigations interfere with the world, in one way or another they always make a difference, politically and otherwise.'

Before presenting a critical realist answer to the question of reality in drug policy, I will consider examples of two other approaches that are increasingly used in drug policy analysis. I will refer to them as radical constructionism and successionism in data science. I use these recondite terms in order to be more precise in targeting my critique. I am not attempting to dismiss the contribution of all work carried out in the name of causal inference (Hernán, Hsu, & Healy, 2019; Holland, 1986) or the ontological turn (Law, 2004; Mol, 2002), still less to discount the insights of all econometric or

post-structuralist analyses of drug policy. Indeed, critical realism shares much with each of these approaches, including the desire to create more sophisticated understandings of complex social processes. Rather, I am targeting two particular ontological positions within some instances of these approaches. Radical constructionism is characterised by the claim that reality is internal rather than external to our methods of studying it; that there is no reality anterior to observation. Successionism in data science involves the belief that real causes can be identified directly from patterns in data. Consideration of the methodological strengths and ontological weaknesses of research influenced by these positions will lead to description and examples of a critical approach to drug policy which is both anti-foundationalist and realist (Cruickshank, 2003); a critical realist ontology of drug policy.

The analytical paralysis of radical constructionist ontology in drug policy research

An increasing body of research on drug policy 'explores the way policy problems are constructed, and agendas are set and delineated by dominant frames and narratives' (Gstrein, 2018: 75). The great value of such approaches is that they remind us of the contingency of knowledge. However, this epistemological advantage can be blurred by taking an ontological position that denies the very possibility of knowledge. This is because radical constructionism suggests that nothing can be considered to exist that is external or prior to discourse and actions. So it denies the independent, intransitive existences of the essential referent of knowledge; reality. I want to be clear here that I am not claiming that 'ontologically oriented' researchers operates a crudely sophist denial of the existence of reality. But they do argue that reality is constituted rather than discovered by our attempts to know it. In line with social constructionism, they insist on the 'made-ness' of the phenomena we study (Fraser, Moore, & Keane, 2014: 18). They then takes an 'extra crucial step beyond…constructionism in the common sense' by arguing that these constructions are not 'singular and terminal', but rather continually being made and remade in ongoing practices of 'enactment' (Ibid: 17-19). Fraser, Moore and Keane also rejects the '"soft" constructionism in which the social constructed concepts [e.g. of alcohol and addiction] are distinct from the reality of biology and pharmacology' (Ibid:130). Rather, 'all is practice: no other (founding) reality lurks behind them' (Ibid: 21). It is for these reasons that I describe the aspect of examples of the ontological turn that I criticise here as a form of *radical* constructionism.

Many studies have shown that people hold knowledge about drug policy that takes different forms and has various contents. Their knowledges are contingent on the point they occupy in space and time, as well as their disciplinary training. The nature of the 'drug problem' itself is not an independently given, Durkheimian 'social fact'. Dwyer and Moore's (2013) study valuably showed, for example, the ways in which different knowledges on methamphetamine have been constructed in Australia. Interesting research has also been done on the construction and enactment of the 'contexts' of drug use (Duff, 2014), of the 'problem' of crack (e.g. Hartman & Golub, 1999; Reinarman & Levine, 1997), of heroin (e.g. Carnwath & Smith, 2002), of methadone (Rhodes, Azbel, Lancaster, & Meyer, 2019), of hepatitis C (Rhodes, Lancaster, Harris, & Treloar, 2018), and of cannabis (e.g. Acevedo, 2007). Addiction has been analysed as made through social construction and 'evidencing' (Fraser et al., 2014; Keane, 2002, 2012; Moore & Fraser, 2013; Seear, 2019; Reinarman, 2005), as has drug treatment (valentine, 2009), and the very concept of 'drugs' (Race, 2013; Seddon, 2010).[1]

[1] Not all of the works cited here adopt a radical' constructionist approach. I use them here as examples of the value of studying how accounts of drugs and drug policy are contingent on time, space and the scientific

Responses to drug problems are not naturally occurring, inevitable consequences of neutrally scientific and rational deliberation. They are products of social (and – in post-humanist accounts - material) processes. 'Solutions' to drug problems are constructed through discourses, which are the sets of words, images and symbols which form drug policy. We can learn valuable lessons by studying how these discourses operate in constructing new realities of drug effects and policies (Fraser & Seeare, 2011; Moore & Fraser, 2015; Stevens, 2019).

But in order to see the value of this knowledge, we need a conceptual framework which allows for the possibility that there is a reality that is external to it. The claim that 'scientific processes produce their objects' (Moore, 2011: 82) cannot provide a sound basis for analysis. If knowledge claims refer to enactments of reality, rather than to reality itself, and there are no methodological criteria for judging how well they describe reality - because 'the realities of drug use and addiction do not pre-exist our attempts to know them' (Dilkes-Frayne, 2018: 1548) - then how are we to assess which knowledge we should use as a basis for action in drug policy? Without having some basis for such 'judgemental rationality', analysis is paralysed (Archer et al., 2017). It cannot move us forwards towards more adequate accounts of reality. All it can do is throw up a 'multiplicity' of competing 'forms of reality' (Moore, 2011: 85).

This problem was recognised by one of the principle authors of the ontological turn, Annemarie Mol. Dwyer and Moore (2013) quoted her claim that 'reality does not precede the mundane practices in which we interact with it, but is rather shaped within these practices' (Mol, 1999: 75). The logical implication of this claim is that there is no basis for thinking that one form of knowledge is superior to another, because knowledge is interior to our methods of knowing, rather than being grounded in a reality that lies outside them. In her study of medical practice, Mol (2002: 154) acknowledged that this detachment of knowledge from an external referent is potentially 'paralyzing'. It makes it impossible for studies of science to answer the question of 'what makes science studies better than the self-interpretation of scientists, or lay opinion? What are the grounds for its own claims to expertise?' (Ibid: 155). And here it the heart of the problem with radical constructionism. It is self-contradictory. Its maxims do not survive being applied to themselves.[2] It claims an expertise which advances knowledge, while stating that there are no external criteria for preferring this form of knowledge over any other.

This self-contradiction is evident in two common inconsistencies in some contemporary qualitative drug policy research; empirical ambivalence and *ersatz* epistemic egalitarianism.

The empirical ambivalence of radical constructionsim is visible in the two positions it simultaneously adopts towards the data that it uses in creating accounts of how drug policy realities are made. A common research method in the critique of ontologial politics - as used by Dwyer and Moore (2013), Fraser et al (2014), Sarmineto et al (2019) and many others - is the gathering of data on discourses presented in interviews, media articles and other texts. The radical constructionism of the ontological turn analyses these data as both representative and constitutive of realities. They

concepts and tools applied; a feature of social and scientific research which critical realists call 'epistemic relativism' (Archer et, 2017).

[2] Take, for example, Law's (2004:155) statement that 'there are no general rules. Instead there are only specific and enacted overlaps between provisionally congealed realities'. This is itself a statement of a general maxim, or rule.

contain accounts of drugs and drug policies, but they also create these entities. Radical constructionist analysis must also acknowledge its own role in 'enacting' the realities of these discourses, which can no more be antecedent or anterior than the realities which they themselves enact. As Fraser et al (2014:17) put it, practices go 'all the way down'. The problem with this is that it asserts that there is nothing at the bottom that is not practice. This article would be an enactment of enactments of enactments and so on. Even the antecedent real existence of the textual data that is gathered for analysis is in doubt and could, in the terms of the ontological turn, be 'otherwise'.

In practice, radical constructionist analysis tends to 'slip back and forth' (Graeber, 2015: 20) between a 'semantic' understanding of ontology (which refers to the beliefs that people hold about reality) and a 'rational' version, where ontology refers to what really is (Calvert-Minor, 2014). Indeed, radical constructiuonism tends to treat these two versions of ontology interchangeably, rejecting the 'soft' constructionist separation of concepts from realities. For example, Fraser et al (2014:136) wrote that 'material objects – such as alcohol – are neither purely the product of social practices nor entirely determined by their supposedly intrinsic material attributes'. This contradicts their earlier statement on practices going 'all the way down'. If this is the case, and the intrinsic-ness of objects is merely 'supposed', then materail objects *are* purely the product of social practices, as there is not a basic, 'anteriror' matrial on which to ground these practices.[3]

This self-contradictory ambivalence leads us to the problem of epistemic egalitarianism, or the claim that no particular way of representing what occus is superior to a contrasting account. This is not a claim that is always made directly by radical constructionist studies of drug policy. It is, however, implicit in their repeated claims that realities are multiple and that there are no empirical grounds for choosing between these realities, as they are produced within our methods.

Ersatz epistemic egalitarianism involves professing to hold this belief while creating accounts of the world that are self-evidently presented as being superior to others.[4] For example, Dwyer and Moore (2013: 210) stated they did not intend to offer a '"better" version of methamphetamine'. But a few sentences later, they called for accounts that are 'less alarmist' and 'more nuanced'. Can it really be contended that such accounts were not intended to be *better* than the discourses that Dwyer and Moore criticically analysed? An account which is more nuanced can hardly be intended to be worse, or even equal. An accusation of alarmism only makes sense if it alleges *mis*representation, not just different represesntation. In another article on methamphetamine, Moore and Fraser (2015: 91) called for research 'to treat its objects of investigation with greater rigour and precision'. This is a welcome call, but it depends on there being objects external to our methods which can be described more precisely. If, as Law (2004: 148) recognised, the question of truth remains 'critical' and is not to be judged 'on the basis of whim or volition', then we need some basis for preferring some accounts over others. Again, we need a form of 'judgemental rationality' (Archer et al., 2017).

Indeed, in their discussion of Room's (2003) work on the 'cultural framing of addiction', Fraser et al (2014: 135) suggested that his relecutance to state which account of addiction is better or worse

[3] Even in post-foundationalist thought, the 'quest for grounding' must be accepted 'as a both impossible and indispensable enterprise' (Marchart, 2007: 9)

[4] I use the German word *'ersatz'* here because its usage in English denotes a substitute for a real thing that cannot be used. The English equivalent 'fake' implies an intention to deceive, which I do not suggest here. Rather, I am suggesting that strict epistemic egalitarianism is not actually available for use by anyone who is proposing an account which they hope to be persuasive.

puts him in an 'impasse'. The 'way out' which they offered is to recognise that 'people, objects and concepts make and remake each other in specific encounters' (Ibid:136). But this is not a way out of the analytical blockage they found in Room's work. It provides only a way back to taking every single encounter on its own terms; an analytical impossibility for anyone who wishes to create knowkedge that is generalisable or transferable. Fraser et al (Ibid: 19) wrote '[t]here is no "in general". There are only singular, unstable assemblages.' This is perhaps an admirable rejecting of scientific reductionism, but it does not give us much hope of producing knowledge that can be used in informing policies. After all, the whole point of having a policy is that it avoids treating each case as singular. Policy provide a general rule or procedure.

In effect, Fraser et al (2014) took a similar sidestep to that performed by Mol (2002). Instead of addressing the question of how we might choose between different accounts of addiction, they repeated their assertion of ontological contingency. Mol (2002:159), in answer to her own question about how different accounts could be judged against each other, stated that this is '[a]n important question, but not one that has to be posed in this paralyzing way'. But sidestepping a question by rephrasing it into a different question is not the same as answering it. The possibility of paralysis persists.

In forging on past her acknowledgement of this potential paralysis, Mol stated (in line with critical realist thinking) that our methods of observation always 'interfere' with the phenomena we are observing. But she then argued that we must move beyond judging accounts on the basis of their relationship to an antecedent reality. For her and for Law (2004), judgements between claims are to be made on normative and political rather than empirical grounds. The problem here is that radical constructionism is 'crypto-normative' (Sayer, 2012). It takes a critical normative stance while having no grounds on which to base that stance. It sees norms as well as knowledge to be both multiple and incommensurable.[5] The materialist realist, Manuel DeLanda (2006: 195), argued that this kind of normative relativism is 'at odds' with 'our ethico-political commitments to intervention'. By taking away the possibility to argue rationally for the superiority of any account, radical constructionism weakens our ability to resist the authoritarian imposition of knowledge and values (Latour, 2004; Parr, 2015; Sismondo, 2017).[6]

Radical constructionism abandons the attempt to ground knowledge claims on its relationship with antecedent reality. Some of its exponents then argue (self-defeatingly) that we can judge between knowledge claims on normative grounds, but that there is no extra-discursive basis on which to ground these judgements. If we combine these claims with the Foucauldian assumption that knowledge and norms are decided on the basis of 'centralising power' (Lancaster, Seear, Treloar, & Ritter, 2017: 71), then whom do we expect to prevail when knowledge is contested (as it very often is in drug policy)? Will it be those who value equality, compassion and mutual respect? Or those who value struggle, conformity and domination? Without a commitment to verisimilitude in our accounts of social processes, we are left in a world of pure rhetoric, prey to abuses of power with no basis for contesting them, except our own ignorable normative preferences.

[5] 'Like ontology, the good is inevitably multiple: there is more than one of it' (Mol, 2002: 176).

[6] Law (2004:62-65) claims to evade the 'horrors of relativism' by stating there is a 'third option' between singularity and plurality in making empirical, ethical and political judgements, which is to accept the possibility of partial, situated versions. But this does not escape the charge of relativism as it just replicate the assumption that truths are plural/multiple.

Successionist causal ontology in drug policy data science

The conventional quantitative methods adopted by many data science involve a fundamentally Humean, successionist view of causation. Hume (1758: 371) wrote, 'we have no other idea of this relation [of causation] than that of two objects, which have been frequently conjoined'. Hume's constant conjunctions are the regularities for which data scientists search. He ruled out the attempt to create ideas about these conjunctions, seeing this as 'metaphysical' speculation, which should be committed 'to the flames' (Hume, 1772).

Interesting studies have identified regular successions from providing drug treatment to fewer crimes (Bondurant, Lindo, & Swensen, 2018; NTA, 2012), from relatively loose availability of medical marijuana to fewer opioid deaths (Powell, Pacula, & Jacobson, 2018)[7], from the control of precursor chemicals to reductions in cocaine availability (Cunningham, Callaghan, & Liu, 2015), from various forms of drug law enforcement to various forms of harm (DeBeck et al., 2017; Werb et al., 2010), and from lax regulatory environments to increased use of alcohol (Babor et al., 2010).

Just as some critical studies in drug policy cannot sustain a thorough-going radical constructionism and so employ empirical justifications for the superiority of their accounts, so data scientists do not always adhere to a strictly Humean, empiricist separation between 'matters of fact' and 'relations of ideas'. Even Hume himself could not refrain from theoretical conjecture when attempting to explain why expected regularities may not occur (Bhaskar, 1975: 41).

As Hume's self-contradictory forays into 'metaphysical' speculation suggest, regular successions are not the only thing we need to know about causation. The great problem with the Humean approach to causation is that it is essentially tautological. It tell us nothing about causes that is not inherent to its definitions of a cause. To suggest a relationship is causal if there is constant conjunction, precedence and necessity in the relationship between Xs and Ys does not answer the explanatory question of *why* Ys occur in conjunction with Xs. Relations of causality cannot simply be read off from the common co-occurrence of two abstracted variables (Sayer, 2000), however complex the statistical model, and however tightly it fits the data. Causes are not to be found at the surface of social systems, in the coincidence of the 'variate traces' that we produce in measurements of actual cases (Byrne, 2011: 32). Mechanisms are distinct from variables, despite the tendency of data scientists to use these two words as if they were synonymous (e.g. Vogler, 2017). In order to explain social processes, we need to identify causal mechanisms, not statistical regularities (Byrne, 2011; Dupré & Cartwright, 1988; Hedström & Ylikoski, 2010).

This better view of causation presents a fundamental challenge to studies which attempt to close off other influence of other variables – by randomised experiment or statistical control – on the relationship between a posited causal X and a supposedly caused Y. Experimental methods are not often used in drug policy analysis, as it is difficult to randomise cases to different drug policy conditions. Data scientists have displayed a great deal of methodological imagination in creating ways to draw causal inferences from non-experimental data. These are usually based on the template of linear regressions analysis, with additional components to reduce the possibility of error in the identification of successionist effects. So we increasingly see the application of propensity score matching, regression discontinuity, difference-in-difference, event study design and instrumental variable approaches in studies of drug policy. The common feature here is the attempt

[7] This succession was not found in a more recent study, looking at data over a longer time period (Shover, Davis, Gordon, & Humphreys, 2019).

to isolate the succession from X to Y from all the other conjunctions that may confound our view of it. So these studies express the hope that 'if human behaviour were subject to experimental closure [by excluding the influence of all other variables], we could observe causal laws at work' (Cruickshank, 2003: 46).

These types of studies can add greatly to our knowledge by indicating where to look for causal processes. Some quantitative studies adopt a nuanced and careful approach to causation. But in reading many others, I have identified four common, related characteristics that may reduce their usefulness. They may even produce knowledge that is dangerously wrong. These characteristics are observed in the methods by which some data scientists establish and report causal claims in drug policy analysis. But they originate in a particular view of the nature of causation. So they are not only epistemological concerns, relating to how best we can know the world. They are also ontological. They represent a particular view on what the world is. These four characteristics are:

- *Causal inference at a distance*. From a realist perspective, it is not enough just to find that patterns in data are consistent with a theorised mechanism existing. An important step in studying causal processes is the collection of evidence that the proposed mechanism actually exists (Rogeberg & Melberg, 2011). If the causal mechanism is not observed in action, then it cannot be known that it is that mechanism which actually is in operation. Identified successions might be consistent with many other possible mechanisms (Hedström & Ylikoski, 2010). For example, we might have an idea that changing penalties for drug possession can affect drug-related harms by affecting levels of drug use. But to know whether this particular causal process is in action, we would need to use data on levels of drug use, not just a regular conjunction between changes in penalties and indicators of harms. Purely successionist studies omit this crucial step. We can call this 'causal inference at a distance' because it ignores the need to develop an intimate, up-close knowledge of the mechanisms involved in producing the outcomes of drug policy.

- *Monofinality*. Many successionist studies identify one additive 'causal recipe' (in the form of a regression equation) as the best representation of the analysed data (Ragin, 2008). These methods are therefore monofinal, even if they include more than one independent variable and so are not monocausal. The assumption of monofinality obscures the possibility that the same outcome in different cases may have different causes (i.e. 'equifinality', George & Bennett, 2005).[8] It may also ignore the complexity of contingent causation across different combinations of causal factors. The introduction of interaction terms into regression equations goes some way to acknowledging this complexity, although it still problematically assumes that 'net effects' of variables can be isolated *ceteris paribus* from complex configurations, where all else is rarely equal (Byrne, 2011; Ragin, 2008). And it is highly unusual for drug policy studies to examine more than one or two first order interactions. Many other possible combinations normally exist. These possibilities are rarely exhausted by the sensitivity analyses that econometric studies tend to include. Eliminating a small number

[8] For example, decriminalisation of drug possession may occur because of the 'moral dissonance' between high rates of drug use and legal prohibition, as has been suggested as an explanation for decriminalisation of cannabis in several US states (Lempert, 1974). But it may also occur in response to concerns over the social integration of people with drug problems, as in Portugal in 2001 (Hughes & Stevens, 2010), due to a political rejection of soviet-style state oppression, as in Czechoslovakia in 1990 (Zábranský, 2004), or as an unanticipated result of a constitutional court decision, as in Germany in 1994 (Bollinger, 2004).

of alternative causal paths does not rule out the myriad combinations of observed and unobserved processes which might cause the outcome to occur.

- *Limited causal imagination*. We observe limited causal imagination when hypothesised causal mechanisms are based on only one type of theory. Economic studies, for example, often only base causal ideas on the 'completely impoverished' view of human motivation as being reducible to instrumental, self-interested, rational choice (Archer, 2003). This perspective is the basis of rational addiction theory (Becker & Murphy, 1988). Nobody can deny a role for rationality in human decision making without contradicting themselves (if rationality has no role, why bother justifying assertions in arguments?). But rational addiction theory fails accurately to predict the behaviour of people who use drugs, partly because it ignores genetic, neurological and sociological processes (Bretteville-Jensen, 1999; Rogeberg, 2004; Stevens, 2011a; Vale, 2010).[9]

- *Overly confident causal claims*. It is common for drug policy researchers to find correlational associations; far rarer for them to find strong evidence of causality. Nevertheless, strong claims are often made. Every time an abstract or conclusion slips from reporting a statistical association to stating that one variable 'increased', 'reduced', 'limited', 'impacted', 'induced' or 'generated' another, a strong causal claim is being made.

Evidence that these inconsistencies commonly occur in the quantitative drug policy studies was provide, for example, by Rogeberg and Melberg (2011) survey of 64 researchers who published studies using rational addiction theory. The majority of these researchers accepted the claims that such research could provide 'causal insight' without observing causal processes. In other words, they supported what I have called causal inference at a distance. Rogeberg and Melberg argued these researchers did not meet the threshold of being even 'crudely rational'. Such remote causal inference is not rational from the realist perspective which Rogeberg and Melberg adopted. But it is entirely consistent for a Humean ontologist to deny the need for any other information than the contiguity in the observed relation between X and Y. This is the successionist approach which is often used in data science, even though – as discussed above – it is tautological and unsustainable in practice.

[9] Rational addiction theory 'illustrate how absurd choice theories in economics get taken seriously as possibly true explanations and tools for welfare analysis despite being poorly interpreted, empirically unfalsifiable, and based on wildly inaccurate assumptions' (Rogeberg, 2004: 263). The contrast between the 'ontologically oriented' and the critical realist critique of individualist rational action theory shows well the analytical paralysis of radical constructionism. While critical realists, such as Rogeberg (2004) and Archer (2003), can consistently claim to offer a better account of human agency, Moore's (2011) radical constructionist critique of the 'monadic individualism' of agency in agent-based modelling can only offer a different version of agency, without having a consistent basis for arguing that policy makers should use one version instead of another in creating their policies.

Figure 1: Common characteristics of successionist data science in studies cited by Doleac et al's (2018) *Research Roundup* on reducing opioid use and deaths (black cells represent the presence of the characteristic)

Study	Causal inference at a distance	Monofinality	Rational action theory only	Strong causal claim
Alpert et al (2017)		■		■
Ayres & Jalal (2018)	■			■
Beheshti (2018)		■		■
Birk & Waddell (2017)	■	■		
Bondurant et al (2018)	■	■		■
Bradford et al (2018)	■	■		
Buchmueller & Carey (2018)	■	■		■
Dave et al (2018)	■	■		■
Delgado et al (2018)	■	■		
Doctor et al (2018)	■	■		
Doleac & Mukerjee (2018)	■	■	■	■
Evans et al (2018)				■
Mallatt (2018)		■		■
Meara et al (2016)	■	■		
Moore & Schnepel (2017)		■	■	
Packham (2019)	■	■	■	■
Powell et al (2015)				
Powell et al (2017)				■
Rees et al (2017)		■		
Ruhm (2018)	■			
Schnell (2017)	■	■	■	■
Schnell & Currie (2018)	■	■		
Soni (2018)	■	■	■	
Sordo et al (2017)		■		
Stein et al (2015)		■		
Swensen (2015)	■	■		■
Vogler (2017)	■			■
Wen et al (2017)	■	■	■	■

More evidence comes from a recent review that aimed to 'highlight studies that measure the *causal* effect of recent policies on opioid abuse and mortality' (Doleac, Mukherjee, & Schnell, 2018, emphasis in original). The studies which Doleac et al selected provided many examples of the four characteristics of successionist data science. They explicitly excluded qualitative research and observational studies which did not provide some counter-factual analysis, on the grounds that these could not provide causal insight. They cited 28 studies (listed in Figure 1) that reported on the effect of an intervention or programme. Of these studies, 18 did not include observations of a posited causal process, and so display causal inference at a distance. Twenty-two expressed this causal process in one additive equation (with no interaction terms) and so displayed monofinality. Nine did not provide a theoretical explanation for the link they investigate between intervention and outcome, so relying on a purely successionist concept of causation. Of the 19 that did provide a causal explanation or theory, six based their causal imagination on the limiting perspectives of

instrumental rational choice theory. And 15 present their primary finding as a strong causal claims on the basis of observed associations.

Doleac and Mukherjee's own (2018) controversial working paper on the 'moral hazard' of naloxone displayed all four of the problematic characteristics of successionist data science, as shown in Figure 1. It made the strong causal claim that 'broadening naloxone access increased opioid-related mortality by 14%' in the mid-west region of the USA. Later scrutiny showed this result to be highly sensitive to the specification of the regression discontinuity (Border, 2018). And more recent, peer-reviewed research shows effects of naloxone distribution on mortality in the opposite direction to those found by Doleac and Mukherjee (Abouk, Pacula, & Powell, 2019). More caution was warranted in their making of their causal claim, which may – if taken into policy making – have had the effect of limiting access to a life-saving intervention.

The increasing sophistication of the methods used in data science provide increasingly specific clues on where to look for causes. But successionist studies that assume rather than demonstrate particular causal processes may lead us astray, sometimes dangerously so. To understand the causal processes that operate in drug policy, we need a different approach.

Critical realist ontology for drug policy research

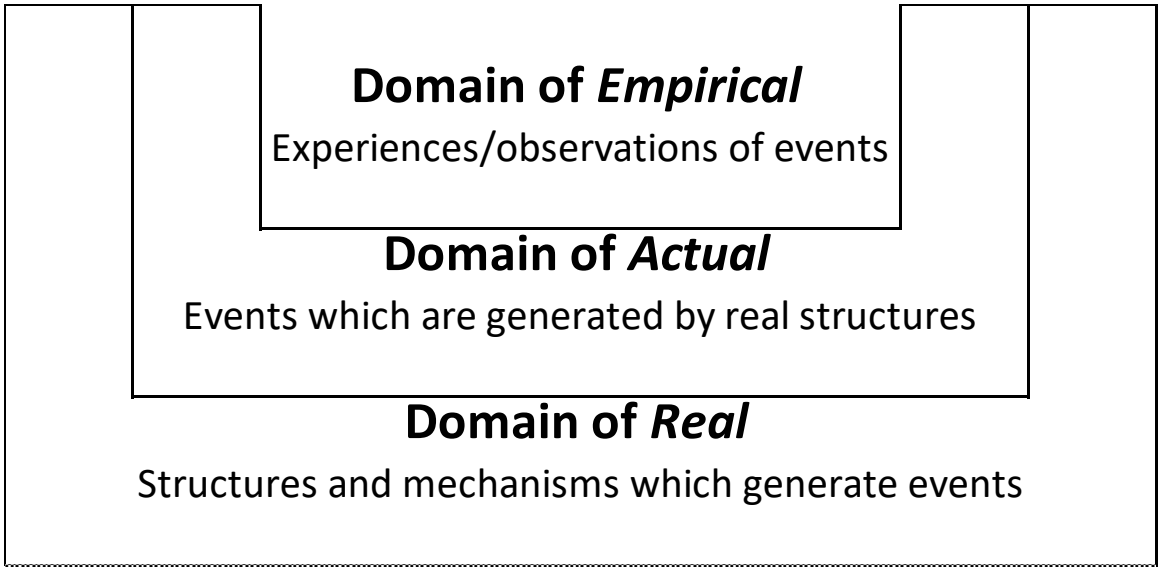
Depth ontology

In his *Realist Theory of Science,* Roy Bhaskar (1975) presented a nested ontological model. His three domains of reality fit together like a Russian doll, with the domain of the 'empirical' being inside the domain of the 'actual', which is inside the domain of the 'real' (see Figure 2). The effects of real causal processes are the actual events which we observe empirically. Bhaskar argued that we can only assume that causal mechanisms operate when we are not observing them if we assume that these mechanisms are independent of the events they generate. Similarly, we can only make sense of our perceptions of these events if we assume that they occur 'independently of experience'.

> 'Structures and mechanisms then are real [domain of *real*] and distinct from the patterns of events [domain of *actual*] that they generate; just as events are real and distinct from the experiences in which they are apprehended [domain of *empirical*]' (Bhaskar, 1975:56).

This approach shares much that is critical with some assumptions made by authors inspired by the ontological turn, especially the idea that no scientific finding or concept is 'simply or self-evidently real' (Fraser et al 2014: 147). Critical realism 'recognizes the materiality of somatic, psychological and social experience, but conceptualizes this materiality as mediated by culture, language and politics' (Ussher, 2010: 23). It does not see reality as fixed and stable, or (as some have implied) attempt to extract 'isolatable' causal mechanisms from the social systems in which they emerge (Rhodes & Lancaster, 2019: 4). Rather, it sees reality as complex, open, dynamic, heterogeneous, relational and emergent (Jessop, 2005; Pratten, 2013; Rutzou, 2017). This is why there is a dotted line at the bottom of Figure 2. New realities can emerge which transform the actual. And new perspectives can be created which destabilise our empirical understandings.

Figure 2: Three nested domains of reality. Adapted from Mingers (2004), on the basis of Bhaskar (1975)



Critical realism does not advocate an omniscient, mono-perspectival, value-neutral attempt to capture and fix the world in one scientific approach. Rather, it accepts different perspectives and methods as helpful in developing more adequate accounts of a complex reality. It does insist on 'judgemental rationality' and the need to choose between competing accounts of the world (Archer et al., 2017), or – as Stenger (2018: 91-92) puts it – to 'authorise one way of understanding over possible other ways'. But it would be a misconception to think that critical realism operates a correspondence theory of truth which identifies the real with the empirical, or to think of it as promoting a value-free science (Cruickshank, 2003; Sayer, 2000). It accepts the culturally mediated and theory-laden nature of our knowledge. Indeed, it develops an 'epistemic relativism' which is 'entailed both by ontological realism and by the transformational conception of social activity' (Bhaskar, 1998: 57-58). Knowledge is contingent on structural and cultural conditions, which are open to change through social action (Archer et al., 2017). We have no direct access to the domain of the real. It is, in the critical realist definitions, beyond the grasp of our concepts. But we have to operate on the belief that there is a realty beyond or behind our concepts if they are to have any meaning (Graeber, 2015).

As Graeber notes, '[t]he fact that the object of science is, to some degree, constituted by the theory and practice of science itself, does not mean that reality is entirely so constituted' (Ibid:26). So critical realist ontology differs from that of both strictly successionist data science and radical constructionist critique. It places both as operating at the level of the empirical, rather than the deeper level of which we need to develop better understandings in studying drug policy and its effects. This is why critical realists accuse both successionists and radical constructionists of using a 'flat' ontology which commits the 'epistemic fallacy' of conflating our knowledge of reality with reality itself (Bhaskar, 1975; Cruickshank, 2003; Graeber, 2015). We prefer a 'depth' ontology which maintains the necessary separation between concepts and antecedent reality. We seek out the causal powers and properties which underlie the events which we observe, as well as the ways in which we – at least partly - create them.

In radical constructionist studies, flat ontology accompanies the denial of the 'mind-independence' of actual reality, so restricting our view of reality as if it only exists in the empirical realm, in our

interactions with those elements of it that are available for our direct apprehension (DeLanda, 2006). In data science, flat ontology merges the empirical with the actual by assuming direct correspondence between observed data and actual events. For critical realists, empirical data are related to but separate from actual events and from the real causal mechanisms that produce these events. We need to use data carefully to produce (inductively) and test (deductively) ideas about how events are generated. What are the mechanisms that produce 'demi-regularities' (Lawson, 1997) in the social world, and how are they activated? In order to improve drug policy analysis, we need continually to gather qualitative and quantitative data on events and their meanings, to develop ideas on how these are generated, and to test these ideas to produce more nuanced and accurate understandings of the structures and mechanisms that generate drug policy and its outcomes.

This is a 'process-in-motion' that has 'no foreseeable end' (Bhaskar, 1975:16), as we move to deeper – but always provisional – knowledge. This never-ending process can move us forward to understandings that are better, in the conventional sense that they enable us to explain a wider range of phenomena, but also in the critical sense that they expose the ways in which knowledges, practices and realty are entangled with each other (Stenger, 2018). Critical realism cannot provide certainty about what is real, but it can provide criteria for choosing between conflicting accounts of what is real. It is compatible with a 'slow science' which holds us in suspense as to the possibility of discovering an ultimate truth. But it does so in a way that allows us to use, pragmatically, the limited knowledge we do have to promote fulfilment of values which we can rationally justify (Sayer, 2011; Stevens, 2011b).

Generative causation

The task of drug policy analysis is therefore to move us towards such deeper understandings of the real structures and mechanisms that generate the phenomena we observe. This can partly be done by developing more sophisticated causal models. For example, a recent study by Otten et al (2018) included observation of various intervening steps between early childhood stress and early adolescent substance use, rather than assuming that these steps occur without observing them. By taking us through the sequence from children's life experiences at ages 2 to 5, to problems in inhibitory control at ages 7 and 8, to deviance at ages 9 and 10, Otten et al provide a better understanding of how some children come to use substances at age 14. But theirs is still a successionist approach, incorporating several causal arrow from Xs to Ys. To inform a critical realist understanding of the causation of early substance use, we need to go deeper. Each of these steps in the sequence needs to be accompanied by an idea of *why* one set of events might lead to the next.

Critical realists also retain a critical distance from terms like 'inhibitory control' and 'deviance', in line with our *qualified* social constructionism, which acknowledges the 'made-ness' of social realities, but sees them as constructed from 'something rather than nothing' (Byrne, 2011: 20). These variables represent socially constructed categories in the domain of the empirical, created in part by the scales that are used to measure them. They are the socially shaped variate traces of the actual behaviours of the children included in the study.

In open social systems, we recognise that 'people make things happen' and so examines the reasoning and capacities that people deploy (Pawson, 2008). We therefore must not stop at identifying successions between events. We must study the conscious and unconscious decision-making of both the people who use drugs, and of the people who make policy about them. We can,

for example, usefully supplement Otten et al's successionist causal model with information from qualitative research on parental experiences of adverse childhood events, and of how to increase children's resilience to them (Woods-Jaeger, Cho, Sexton, Slagel, & Goggin, 2018).

The move to generative explanation will therefore be a collective endeavour, undertaken by disparate researchers across many disciplines. Part of the point in following established conventions for the communication of research findings is to enable the accumulation of this knowledge. Some processes for accumulation – such as systematic reviews and meta-analyses – limit their selection of studies in order to produce a more rigorous account of observed successions. This has the disadvantage of excluding knowledge that could be very useful in producing and testing ideas on how drug policy interventions produce outcomes. The review by Doleac et al (2018), for example, would have benefitted greatly from the inclusion of evidence from observational and qualitative studies on how and why people use naloxone, needle exchanges and other harm reduction measures to reduce risks of drug use (e.g. Boucher et al., 2017; Marshall, Dechman, Minichiello, Alcock, & Harris, 2015; Neale et al., 2019; Rhodes et al., 2011).

A more recent example of how to use qualitative data to provide explanations of observed statistical patterns is provided by Roberts et al's (2019) study of different responses of people who use opioids to 'lock-in' restrictions on where they can fill their prescriptions. Other approaches to mixing these methods include using qualitative analysis to inform the development of quantitative, agent-based simulation models (e.g. Dray et al, 2012). Qualitative comparative analysis (QCA, Ragin, 2000, 2008) involves iterative dialogue between numerical data and substantive knowledge of cases. An example is my study of the complex causation of high national rates of adolescent cannabis use (Stevens, 2016).

Critical realist review

There is a method which has been specifically developed for the accumulation of knowledge that supports the 'process-in-motion' of critical realism by developing and testing ideas on the complex, contingent generation of outcomes. This is the realist review (Pawson, Greenhalgh, Harvey, & Walshe, 2005). Its aim is to develop a 'programme theory', which is 'an abstracted description and/or diagram that lays out what a program (or family of programs or intervention) comprises and how it is expected to work' (Wong, Westhorp, Pawson, & Greenhalgh, 2013: 24). Critical realist review differs from less critical versions by acknowledging the politically and culturally mediated nature of its aims and methods (Edgley, Stickley, Timmons, & Meal, 2016). It recognises the essentially normative nature of the attempt to produce knowledge, asking not only 'what works for whom', but also what 'works' means, and why we value this (Sayer, 2011). It places the configurations of programme context, mechanisms and outcomes (CMO) which it constructs in the context of the open, complex social systems which they inhabit and affect (Archer, 1995).

A recent example which I led developed a programme theory of alternatives to criminalisation for simple possession of drugs (Stevens, Hughes, Hulme, & Cassidy, 2019). We reviewed these approaches in nine selected countries (Australia, Czech Republic, Denmark, Germany, Jamaica, Netherland, Portugal, UK, USA) in a project for the Irish government. The programme theory includes three overlapping causal pathways (normative, criminal justice, and health and social services) through which different forms of depenalisation, diversion and decriminalisation trigger various outcomes in combination with specified contexts.

For example, the 'gateway effect' is one of the posited mechanisms that is included in this programme theory. This is because it has been suggested (e.g. by Kelly & Rasul, 2014) as one of the processes by which reducing penalties for possessing one drug may increase the use and so the harms of other drugs. But this depends on at least two intervening processes occurring. One is that reducing penalties does indeed increase the use of the supposed gateway drug. The other is that this will increase the use of other drugs. Kelly and Rasul (2014) used rational addiction theory to suggest that depenalisation reduces the price of cannabis, so increasing use.[10] But there may also be other mechanisms involved, such as neurobiological priming, or the 'supply gateway' of introducing people who use one drugs to suppliers of others, or common causation of use of various substances, as implicitly suggested by Otten et al (2018). And there may be other, counter-balancing mechanisms (such as the stigma associated with some 'harder' drugs) which prevent increases in their use. Each part of the programme theory therefore highlights the need to deepen our understanding of each component of the complex web of causation, and also to observe and develop ideas on how these combine with other contexts and mechanisms.

Our review of depenalisation, diversion and decriminalisation was critical in that it placed the CMO combinations it identified within Archer's (1995) 'morpohogenetic' approach to the interplay of contexts, mechanisms and outcomes with the cultural and structural conditions in which they operate. It notes the role that our methods played in constructing the programme theory, and discusses how this might have been 'otherwise'. We were not as explicit in stating our political positions as Edgley et al's (2012) avowedly 'left libertarian' analysis of the 'politics of recovery in mental health'. But we did clearly state our normative, political interest in helping to reduce the harms done by the criminal justice system while protecting public health. We noted how the political process through which the review was established for the Irish government led us away from asking research questions that may have been more politically challenging, for example on ethnic disparities and on legitimacy in law enforcement. It is through these type of explicit reflection on political and normative positions that critical realist studies acknowledge the entanglement of knowledge with values. The difference here with radical constructionism is that critical realism also provides reasons why we should prefer some value positions over others (Sayer, 2011; Vandenberghe, 2019).

Such critical realist analysis has not often been used in drug policy analysis, although there have been realist reviews of the impact of economic recession on illicit drug use (Nagelhout et al., 2017) and of brief interventions for alcohol misuse delivered in hospital emergency departments (Davey, Landy, Pecora, Quintero, & McShane, 2015). Each provided useful information on contingent combinations from which specific outcomes can emerge, even in the absence of randomised studies or instrumental variables by which to study causal inference. Another review is under way on 'complex interventions to prevent adolescents from engaging in multiple risk behaviours' (Cooper, Lhussier, Shucksmith, & Carr, 2017). Given the policy importance of interventions such as medically

[10] Kelly and Rasul's (2014) study of the Lambeth cannabis warning scheme provide a fascinating example of multi-stage causal inference at a distance. They assumed causal links from reduced penalties for cannabis possession in a London borough to lower prices, to increased use of cannabis, to increased use of 'harder' class A drugs, to observed increases in hospitalisations for class A drugs in that borough compared to others. But they did not directly observe or report data on cannabis prices, or on cannabis use, or on use of class A substances. Other studies on the national implementation of the cannabis warning scheme disconfirmed the hypothesis of a causal effect in increasing cannabis use (Braakmann & Jones, 2014; Hamilton, Lloyd, Hewitt, & Godfrey, 2014).

supervised drug consumption rooms which are hard to randomise but normatively important to transfer between contexts (Pardo et al., 2018), there is great scope for more critical realist reviews to be done in this field.

When the findings of evidence reviews do not fit the political priorities of the powerful, they may be ignored (Kelly, 2018; Stevens, 2019). There is no possibility of creating – in line with some kind of technocratic 'geek manifesto' (Henderson, 2012) - a value-free, politically neutral, 'evidence-based' policy (Monaghan & Boaz, 2018; Moore & Fraser, 2015). But this does not mean we should abandon the collective effort to build more accurate, less biased representations of actual events and real causal processes in order to better inform policy debates. Critical realism shares with science and technology studies (STS) an interest in how power inequalities affect what forms of knowledge come to be seen as legitimate. Contested knowledge debates in drug policy will not be decided solely on the basis of the most sophisticated or accurate representations of reality. Structurally asymmetric power will influence what evidence is used in policy (Stevens, 2011c). However, what critical realism can do – which radical constructionist studies influenced by STS cannot – is provide some empirical grounds for consistently challenging forms of knowledge which are inadequate in describing and explaining our observations of reality.

Critical realist discourse analysis

In addition to better understanding of the contexts and mechanisms though which drug policy outcomes are generated, we also need better understandings of the ways in which drug policy itself is produced. The tools of discourse analysis help us to do this by tracing the origins and presence of particular conceptions in drug policy. But, as shown above, critical discourse analysis based on a radical constructionist ontology is self-defeating. There is, however, a critical realist form of discourse analysis (Flatschart, 2016; Sims-Schouten, Riley, & Willig, 2007). The crucial difference is that critical realist discourse analysis acknowledges that there is an external reality to which analysed discourses may apply. It therefore becomes an important step in the analysis to identify relevant extra-discursive features of the field.

In Ussher's (2010) critical realist study of the medicalisation of 'women's misery', these included the somatic, material side effects of selective serotonin re-uptake inhibitor drugs, as well as evidence on the equivalent effectiveness of placebo, diet, exercise, and cognitive-behavioural therapy in treating low mood. In my analysis of the UK government's failure to act on recommendations to reduce opioid-related deaths (Stevens, 2019), antecedent realities included the rise in opioid-related deaths since 2012, the concentration of these deaths in deindustrialised working class areas, and the long project of partial state shrinkage in which the Conservative Party and its financial backers have engaged since the 1970s. In both studies, inclusion of material realities which are – at least partly – anterior to our research methods helps to sharpen the critique. These phenomena are known through empirical data that is selectively framed and imperfectly measured. But these data are only intelligible and refutable if we assume that they have some relation to actual events.

Different 'mid-range' theoretical frameworks, including the advocacy coalition framework of Sabatier and Jenkins-Smith (1993), the multiple streams approach of Kingdon (1984) and the punctuated equilibrium theory (PET) of Baumgartner and Jones (1993) all provide ideas that have been used in studying the contexts and mechanisms of drug policy change (Houborg & Asmussen Frank, 2014; Kübler, 2001; Ritter & Bammer, 2010; Rychert & Wilkins, 2018). Rychert and Wilkins, for example, used PET in highlighting processes of positive and negative mobilisation around the

regulation of new psychoactive substances (NPS) in New Zealand. From a critical realist perspective, these mobilisations emerge from configurations of real structures and mechanisms which relate to (but do not exactly reflect) real effects of NPS and their sale and regulation. Critical realist discourse analysis enables us to examine the contexts and mechanisms posited by these policy theories. It accepts a necessary distinction between anterior and discursive realities, encompassing both without conflating them into a flat ontology.

Conclusion

In this article, I have criticised the flat ontological assumptions of both strictly successionist data science and radical constructionist critique as they have been used in some studies of drug policy. This leads us to a consideration of how critical realism can be used to overcome these antinomies. Critical realism is anti-foundationalist. Its claims do not arise from a pretended direct, empiricist access to causal law. It acknowledges a transitive aspect to reality in which our methods of observations will 'interfere', as well as an antecedent, anterior, intransitive aspect which 'lurks behind' our observations. As Bhaskar (1975: 250) concluded, 'there could not be knowledge without antecedents'.

Critical realism enables analysis of knowledges as contingent and varied across time and spaces. This shows us that we do not have direct access to understanding how things occur. But to reject the idea that some forms of knowledge are superior because they help us better to understand real entities and processes which are external to our research methods is to invite the paralysis of the radical constructionist position. We are left, therefore with the provisional, fallible ontological thesis of critical realism; that there is a reality external to knowledge, but our knowledge of it is inevitable provisional and fallible.

Critical realist ontology encourages us to avoid making overly confident causal claims based on any one research method or theory. We must avoid a rush to premature closure of questions on which form of regulation of drug markets, or which prevention, treatment and harm reduction interventions lead to the best combinations of freedom and health. We need to capture discontinuous moments of the heterogeneous flux of reality in order to produce accounts of it. But we should not translate this into a belief that reality itself can be pinned down, fixed and 'solidified' by a particular form of analysis (Rutzou, 2017). Critical realism agrees with constructionists on the need to challenge, problematise and destabilise accepted knowledges. It suggests that we combine analytical forces across disciplines to create better understandings of the complex processes which underlie the data we collect on drug policies.

David Moore has himself participated in the type of multidisciplinary research that is needed to provide such deeper understandings of drug policy (Dray et al., 2012). In reflecting on this engagement between quantitative and qualitative methods, he suggested that some qualitative researchers might have to 'suspend their theoretical and epistemological commitments' (Moore, 2011:74) in order to inform policy.[11] I suggest, rather, that we do not need to 'suspend' theoretical

[11] Moore (2011: 81) called this the 'suspension mode of multidisciplinary engagement'. On the basis of ideas from Law and Mol, he argued that qualitative researchers should also consider the 'ontological politics' of these encounters. However, his suggestions on how multidisciplinary research can inform policy come in a section of his chapter on the 'suspension mode'. His section on 'ontological politics' raises a number of

viewpoints, but rather to adopt a coherent ontological position which is compatible with multi-method collaboration. We can then avoid the self-paralysis of radical constructionism by using empirical data critically to produce more sophisticated and nuanced accounts. We can use these accounts coherently to argue for better drug policies.

For quantitative researchers, the implications of a critical realist ontological approach are fourfold, at least. We need to combine sophisticated causal models with close observations of causal processes in action, rather than making assumptions about them from a distance. We should recognise the possibility of multiple configurations of conditions producing similar outcomes (or different outcomes from different combinations). This can be done by making greater use of case-oriented methods, such as QCA, which allow for equifinality (Ragin, 2008). We should not treat variables that have been abstracted from cases as if they have independent causal powers (Byrne, 2011). We should instead use methods that combine quantitative measurement and analysis with qualitative information and judgements (George & Bennett, 2005; Ragin, 2000). We should draw on a wide range of theoretical perspectives in developing causal hypotheses, and avoid relying on 'individualistic and asocial' (Byrne, 2011: 182) rational choice theory (and especially 'absurd' rational addiction theory) alone. And we need to be cautious in reporting the consistency of the associations we discover with posited causal mechanisms, rather than pretending to identify causal laws directly. All this should be done while recognising the imperfections of the data we use and that the empirical does not correspond directly to the actual or real domains of reality.

Critical realism provides a sound theoretical basis for producing better knowledge to use in criticising and improving policy (Matthews, 2014). Its combination of ontological realism, epistemic relativism and judgemental rationality supports a combination of qualified constructionism and cautious data science in drug policy analysis. The collective effort I am calling for should not arbitrarily exclude any particular method or source of knowledge. It cannot treat social and political questions as if they can be answered by science alone (Reeves, 2009). We should not limit the forms of evidence we consider to just those produced by highly qualified researchers using designs that aim for quasi-experimental closure. People who use drugs are vital partners in the effort to improve knowledge on drug policy, as they have the necessary intimate, up-close knowledge of the events and processes involved. We can work together towards improved accounts through the skilled implementation of our continually developing methods of research, and in collaborative 'symbiosis' (Stenger, 2018) with people who hold other forms of knowledge. This will help us create always-provisional but increasingly useful explanations of why certain forms of drug policy exist and of how they produce particular outcomes in specific contexts. Such claims can only be made coherently if we adopt an ontology which is both critical and realist.

Acknowledgements

An earlier version of this article was presented as a paper to the 13th annual conference of the International Society for the Study of Drug Policy in Paris in May 2019. I am grateful for the helpful comments received from friends and colleagues, including Alison Ritter, Rosalie Liccardo Pacula, Kari

interesting questions about how different 'forms of reality' are created and deployed. Such multiplicities are of interest to some researchers in the field. But, given that radical constructionism provides no other grounds than contested normative preference to choose between competing forms, such ontologically oriented questions are not likely to be very useful in creating knowledge that successfully challenges dominant accounts in the evidence-saturated world of policy making (Stevens, 2011c).

Lancaster, Tim Rhodes, Mark Monaghan, David Moore, Alex Gertner, Balihar Sanghera, Sweta Rajan-Rankin, Ben Baumberg-Geiger as well as four anonymous reviewers. I am also extremely grateful to the excellent neuro-oncology team at King's College Hospital.

References

Abouk, R., Pacula, R. L., & Powell, D. (2019). Association Between State Laws Facilitating Pharmacy Distribution of Naloxone and Risk of Fatal Overdose. *JAMA Internal Medicine*, *179*(6), 805–811. https://doi.org/10.1001/JAMAINTERNMED.2019.0272

Acevedo, B. (2007). Creating the cannabis user: A post-structuralist analysis of the re-classification of cannabis in the United Kingdom (2004-2005). *International Journal of Drug Policy*, *18*(3), 177–186.

Alpert, A., Powell, D., & Pacula, R. L. (2017). Supply-Side Drug Policy in the Presence of Substitutes: Evidence from the Introduction of Abuse-Deterrent Opioids. *SSRN*, *10*(4), 1–35. https://doi.org/10.2139/ssrn.2897179

Archer, M.S. (1995). *Realist Social Theory: The Morphogentic Approach*. Cambridge: Cambridge University Press.

Archer, M.S. (2003). The private life of the social agent: What difference does it make? In *Critical Realism: the Difference it Makes* (pp. 17–29). London: Routledge.

Archer, M.S., Decoteau, C., Gorski:, Little, D., Porpora, D., Rutzou, T., … Steinmetz, G. Vandenberghe, F. (2017). What is critical realism? https://doi.org/10.1111/jtsb.12107

Ayres, I., & Jalal, A. (2018). The impact of prescription drug monitoring programs on U.S. Opioid prescriptions. *Journal of Law, Medicine and Ethics*, *46*(2), 387–403. https://doi.org/10.1177/1073110518782948

Babor, T. F., Caetano, R., Casswell, S., Edwards, G., Giesbrecht, N., Graham, K., … Hill, L. (2010). *Alcohol: No Ordinary Commodity. Research and Public Policy. Second Edition*. Oxford: Oxford University Press.

Baumgartner, F., & Jones, B. (1993). *Agendas and instability in American politics* . Chicago: University of Chicago Press.

Becker, G. S., & Murphy, K. M. (1988). A Theory of Rational Addiction. *Journal of Political Economy*, *96*(4), 675–700. https://doi.org/10.1086/261558

Beheshti, D. (2018). Adverse Health Effects of Abuse-Deterrent Opioids : Evidence from the Reformulation of OxyContin. Retrieved March 1, 2019, from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3192739

Bhaskar, R. (1975). *A Realist Theory of Science*. Leeds: Leeds Books.

Bhaskar, R. (1998). *The Possibility of Naturalism: a Philosophical Critique of the Contemporary Human Sciences, 3rd edition*. Abingdon: Routledge.

Birk, E. G., & Waddell, G. R. (2017). The Mitigating Role of Prescription Drug Monitoring Programs in the Abuse of Prescription Drugs. *IZA Discussion Paper No. 10990*.

Bollinger, L. (2004). Drug Law and Policy in Germany and the European Community: Recent Developments. *Journal of Drug Issues*, *34*, 491–510. https://doi.org/10.1177/002204260403400302

Bondurant, S. R., Lindo, J. M., & Swensen, I. D. (2018). Substance abuse treatment centers and local crime. *Journal of Urban Economics*, *104*, 124–133. https://doi.org/10.1016/j.jue.2018.01.007

Border, R. (2018). www.richardborder.com. Retrieved March 8, 2019, from https://www.richardborder.com/nalexonemidwest

Boucher, L. M., Marshall, Z., Martin, A., Larose-Hébert, K., Flynn, J. V., Lalonde, C., … Kendall, C. (2017). Expanding conceptualizations of harm reduction: results from a qualitative community-based participatory research study with people who inject drugs. *Harm Reduction Journal*, *14*(1), 18. https://doi.org/10.1186/s12954-017-0145-2

Braakmann, N., & Jones, S. (2014). Cannabis depenalisation, drug consumption and crime – Evidence from the 2004 cannabis declassification in the UK. *Social Science & Medicine*, *115*, 29–37. https://doi.org/http://dx.doi.org/10.1016/j.socscimed.2014.06.003

Bradford, A. C., Bradford, W. D., Abraham, A., & Adams, G. B. (2018). Association between US state medical cannabis laws and opioid prescribing in the medicare part D population. *JAMA Internal Medicine*, *178*(5), 667–673. https://doi.org/10.1001/jamainternmed.2018.0266

Bretteville-Jensen, A. L. (1999). Addiction and discounting. *Journal of Health Economics*. https://doi.org/10.1016/S0167-6296(98)00057-5

Buchmueller, T. C., & Carey, C. (2018). The Effect of Prescription Drug Monitoring Programs on Opioid

Utilization in Medicare. *American Economic Journal: Economic Policy*, *10*(1), 77–112. https://doi.org/10.2139/ssrn.3050692
Byrne, D. (2011). *Applying Social Science: The Role of Social Research in Politics, Policy and Practice*. Bristol: Policy Press.
Calvert-Minor, C. (2014). Epistemological Misgivings of Karen Barad's "Posthumanism." *Human Studies*, *37*(1), 123–137. https://doi.org/10.1007/s10746-013-9285-x
Carnwath, T., & Smith, I. (2002). *Heroin Century*. London: Routledge.
Cooper, C., Lhussier, M., Shucksmith, J., & Carr, S. M. (2017). Protocol for a realist review of complex interventions to prevent adolescents from engaging in multiple risk behaviours. *BMJ Open*, *7*(9). https://doi.org/10.1136/bmjopen-2016-015477
Cruickshank, J. (2003). *Realism and sociology: anti-foundationalism, ontology and social research*. London: Routledge.
Cunningham, J. K., Callaghan, R. C., & Liu, L.-M. (2015). US federal cocaine essential ('precursor') chemical regulation impacts on US cocaine availability: an intervention time-series analysis with temporal replication. *Addiction*, *110*(5), 805–820. https://doi.org/10.1111/add.12839
Dave, D., Horn, B. P., & Deza, M. (2018). Prescription drug monitoring programs, opioid abuse, and crime. *NBER Working Paper 24975*.
Davey, C. J., Landy, M. S. H., Pecora, A., Quintero, D., & McShane, K. E. (2015). A realist review of brief interventions for alcohol misuse delivered in emergency departments. *Systematic Reviews*, *4*(1). https://doi.org/10.1186/s13643-015-0024-4
DeBeck, K., Cheng, T., Montaner, J. S., Beyrer, C., Elliott, R., Sherman, S., … Baral, S. (2017). HIV and the criminalisation of drug use among people who inject drugs: a systematic review. *The Lancet HIV*. https://doi.org/10.1016/S2352-3018(17)30073-5
DeLanda, M. (2006). *A new philosophy of society: Assemblage theory and social complexity*. London: Continuum.
Delgado, M. K., Shofer, F. S., Patel, M. S., Halpern, S., Edwards, C., Meisel, Z. F., & Perrone, J. (2018). Association between Electronic Medical Record Implementation of Default Opioid Prescription Quantities and Prescribing Behavior in Two Emergency Departments. *Journal of General Internal Medicine*, *41*, 409–411. https://doi.org/10.1007/s11606-017-4286-5
Dilkes-Frayne, E. (2018). Commentary on Ritter et al. (2018): Making research active in policy-engaging in ontological politics and evidence events. *Addiction*, *113*(8), 1548–1549. https://doi.org/10.1111/add.14237
Doctor, J. N., Nguyen, A., Lev, R., Lucas, J., Knight, T., Zhao, H., & Menchine, M. (2018). Opioid prescribing decreases after learning of a patient's fatal overdose. *Science*, *361*(6402), 588–590. https://doi.org/10.1126/science.aat4595
Doleac, J. L., & Mukherjee, A. (2018). The Moral Hazard of Lifesaving Innovations: Naloxone Access, Opioid Abuse, and Crime. *IZA Discussion Paper No. 11489*. https://doi.org/10.2139/ssrn.3135264
Doleac, J. L., Mukherjee, A., & Schnell, M. (2018). Research roundup: What does the evidence say about how to fight the opioid epidemic? Retrieved February 22, 2019, from https://www.brookings.edu/blog/up-front/2018/12/07/research-roundup-what-does-the-evidence-say-about-how-to-fight-the-opioid-epidemic/
Dray, A., Perez:, Moore, D., Dietze:, Bammer, G., Jenkinson, R., … Maher, L. (2012). Are drug detection dogs and mass-media campaigns likely to be effective policy responses to psychostimulant use and related harm? Results from an agent-based simulation model. *International Journal of Drug Policy*, *23*(2), 148–153. https://doi.org/10.1016/j.drugpo.2011.05.018
Duff, C. (2014). The place and time of drugs. *International Journal of Drug Policy*, *25*(3), 633–639. https://doi.org/10.1016/j.drugpo.2013.10.014
Dupré, J., & Cartwright, N. (1988). Probability and Causality: Why Hume and Indeterminism Don't Mix. *Noûs*, *22*(4), 521–536. Retrieved from http://www.jstor.org/stable/2215455?seq=1#page_scan_tab_contents
Dwyer, R., & Moore, D. (2013). Enacting multiple methamphetamines: the ontological politics of public discourse and consumer accounts of a drug and its effects. *The International Journal of Drug Policy Drug Policy*, *24*(3), 203–211. https://doi.org/10.1016/j.drugpo.2013.03.003
Edgley, A., Stickley, T., Timmons, S., & Meal, A. (2016). Critical realist review: exploring the real, beyond the empirical. *Journal of Further and Higher Education*, *40*(3), 316–330. https://doi.org/10.1080/0309877X.2014.953458
Edgley, A., Stickley, T., Wright, N., & Repper, J. (2012, May). The politics of recovery in mental health: A left libertarian policy analysis. *Social Theory and Health*, 10: 121–140. https://doi.org/10.1057/sth.2012.1

Evans, W. N., Lieber, E. M. J., & Power: (2018). How the Reformulation of OxyContin Ignited the Heroin Epidemic. *NBER Working Paper No. 24475*. https://doi.org/10.1162/rest_a_00755
Flatschart, E. (2016). Critical Realist Critical Discourse Analysis: A Necessary Alternative to Post-marxist Discourse Theory. *Journal of Critical Realism*, *15*(1), 21–52. https://doi.org/10.1080/14767430.2015.1118588
Frank, R. G., Humphreys, K., & Pollack, H. A. (2018). Does Naloxone Availability Increase Opioid Abuse? The Case For Skepticism. Retrieved February 16, 2019, from https://www.healthaffairs.org/do/10.1377/hblog20180316.599095/full/
Fraser, S., & Seeare, K. (2011). *Making Disease, Making Citizens: The Politics of Hepatitis C*. Farnham: Ashgate.
Fraser, S., Moore, D., & Keane, H. (2014). *Habits: Remaking Addictions*. Basingstoke: Palgrave Macmillan.
George, A. L., & Bennett, A. (2005). *Case Studies and Theory Development in the Social Sciences*. Harvard: The MIT Press.
Graeber, D. (2015). Radical alterity is just another way of saying reality A reply to Eduardo Viveiros de Castro. *HAU: Journal of Ethnographic Theory*, *5*(2), 1–41. https://doi.org/10.14318/hau5.2.003
Gstrein, V. (2018). Ideation, social construction and drug policy: A scoping review. *International Journal of Drug Policy*, *51*, 75–86. https://doi.org/10.1016/j.drugpo.2017.10.011
Hamilton, I., Lloyd, C., Hewitt, C., & Godfrey, C. (2014). Effect of reclassification of cannabis on hospital admissions for cannabis psychosis: A time series analysis. *International Journal of Drug Policy*, *25*(1), 151–156. https://doi.org/10.1016/j.drugpo.2013.05.016
Hartman, D. M., & Golub, A. (1999). The Social Construction of the Crack Epidemic in the Print Media. *Journal of Psychoactive Drugs*, *31*(4), 423–433. https://doi.org/10.1080/02791072.1999.10471772
Henderson, M. (2012). *The Geek Manifesto: Why Science Matters*. London: Corgi.
Hernán, M. A., Hsu, J., & Healy, B. (2019). A Second Chance to Get Causal Inference Right: A Classification of Data Science Tasks. *Https://Doi.Org/10.1080/09332480.2019.1579578*, *32*(1), 42–49. https://doi.org/10.1080/09332480.2019.1579578
Holland: W. (1986). Statistics and causal inference. *Journal of the American Statistical Association*, *81*(396), 945–960. https://doi.org/10.1080/01621459.1986.10478354
Houborg, E., & Asmussen Frank, V. A. (2014). Drug consumption rooms and the role of politics and governance in policy processes. *International Journal of Drug Policy*. https://doi.org/10.1016/j.drugpo.2014.01.008
Hughes, C.E., & Stevens, A. (2010). What can we learn from the Portuguese decriminalisation of illicit drugs? *British Journal of Criminology*, *50*(6), 999–1022.
Hume, D. (1758). *Essays and Treatises on Several Subjects*. Edinburgh: A. Kincaid & A. Donaldson.
Hume, D. (1772). *An Enquiry Concerning Human Understanding*. Edinburgh: T. Capell.
Jessop, B. (2005). Critical realism and the strategic-relational approach. *New Frontiers*, *56*, 40–53.
Keane, H. (2002). *What's wrong with addiction?* Melbourne: Melbourne University Press.
Keane, H. (2012). Editorial: Diagnosing Drug Problems and the DSM. *Contemporary Drug Problems*, *39*(3), 353–370. https://doi.org/10.1177/009145091203900302
Kelly, E., & Rasul, I. (2014). Policing cannabis and drug related hospital admissions: Evidence from administrative records. *Journal of Public Economics*, *112*(August 2013), 89–114. https://doi.org/10.1016/j.jpubeco.2014.01.008
Kelly, M. (2018). Realist research, guidelines and the politics of evidence. In N. Emmel, J. Greenhalgh, A. Manzona, M. Monaghan, & S. Dalkin (Eds.), *Doing Realist Research* (pp. 185–201). London: Sage.
Kingdon, J. (1984). *Agendas, alternatives, and public policies*. Boston: Little, Brown.
Kübler, D. (2001). Understanding Policy Change with the Advocacy Coalition Framework: An Application to Swiss Drug Policy. *Journal of European Public Policy*, *8*(4), 623–641.
Lancaster, K., Seear, K., Treloar, C., & Ritter, A. (2017). The productive techniques and constitutive effects of 'evidence-based policy' and 'consumer participation' discourses in health policy processes. *Social Science & Medicine*. https://doi.org/10.1016/j.socscimed.2017.01.031
Latour, B. (2004). *Why Has Critique Run out of Steam? From Matters of Fact to Matters of Concern*. *Critical Inquiry* (Vol. 30).
Law, J. (2004). *After Method: Mess in Social Science Research*. London: Routledge.
Lawson, T. (1997). *Economics and Reality*. Lonson: Routledge.
Lempert, R. (1974). Toward a Theory of Decriminalization. *University of Michigan Public Law and Legal Theory Working Paper Series*, *209*. https://doi.org/10.2139/ssrn.1662653
Mallatt, J. (2018). The Effect of Prescription Drug Monitoring Programs on Opioid Prescriptions and Heroin Crime Rates. https://doi.org/10.2139/ssrn.3050692
Marchart, O. (2007). *Post-Foundational Political Thought: Political Difference in Nancy, Lefort, Badiou and*

Laclau. Edinburgh: Edinburh University Press.
Marshall, Z., Dechman, M. K., Minichiello, a., Alcock, L., & Harris, G. E. (2015). Peering into the literature: a systematic review of the roles of people who inject drugs in harm reduction initiatives. *Drug and Alcohol Dependence*, *151*, 1–14. https://doi.org/10.1016/j.drugalcdep.2015.03.002
Matthews, R. (2014). *Realist Criminology*. Basingstoke: Palgvrave Macmillan.
May, T. (2017). Engagements, 20th December 2017. *Hansard*, *633*.
Meara, E., Horwitz, J. R., Powell, W., McClelland, L., Zhou, W., O'Malley, A. J., & Morden, N. E. (2016). State Legal Restrictions and Prescription-Opioid Use among Disabled Adults. *New England Journal of Medicine*, *375*(1), 44–53. https://doi.org/10.1056/NEJMsa1514387
Mingers, J. (2004). Real-izing information systems: Critical realism as an underpinning philosophy for information systems. *Information and Organization*, *14*(2), 87–103. https://doi.org/10.1016/j.infoandorg.2003.06.001
Mol, A. (1999). Ontological politics: A word and some questions. In J. Law & J. Hassard (Eds.), *Actor Network Theory and After* (pp. 74–89). Oxford: Blackwell.
Mol, A. (2002). *The body multiple: Ontology in medical practice*. Durham: Duke University Press.
Monaghan, M., & Boaz, A. (2018). Evidence from realist reviews, its influence and impact. In N. Emmel, J. Greenhalgh, A. Manzano, M. Monaghan, & S. Dalkin (Eds.), *Doing Realist Research* (pp. 167–184). London.
Moore, D. (2011). The ontological politics of knowledge production: Qualitative research in the multidisciplinary drug field. In S. Fraser & D. Moore (Eds.), *The Drug Effect: Health, Crime and Society* (pp. 73–90). Cambridge: Cambridge University Press.
Moore, D., & Fraser, S. (2013). Producing the "Problem" of Addiction in Drug Treatment. *Qualitative Health Research*, *23*(7), 916–923. https://doi.org/10.1177/1049732313487027
Moore, D., & Fraser, S. (2015). Causation, knowledge and politics: Greater precision and rigour needed in methamphetamine research and policy-making to avoid problem inflation. *Addiction Research and Theory*, *23*(2), 89–92. https://doi.org/10.3109/16066359.2015.1017571
Moore, T. J., & Schnepel, K. (2017). The Long-term Consequences of a Heroin Supply Shock. Paper presened to *Association of Public Policy Analysis and Management*. Chicago.
Nagelhout, G. E., Hummel, K., De Goeij, M. C. M., De Vries, H., Kaner, E., & Lemmens: (2017). How economic recessions and unemployment affect illegal drug use: A systematic realist literature review. *International Journal of Drug Policy*, *44*, 69–83. https://doi.org/10.1016/j.drugpo.2017.03.013
Neale, J., Brown, C., Campbell, A. N. C., Jones, J. D., Metz, V. E., Strang, J., & Comer, S. D. (2019). How competent are people who use opioids at responding to overdoses? Qualitative analyses of actions and decisions taken during overdose emergencies. *Addiction*, *114*(4), 708–718. https://doi.org/10.1111/add.14510
NTA. (2012). *Estimating the crime reduction benefits of drug treatment*. London: National Treatment Agency for Substance Misuse.
Otten, R., Mun, C. J., Shaw, D. S., Wilson, M. N., & Dishion, T. J. (2018). A developmental cascade model for early adolescent-onset substance use: the role of early childhood stress. *Addiction*, *114*, 326–334. https://doi.org/10.1111/add.14452
Packham, A. (2019). Are Syringe Exchange Programs Helpful or Harmful? New Evidence in the Wake of the Opioid Epidemic. Retrieved February 1, 2019, from https://apackham.github.io/mywebsite/opioidpaper-forweb.pdf
Pardo, B., Caulkins, J. P., Kilmer, B., Care, R. H., Social, R., & Well-being, E. (2018). *Assessing the Evidence on Supervised Drug Consumption Sites*. Santa Monica: RAND Corporation.
Parr, S. (2015). Integrating critical realist and feminist methodologies: ethical and analytical dilemmas. *International Journal of Social Research Methodology*, *18*(2), 193–207. https://doi.org/10.1080/13645579.2013.868572
Pawson, R. (2008). Causality for beginners. Retrieved March 18, 2019, from http://eprints.ncrm.ac.uk/245/
Pawson, R., Greenhalgh, T., Harvey, G., & Walshe, K. (2005). Realist review - a new method of systematic review designed for complex policy interventions. *Journal of Health Services Research & Policy*, *10*(1(supplement)), 21–34. https://doi.org/10.1258/1355819054308530
Powell, D., Pacula, R. L., & Jacobson, M. (2018). Do medical marijuana laws reduce addictions and deaths related to pain killers? *Journal of Health Economics*, *58*, 29–42. https://doi.org/10.1016/J.JHEALECO.2017.12.007
Powell, D., Pacula, R. L., & Taylor, E. (2015). How Increasing Medical Access to Opioids Contributes to the Opioid Epidemic: Evidence from Medicare Part D. *NBER Working Paper 21072*.

https://doi.org/10.1115/FPMC2014-7807
Pratten, S. (2013). Critical realism and the process account of emergence. *Journal for the Theory of Social Behaviour*, *43*(3), 251–279. https://doi.org/10.1111/jtsb.12017
Race, K. (2013). Drugs and Domesticity: Fencing the Nation. *Cultural Studies Review*, *10*(2), 62–84.
Ragin, C. C. (2000). *Fuzzy Set Social Science*. Chicago: University of Chicago Press.
Ragin, C. C. (2008). *Redesigning Social Inquiry: Fuzzy Sets and Beyond*. Chicago: University of Chicago Press.
Rees, D. I., Sabia, J. J., Argys, L. M., Latshaw, J., & Dave, D. (2017). With a little help From my friends: The effects of naloxone access and good samaritan laws on opioid-related deaths. *NBER Working Paper 23171*.
Reeves, C. (2009). Causality and Critical Theory: Nature's Order in Adorno, Cartwright and Bhaskar. *Journal of Critical Realism*, *8*(3), 316–342. https://doi.org/10.1558/jocr.v8i3.316
Reinarman, C. (2005). Addiction as accomplishment: The discursive construction of disease. *Addiction Research & Theory*, *13*(4), 307–320.
Reinarman, C., & Levine, H. (1997). Crack in America: Demon Drugs and Social Justice. Berkeley: University of California Press.
Rhodes, T., & Lancaster, K. (2019). Evidence-making interventions in health: A conceptual framing. *Social Science and Medicine*, *238*, 112488. https://doi.org/10.1016/j.socscimed.2019.112488
Rhodes, T., Azbel, L., Lancaster, K., & Meyer, J. (2019). The becoming methadone body: on the ontopolitics of health intervention translations. *Sociology of Health and Illness.* 41(8):1618-1636.
Rhodes, T., Bivol, S., Scutelniciuc, O., Hunt, N., Bernays, S., & Busza, J. (2011). Narrating the social relations of initiating injecting drug use: Transitions in self and society. *International Journal of Drug Policy*, *22*(6), 445–454. https://doi.org/10.1016/j.drugpo.2011.07.012
Rhodes, T., Lancaster, K., Harris, M., & Treloar, C. (2018). Evidence-making controversies: the case of hepatitis C treatment and the promise of viral elimination. *Critical Public Health*, *1596*, 1–14. https://doi.org/10.1080/09581596.2018.1459475
Ritter, A., & Bammer, G. (2010). Models of policy-making and their relevance for drug research. *Drug and Alcohol Review*.*29*(5):352-357. https://doi.org/10.1111/j.1465-3362.2009.00155.x
Roberts, A. W., Skinner, A. C., Lauffenburger, J. C., Kimberly, A., Roberts, A. W., Skinner, A. C., & Lauffenburger, J. C. (2019). The lock-in loophole : Using mixed methods to explain patient circumvention of a Medicaid opioid restriction program The lock-in loophole : Using mixed methods to explain patient circumvention of. *Substance Abuse*, DOI: 10.1080/08897077.2019.1674239. https://doi.org/10.1080/08897077.2019.1674239
Rogeberg, O. (2004). Taking Absurd Theories Seriously: Economics and the Case of Rational Addiction Theories. *Philosophy of Science*, *71*(3), 263–285. https://doi.org/10.1086/421535
Rogeberg, O., & Melberg, H. O. (2011). Acceptance of unsupported claims about reality: A blind spot in economics. *Journal of Economic Methodology*, *18*(1), 29–52. https://doi.org/10.1080/1350178X.2011.556817
Room, R. (2003). The Cultural Framing of Addiction. *Janus Head*, *6*(2), 221–234.
Ruhm, C. J. (2018). Deaths of despair or drug problems? *NBER Working Paper 24188*.
Rutzou, T. (2017). Finding Bhaskar in all the wrong places? Causation, process, and structure in Bhaskar and Deleuze. *Journal for the Theory of Social Behaviour*, *47*(4), 402–417. https://doi.org/10.1111/jtsb.12138
Rychert, M., & Wilkins, C. (2018). Understanding the development of a regulated market approach to new psychoactive substances (NPS) in New Zealand using Punctuated Equilibrium Theory. *Addiction*, *113*(11), 2132–2139. https://doi.org/10.1111/add.14260
Sabatier:, & Jenkins-Smith, H. (1993). *Policy change and learning: An advocacy coalition approach*. Boulder, CO: Westview Press.
Sarmiento, E., Seear, K., & Fraser, S. (2019). Enacting Alcohol and Other Drug (Testing)-Related Harms in an Australian Drug Court: *Contemporary Drug Problems*, *46*(3), 282–303. https://doi.org/10.1177/0091450919865299
Sayer, A. (2000). *Realism and Social Science*. London: Sage.
Sayer, A. (2005). *The Moral Significance of Class*. Cambridge: Cambridge University Press.
Sayer, A. (2011). *Why Things Matter to People: Social Science, Values and Ethical Life*. Cambridge: Cambridge University Press.
Sayer, A. (2012). Power, causality and normativity: A critical realist critique of Foucault. *Journal of Political Power*, *5*(2), 179–194. https://doi.org/10.1080/2158379X.2012.698898
Schnell, M. (2017). Physician Behavior in the Presence of a Secondary Market: The Case of Prescription Opioids. *Princeton University Working Paper*. https://doi.org/10.1016/0148-9062(81)90265-5

Schnell, M., & Currie, J. (2018). Addressing the opioid epidemic: Is there a role for physician education? *American Journal OfHealth Economics*, *4*(3), 383–410. https://doi.org/10.1162/ajhe
Seddon, T. (2010). *A History of Drugs: Drugs and Freedom in the Liberal Age*. London: Routledge.
Seear, K. (2019). *Law, Drugs and the Making of Addiction*. London: Routledge
Shover, C. L., Davis, C. S., Gordon, S. C., & Humphreys, K. (2019). Association between medical cannabis laws and opioid overdose mortality has reversed over time. *Proceedings of the National Academy of Sciences*, (10.1073/pnas.1903434116). https://doi.org/10.1073/PNAS.1903434116
Sims-Schouten, W., Riley, S. C. E., & Willig, C. (2007). Critical Realism in Discourse Analysis: A Presentation of a Systematic Method of Analysis Using Women's Talk of Motherhood, Childcare and Female Employment as an Example. *Theory & Psychology*, *17*(1), 101–124. https://doi.org/10.1177/0959354307073153
Sismondo, S. (2017). Post-truth? *Social Studies of Science*, *4*(1), 3–6. https://doi.org/10.1177/0306312717692076
Soni, A. (2018). Health Insurance , Price Changes , and the Demand for Pain Relief Drugs: Evidence from Medicare Part D*. Retrieved March 1, 2019, from https://kelley.iu.edu/doc/bloomington/faculty-research/departments/business-economics-public-policy/Aparna-Soni-Health-Insurance-Price-Changes-And-The-Demand-for-Pain-Relief-Drugs.pdf
Stein, B. D., Gordon, A. J., Dick, A. W., Burns, R. M., Pacula, R. L., Farmer, C. M., … Sorbero, M. (2015). Supply of buprenorphine waivered physicians: The influence of state policies. *Journal of Substance Abuse Treatment*, *48*(1), 104–111. https://doi.org/10.1016/j.jsat.2014.07.010
Stenger, I. (2018). *Another Science is Possible: A Manifesto for Slow Science*. London: Wiley.
Stevens, A. (2011a). Sociological approaches to the study of drug use and drug policy. *International Journal of Drug Policy*, *22*(6), 399–403. https://doi.org/10.1016/j.drugpo.2011.10.003
Stevens, A. (2011b). Drug policy, harm and human rights: A rationalist approach. *International Journal of Drug Policy*, *22*(3), 233–238. https://doi.org/10.1016/j.drugpo.2011.02.003
Stevens, A. (2011c). Telling Policy Stories: An Ethnographic Study of the Use of Evidence in Policy-making in the UK. *Journal of Social Policy*, *40*(2), 237–256. https://doi.org/doi:10.1017/S0047279410000723
Stevens, A. (2016). Inequality and adolescent cannabis use: a qualitative comparative analysis of the link at national level. *Drugs: Education, Prevention and Policy*, *23*(5), 410–421. https://doi.org/10.3109/09687637.2015.1136266
Stevens, A. (2019). 'Being human' and the 'moral sidestep' in drug policy: Explaining government inaction on opioid-related deaths in the UK. *Addictive Behaviors*, *90*, 444–450. https://doi.org/10.1016/J.ADDBEH.2018.08.036
Stevens, A., Hughes, C. E., Hulme, S., & Cassidy, R. (under review). Depenalisation, diversion and decriminalisation: a realist review and programme theory of alternatives to criminalisation for simple drug possession. *European Journal of Criminology*.
Swensen, I. D. (2015). Substance-abuse treatment and mortality. *Journal of Public Economics*, *122*, 13–30. https://doi.org/10.1016/j.jpubeco.2014.12.008
Ussher, J. M. (2010). Are we medicalizing women's misery? A critical review of women's higher rates of reported depression. *Feminism and Psychology*, *20*(1), 9–35. https://doi.org/10.1177/0959353509350213
Vale, H. (2010). Addiction – and rational choice theory. *International Journal of Consumer Studies*, *34*(1), 38–45. https://doi.org/10.1111/j.1470-6431.2009.00826.x
valentine, k. (2009). Evidence, values and drug treatment policy. *Critical Social Policy*, *29*(3), 443–464.
Vandenberghe, F. (2019). The normative foundations of critical realism : a comment on Dave Elder-Vass and Leigh Price. *Journal of Critical Realism. 18*(3): 319-336. https://doi.org/10.1080/14767430.2019.1638607
Vogler, J. (2017). Access to Health Care and Criminal Behavior: Short-Run Evidence from the ACA Medicaid Expansions. https://doi.org/10.2139/ssrn.3042267
Wen, H., Hockenberry, J. M., & Cummings, J. R. (2017). The effect of Medicaid expansion on crime reduction: Evidence from HIFA-waiver expansions. *Journal of Public Economics*, *154*, 67–94. https://doi.org/10.1016/j.jpubeco.2017.09.001
Werb, D., Rowell, G., Kerr, T., Guyatt, G., Montaner, J., & Wood, E. (2010). *Effect of Drug Law Enforcement on Drug-Related Violence: Evidence from a Scientific Review*. Vancouver: Urban Health Research Initiative of the British Columbia Centre for Excellence in HIV/AIDS.
Wong, G., Westhorp, G., Pawson, R., & Greenhalgh, T. (2013). Realist synthesis. RAMESES training materials. The RAMESES Project. Retrieved March 1, 2018, from https://www.ramesesproject.org/media/Realist_reviews_training_materials.pdf
Woods-Jaeger, B. A., Cho, B., Sexton, C. C., Slagel, L., & Goggin, K. (2018). Promoting Resilience: Breaking the

Intergenerational Cycle of Adverse Childhood Experiences: *Health Education & Behavior*, *45*(5), 772–780. https://doi.org/10.1177/1090198117752785

Zábranský, T. (2004). Czech drug laws as an arena of drug policy battle. *Journal of Drug Issues*, *34*(3), 661–686.

Zampini, G. F. (2018). Evidence and morality in harm-reduction debates: can we use value-neutral arguments to achieve value-driven goals? *Palgrave Communications 2018 4:1*, *4*(62), 1–10. https://doi.org/10.1057/s41599-018-0119-3