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A new approach to formulating and appraising drug policy: A multi-criterion decision analysis applied to alcohol and cannabis regulation

Ole Rogeberg[a,*], Daniel Bergsvik[a,b], Lawrence D. Phillips[c], Jan van Amsterdam[d], Niamh Eastwood[e], Graeme Henderson[f], Micheal Lynskey[g], Fiona Measham[h], Rhys Ponton[i], Steve Rolles[j], Anne Katrin Schlag[g], Polly Taylor[k], David Nutt[l]

[a] Ragnar Frisch Centre for Economic Research, Norway
[b] Norwegian Institute of Public Health, Norway
[c] London School of Economics and Political Science, United Kingdom
[d] Academic Medical Center (AMC), University of Amsterdam, Netherlands
[e] Release, United Kingdom
[f] University of Bristol, United Kingdom
[g] King's College London, United Kingdom
[h] Durham University, United Kingdom
[i] University of Auckland, New Zealand
[j] Transform Drug Policy Foundation, United Kingdom
[k] Independent Consultant in Veterinary Anaesthesia, United Kingdom
[l] Imperial College London, United Kingdom

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ABSTRACT

Background: Drug policy, whether for legal or illegal substances, is a controversial field that encompasses many complex issues. Policies can have effects on a myriad of outcomes and stakeholders differ in the outcomes they consider and value, while relevant knowledge on policy effects is dispersed across multiple research disciplines making integrated judgements difficult.

Methods: Experts on drug harms, addiction, criminology and drug policy were invited to a decision conference to develop a multi-criterion decision analysis (MCDA) model for appraising alternative regulatory regimes. Participants collectively defined regulatory regimes and identified outcome criteria reflecting ethical and normative concerns. For cannabis and alcohol separately, participants evaluated each regulatory regime on each criterion and weighted the criteria to provide summary scores for comparing different regimes.

Results: Four generic regulatory regimes were defined: absolute prohibition, decriminalisation, state control and free market. Participants also identified 27 relevant criteria which were organised into seven thematically related clusters. State control was the preferred regime for both alcohol and cannabis. The ranking of the regimes was robust to variations in the criterion-specific weights.

Conclusion: The MCDA process allowed the participants to deconstruct complex drug policy issues into a set of simpler judgements that led to consensus about the results.

Introduction

Substance use can cause harms to individuals and societies, but opinions differ regarding how these harms are best reduced. Such opinions will also reflect how we view trade-offs, as policies need to balance the harms of use against negative consequences of restrictive policies and the pleasures and benefits that the majority of users may claim to experience. Over time, and across regions, policies – even for the same substance – have ranged from strict prohibitions criminalising production and consumption to relatively unregulated commercial markets. In recent years, policy changes in US states, Uruguay and Canada have fuelled a growing debate on whether cannabis supply and

* Corresponding author at: Ragnar Frisch Centre for Economic Research, Gaustadalléen 21, 0349 Oslo, Norway.
E-mail addresses: ole.rogeberg@frisch.uio.no (O. Rogeberg), daniel.bergsvik@fhi.no (D. Bergsvik), larry_phillips@msn.com (L.D. Phillips), jan.van.amsterdam@amc.uva.nl (J. van Amsterdam), niamh@release.org.uk (N. Eastwood), graeme.henderson@bris.ac.uk (G. Henderson), michael.lynskey@kcl.ac.uk (M. Lynskey), f.measham@durham.ac.uk (F. Measham), r.ponton@auckland.ac.nz (R. Ponton), steve@tdpf.org.uk (S. Rolles), anne.schlag@kcl.ac.uk (A.K. Schlag), polly@taylormonroe.co.uk (P. Taylor), d.nutt@imperial.ac.uk (D. Nutt).

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Participants	
Dima Abdulrahim	Addiction and Offender Care Directorate, Central and Northwest London NHS Foundation Trust
Jan van Amsterdam	Amsterdam Academic Medical Center (AMC)
Roland Archer	Analytical Laboratory, Guernsey (first conference only)
Daniel Bergsvik	Norwegian Institute of Public Health, Oslo, Norway
Niamh Eastwood	Executive Director, Release
Graeme Henderson	Professor of Pharmacology, Bristol University
Tom Lloyd	Independent drugs policy advisor, former Cambridgeshire chief police constable
Michael Lynskey	Professor of Addictions, National Addictions Centre, King's College London
Fiona Measham	Professor of Criminology, Durham University
Ole Rogeberg	Ragnar Frisch Centre for Economic Research, Oslo, Norway
Steve Rolles	Senior Policy Analysts, Transform Drug Policy Foundation
Jeremy Sare	Director for Government Affairs and Communications, Angelus Foundation (first conference only)
Anne Schlag	Senior Researcher, King's Centre for Risk Management (first conference only)
Janie Sheridan	Professor, Centre for Addiction Research, University of Auckland, New Zealand
Polly Taylor	Independent consultant in Veterinary Anaesthesia
Tim Williams	Consultant addiction psychiatrist, NHS
Rhys Ponton	School of Pharmacy, University of Auckland, New Zealand (second decision conference only)
Facilitators	
David Nutt	Professor of Neuropsychopharmacology, Imperial College London
Larry Phillips	Emeritus Professor, London School of Economics, and Director, Facilitations Ltd

Panel 1. Facilitators and participating experts in the drug policy MCDA workshop.

consumption should be legalised and, if so, how strictly it should be regulated (Caulkins & Kilmer, 2016; Hawken, Caulkins, Kilmer, & Kleiman, 2013; Room, 2014; Uchtenhagen, 2014). The appropriate balance between "free market" and "government control" also remains an issue for alcohol, with a current example being the debate over minimum unit pricing (Holmes et al., 2014; Stockwell, Auld, Zhao, & Martin, 2012). Public health arguments are frequently emphasised in these discussions (Hall & Degenhardt, 2009; Hall & Lynskey, 2016; Room, Babor, & Rehm, 2005) with a particular focus on adolescent use (Hasin et al., 2015; Simons-Morton, Pickett, Boyce, ter Bogt, & Vollebergh, 2010), while other concerns include social consequences (Klingemann & Gmel, 2001; Laslett et al., 2011) and crime and criminalisation (Csete et al., 2016a; MacCoun & Reuter, 2001).

Identifying an optimal policy for a substance involves three conceptually distinct steps: I) defining the available policy options, II) defining the outcomes of importance and the criteria against which policies should be evaluated, and III) assessing each policy option against each criterion, taking into account how the policy will influence the relevant outcomes.

This is a cognitively complex task: criteria need to reflect the concerns of a broad set of policy stakeholders including not just health and legal experts but also people who use drugs, their neighbours, and the broader national and international society. Judgments regarding the impact of regulatory regimes on outcomes involve assembling knowledge from a broad set of disciplines including medicine, economics, criminology and sociology. Trade-offs between different outcomes require the combination, weighting and integration of judgments across all concerns.

Faced with complex issues, individuals will often answer a simpler substitute question or problem using mental rules of thumb (heuristics) instead, usually without noticing the substitution (Kahneman, 2011). Given the complexity of drug policy, this means that surveys of people's opinions are unlikely to uncover well-constructed, informed preferences: the responses will most likely ignore choice options, disregard most concerns or outcomes, depend on prior beliefs and easily available information, and attempt to avoid facing trade-offs (Payne, Bettman, Schkade, Schwarz, & Gregory, 1999). In addition, people's stated beliefs regarding the effects of different drug policies may themselves serve primarily as expressions of cultural and political identity (Kahan, 2016a, 2016b). As a result, individuals are likely to express policy views that are sensitive to decision-irrelevant factors, and potentially based on false beliefs regarding both the consequences of drug use (benefits, risks and harms) and the likely consequences of drug policy regimes.[1]

Structured decision making processes can be thought of as tools developed to help individuals and groups develop "well-constructed preferences." These are defensible, considered judgments arrived at through a structured, systematic process designed to assist decision-makers in clarifying options and choice criteria, breaking complex judgments down into simpler issues, and helping participants access and integrate relevant information.

This study aimed to develop an analytical framework to describe, assess and discuss different drug regulatory regimes for a Western context (Western Europe and North-America). To do this, we convened a decision conference over two one-and-a-half day sessions to run a multi-criterion decision analysis (MCDA), an established and well-researched decision making process (Phillips, 2007) previously applied to subjects ranging from nuclear waste management (Morton, Airoldi, & Phillips, 2009) to the risk-benefit ratio of prescription drugs (Hughes et al., 2016). Participants were experts on the harms of drugs, addiction, criminology and drug policy. Employing the MCDA process, the participants defined policy options and assessment criteria, and evaluated each policy option on each criterion for different drugs. By combining data and expert judgments to assess real and hypothetical policy states, this new approach can contribute to the literature on comparative policy analysis (Ritter, Livingston, Chalmers, Berends, & Reuter, 2016).

Methods

Study design

Expert participants with varied relevant backgrounds (Panel 1) attended two MCDA sessions (September 10–11th 2015, January 20–21st 2016) to compare alternative drug policies in a Western context. The sessions were facilitated by Lawrence Phillips, an independent specialist in decision analysis modelling, and David Nutt, a medical researcher, and employed decision making software (LSE/Catalyze, 2016) to build, refine and score a model which was projected on a screen in full view of all participants.

[1] Arguably, government decision-making suffers from similar issues, with drug policies ignoring established research (Rogeberg, 2015) unless it conforms to implicit and unstated assumptions (MacCoun & Reuter, 2008). Stevens (2011) provides an ethnographic study of how "evidence" is used selectively to support persuasive policy stories in line with unstated ideological principles – see also Stevens and Measham (2014).

Table 1
Policy criteria and their definitions.

Cluster	Criterion	Definition
Health	Reduces user harms	Prevents medical harms to a user resulting from consumption of intended substance; includes blood-borne viruses (BBV)
	Reduces harms to others	Prevents health harms (including BBVs) to third parties due to either indirect exposure (e.g., second hand smoking) and behavioural responses to consumption (e.g., injury due to alcohol induced violence)
	Shifts use to lower-harm products	Decreases consumption of more harmful substances or increases consumption of less harmful substances (e.g., cannabis prohibition leading to synthetic cannabinoids)
	Encourages treatment	Encourages treatment of substance-use problems
	Improves product quality	Assures the quality of products due to mislabelled or counterfeit/adulterated product, unknown dose/purity
Social	Promotes drug education	Improves education about drugs
	Enables medical use	Policy does not impede medical use
	Promotes/supports research	Policy does not impede research
	Protects human rights	Policy does not interfere with human rights as distinct from the individual's right to use.
	Promotes individual liberty	Policy does not interfere with individual liberty (individual's right to use)
	Improves community cohesion	Policy does not undermine social cohesion in communities
	Promotes family cohesion	Policy does not undermine family cohesion
Political	Supports international development/ security	Policy does not undermine international development and security
	Reduces industry influence	Impedes drug industry influence on governments (less lobbying is preferable)
Public	Promotes well-being	Promotes social and personal well-being
	Protects the young	Protects children and young people
	Protects vulnerable	Protects vulnerable groups other than children and young people
	Respects religious/cultural values	Respects religious or cultural values
Crime	Reduces criminalisation of users	Does not criminalise users
	Reduces acquisitive crime	Reduces acquisitive crime to finance use
	Reduces violent crime	Reduces violent crime due to illegal markets
	Prevents corporate crime	Prevents corporate crime, e.g. money-laundering, tax evasion
	Prevents criminal industry	Extent to which the policy discourages illegal market activity
Economic	Generates state revenue	Generates state revenue
	Reduces economic costs	Reduces public financial costs not directly related to the enforcement policy (e.g., spillover effects on health policy budgets)
Cost	Low policy introduction costs	Financial costs of introducing the policy
	Low policy maintenance costs	Financial costs of enforcing the policy

The MCDA process provides a flexible framework for comparing policy options in terms of their expected impact on valued outcomes in complex situations with limited knowledge. An MCDA model a) lists and defines a set of concerns that a policy should address, b) lists and defines a set of policy options to compare, c) assesses how the different policy options address the concerns, and d) specifies the relative importance of the different concerns. Both data and expert judgments can be used, with expert judgments elicited where data are inadequate or missing. As a result, MCDA models are often best developed in facilitated workshops with issue experts, exposing claims and judgments to multiple perspectives and providing an internal "peer-review" and a structured process for resolving differences in perspective.

At the first two-day meeting, participants developed a set of criteria for assessing drug policy outcomes, defined a set of four generic drug regulatory regimes, and piloted the decision model by applying it to alcohol. Following this first meeting, a summary document was produced and distributed to the participants, who were encouraged to reflect on the outcome and consider possible refinements to the policy regimes and criteria. At the second two-day meeting, participants refined the decision model further, and decided to begin with a re-assessment of alcohol before moving on to cannabis. Finally, the same model was applied to heroin, for which results will be reported in a follow-up paper.

Defining outcome criteria and drug regulatory regimes

Participants were presented at the first meeting with a preliminary strategy table of policy options, developed to focus initial discussions (see table S1 in supporting materials). Working in groups, participants assessed how societal outcomes would be affected by different levels of control/regulation for alcohol and tobacco as contrasted to heroin and cannabis. Based on these group inputs, participants collectively extracted and refined a set of criteria against which drug policies could be appraised. These reflected different ethical and normative concerns held by participants and often familiar from ongoing policy debates, and resulted in 27 criteria grouped into seven thematic clusters (Table 1). The cluster headings served as prompts that helped participants identify a complete set of criteria within each heading. The headings also reduced the cognitive complexity of a later stage in the process where participants specified the relative weight of different criteria.

Based on the established criteria and the discussions about the policy strategy table, participants next defined a set of four regulatory regimes differing in both the legal status of the drug and its use, the balance of state regulation and commercialisation in legal markets, and the type and intensity of punitive sanctions.

After reflecting on the outcomes from the pilot results from the first session, participants refined the policy regimes and criteria at the start of the second meeting. One outcome was that all criteria were reworded to avoid reverse scoring. For instance, the criteria "harms to user", which deals with the medical harms resulting from the use patterns expected under a given regulatory regime, was specified as "prevents medical harms".

Scoring policy regimes on the criteria

The four separate policy regimes were evaluated in two separate stages for each substance assessed: scoring the policy regimes on each criterion separately, and then adjusting the weights across different criteria to reflect their relative importance. This makes the units of measurement comparable, which enables trade-offs across different concerns.

For any single criterion, for example "health harms to users", the four policy regimes were scored from 0 (least preferred option) to 100

Absolute prohibition: Production, distribution, possession and use are illegal under criminal law, and the laws are actively enforced. Policies within this class may differ as to the strictness of penalties, the relative emphasis of enforcement efforts, as well as the type of police procedures used in investigation (e.g., entrapment, surveillance, interception of personal communications, requirements for "probable cause" before demanding house searches or drug tests).

Decriminalisation: Production and distribution remain illegal. Use and possession are a civil offence, but may be subject to fines, or result in recommendations to voluntarily enter treatment (without threat of criminal sanctions for non-compliance). E.g. Portugal. Policies within this class may differ as to the strictness and enforcement of remaining penalties, in the degree of enforcement of supply-side control efforts, or in the particular groups targeted by enforcement (e.g., adolescents, minorities).

'Decriminalisation' is not a strictly defined legal term, but its common usage in drug policy (and the definition used here) refers to the removal of criminal sanctions for possession of small quantities of currently illegal drugs for personal use, with optional use of civil or administrative sanctions. Under this definition of 'decriminalisation', possession of drugs remains unlawful and a punishable offence (albeit not one that results in a criminal record).

State control: There are legal options available for users to access the substance, possess and use it, but a variety of regulatory interventions may be applied to structure the market and shape the levels and type of use: Age limits, state controlled production and sales, legal non-commercial home production, regulations on where, when and by whom consumption is legal, taxation, advertising and marketing restrictions, etc. Policies within this class may differ as to which regulatory instruments they employ and in what way, but a substantial share of users are able to access and use the substance without involving either themselves or others in illegal activity.

Free market: Production, distribution, possession and use are not subject to any specific regulatory policies beyond those that apply in general to consumer goods within a modern market economy (e.g., accurate content declarations, absence of fraud, payment of taxes). No additional taxes or restrictions apply beyond those that apply to all goods (e.g., VAT) beyond age limits.

Panel 2. Definitions of alternative regulatory regimes from drug policy MCDA.

(most preferred option). This defined an interval scale that was used to assess the remaining two policy regimes. To illustrate: if three policies are scored at 0, 80 and 100, this means that moving from the first of these to the second (an increase of 80 points) is valued four times as much as moving from the second to the third (an increase of 20 points). In this way, each criterion-specific scale measures the relative strength of preference across the four policies.

The scoring process asked participants to «think, reveal, discuss» (Gustafson, Shukla, Delbecq, & Walster, 1973), such that participants first made an independent judgment before engaging in a discussion converging on a common judgment. If a participant disagreed with the collective judgment, they were asked to record their concern so that the importance of this disagreement for overall evaluations could be assessed at a later stage in the process. In practice, this part of the process involved lengthy discussion converging to consensus.

Weighting of the criteria

Some criteria matter more than others, either because they reflect more highly valued outcomes, or because the outcomes they consider vary more across policies. Each criterion-specific scale in the decision model was, therefore, weighted to reflect relative importance.

At the beginning of the weighting process, each criterion has its own 0–100 scale. A shift from 0 to 100 on one scale may be valued quite differently to a 0 to 100 shift on another scale, just as a difference of ten on the imperial scale (inches) fails to match a difference of ten on the metric scale (centimetres). To make scores on different scales comparable, the different scales are converted to a single standard. This was performed in two steps – first within and then across criteria clusters (shown in Table 1). In each case it involved a compound judgment on how strongly some outcome differed across policies, and on how important this outcome was relative to others.

Consistency checking was an important part of this process, by changing the specific comparisons made and assessing weights assigned at earlier stages. For instance, if two scales have both been scaled to 0–20 at earlier stages in the weighting, participants may be asked whether the shift from "worst to best" on these two criteria seem comparable. In this way, the MCDA process works to increase the consistency of judgments made at different stages of the process.

Results

Regulatory regimes

The group developed four policy regimes: absolute prohibition, decriminalisation, state control and free market (Panel 2). These were intended to encompass a broad spectrum of general approaches to controlling drugs that are deployed in practice. The regimes were defined in terms of the type of policy tools employed and available within each regulatory regime. We avoided more detailed specification of how the available policy tools would be applied to retain flexibility and make the regimes generally applicable across different drugs. For instance, requiring that «state control» involve restrictions to reduce «second hand smoking» might make sense for cannabis, but not alcohol.

Drug policy evaluation criteria

The refined model finalised during the second session involved 27 criteria, organised into seven thematically related clusters (Table 1). The criteria represent an attempt to recognise desirable and undesirable consequences of drug use, drug markets and drug policies, from the perspective of users, their surroundings and broader society.

Policy evaluations for alcohol and cannabis

Overall preference values for each of the four regulatory regimes,

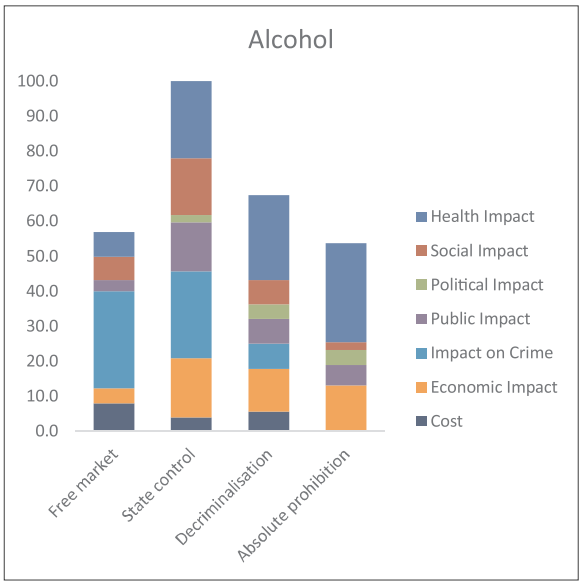

Fig. 1. Alcohol–Overall preference values across regimes. Displays weighted advantages.

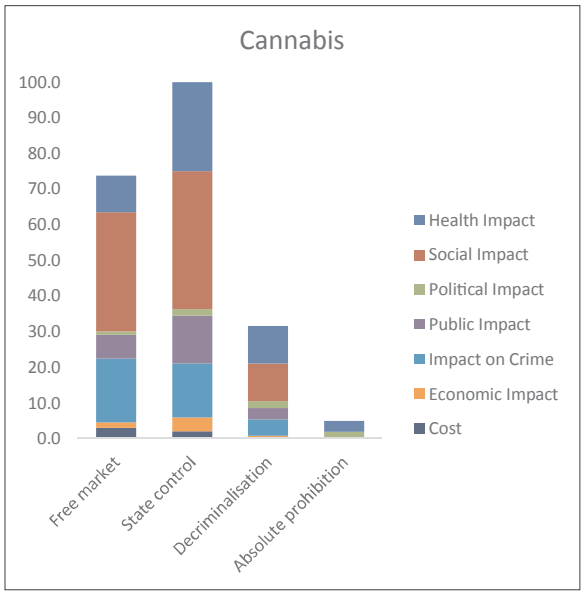

Fig. 2. Cannabis–Overall preference values across regimes. Displays weighted advantages.

scored on a 0–100 scale, are shown in Figs. 1 and 2 respectively. These show the relative preference weight for regulatory regimes for each drug respectively, but are not comparable across substances as the preference scales are substance specific and not equated across the substances. For both substances, state control was the most preferred and absolute prohibition the least preferred regulatory regime, whereas a free market was preferred over decriminalisation for cannabis, but not alcohol. Reasons for these differences are discussed below (see "Evaluation of policies" in "Discussion" section).

To better understand these overall judgments, we compared two policy regimes and identified the specific criteria that made a difference. As shown in Fig. 1 for alcohol, there was a 35-point difference between the total scores for absolute prohibition and state control. This overall difference in scores can be broken down into the differences on each of the criteria – expressed in terms of the weighted preference units. These scores are shown in Fig. 3, which orders the 27 criteria by the extent to which they tilt the overall judgment for alcohol policy towards state control relative to absolute prohibition: the four strongest factors are the avoidance of criminalising users, the generation of state revenues, the avoidance of a criminal industry, and better community cohesion. These four contribute 75% of the 35-point difference favouring state control over prohibition. Since prohibition was expected to reduce consumption, however, both medical harms to users, economic impacts (e.g., health care costs) and harm to others (e.g., alcohol induced violence or drunk driving) pull in favour of prohibition. In addition, prohibition was seen as favoured on the criteria of reducing industry influence on the state.

For cannabis (Fig. 4), the four strongest factors favouring state control over absolute prohibition were improved community cohesion, reduced harms from more harmful substances (e.g. synthetic cannabinoids or "spice"), medical use and family cohesion. These four, however, contributed only 35% of the weighted difference score, as a larger number of criteria contributed substantially in the direction of state control relative to that seen for alcohol. The judgments for cannabis also differed in that only one criterion was seen as favouring absolute prohibition over state markets (less industry influence).

A second contrast compares state control with free market regimes. In this comparison, the criteria that pull towards state control are more similar across the two substances although their relative importance differs somewhat (see Figs. S1 and S2 in Supplementary information). For both, however, important benefits of a state control regime relative to a free market is that state control was judged to reduce harm to users, protect children and the young as well as vulnerable groups, improve family and community cohesion, and generate state revenue. The criteria that pulled overall judgments towards a free market were similar for cannabis and alcohol, in that a state control regime costs more to implement, criminalises some users and may lead to some illicit supply that circumvents taxes and regulations.

A third contrast compares state control to a decriminalisation regime. As in the comparison with absolute prohibition, the benefits of state control are more concentrated in a few outcome dimensions for alcohol relative to what we see for cannabis (see Figs. S3 and S4 in Supplementary information). For alcohol, the net benefit of state control in this comparison is 25 points, and the top four categories collectively contribute 19 points – about 75% of the net benefit. For cannabis, the net benefit of state control is 63 and the top four categories collectively contribute only 22–or less than a third of the net benefit. The ranking of the categories in this comparison are similar to what was seen in the comparison of state control and absolute prohibition.

Sensitivity analyses

Alcohol policy was assessed twice: during the first session and again during the second with revised criteria and regulatory regime definitions. The rescoring and reweighting of regulatory regimes for alcohol were undertaken without reference to the initial scores. The judgments made on the two separate occasions resulted in largely similar scores across free market (35 on the first occasion vs 43 on the second), state control (77 vs 76), decriminalisation (55 vs. 51) and absolute prohibition (40 vs. 41).

These overall scores are calculated using the relative weights assigned to the different criteria. This allows us to assess sensitivity of the results by examining how sensitive the policy ranking is to changes in the criteria weights. This can be done using the swing weight, defined as the value difference of moving from the least to the most preferred policy on a specific criterion, measured on the normalised, common scale. If a swing weight is doubled, this means that the criterion becomes twice as important relative to the other concerns. In this way, we can ask "how much more weight would someone have to give some criterion in order for the overall ranking of policy regimes to change?"

Changes in the swing weight can be assessed for either individual criteria (e.g., harms to user) or for clustered criteria (e.g., all five health outcomes collectively).

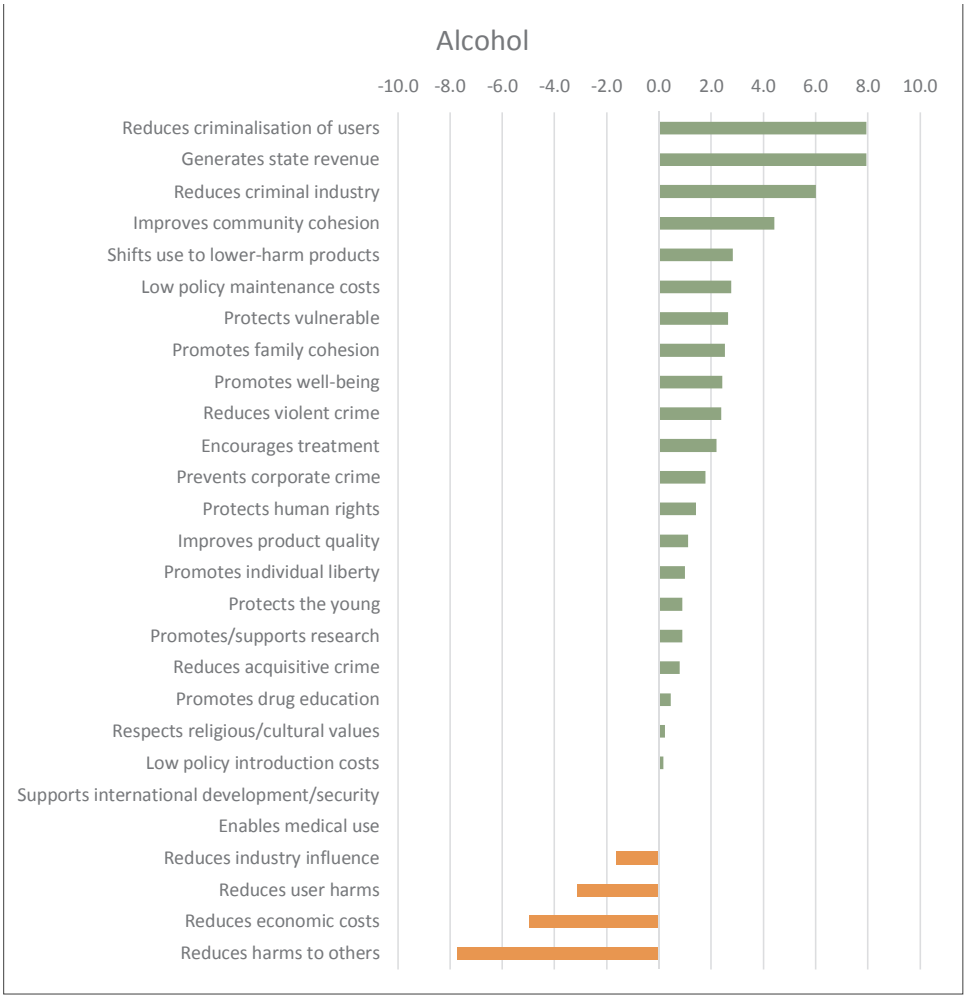

Fig. 3. Alcohol–Comparison of state control to absolute prohibition. The criteria (as defined in Table 1) sorted for alcohol in order of the advantages of State control over absolute prohibition, as given by the weighted difference between their input scores. The green bars show the magnitude of the impacts favouring State control, while the red bars favour prohibition. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Starting with the assessment of criteria clusters, the free market would become the preferred policy alternative if the relative importance of economic costs was increased six-fold or if the weighting of crime fourfold. By contrast, roughly tripling the weight given to health impact (from a swing weight of 28 to 80) would make absolute prohibition preferable. Adjusting the weight on the remaining categories (social impact, public impact and economic impact) did not affect the overall preference for state control.

For cannabis, the only preferences able to shift the preferred policy were the preferences for concerns relating to either crime or costs. The free market would become preferable to state control if the weight on crime was quadrupled or if costs were given 15 times its current weight.

Sensitivity analyses were also performed on the weight for each of the 27 individual criteria, showing similar results, with state control remaining the preferred option even over large increases in the weight for any criterion.

Discussion

Criteria for assessing drug policy

Individuals and stakeholder groups will differ in the weight they give to different concerns and values when assessing drug policies. The discussions amongst the participants highlighted that many of these issues have a significant moral dimension. Scientists, in the words of a public health oriented review of drug policy research, “have no more standing than anyone else in a society to say which specific outcomes a society should care about the most, or whether such outcomes are bad, good, or indifferent” (Babor, 2010, p. 251).

The list of 27 criteria developed in the MCDA process should be seen in this light: they represent an attempt to list exhaustively the main concerns and values raised in drug policy debates, while recognising that different individuals or groups may care more about different subsets or differ in their relative weighting of criteria.

In the decision-making process, the main purpose of these criteria is to help break a complex judgment down into a series of judgments on smaller, more easily assessed issues. In facing complex decisions, there is a risk that individuals pick a very small set of criteria as “the most important” and use these exclusively to evaluate options (Payne, Bettman, & Johnson, 1993). This may lead to extreme solutions that fail to address the full set of relevant trade-offs. For example, focusing too narrowly on prevalence of use might lead to strict prohibition, harsh penalties, and an over-emphasis on abstinence-based interventions over harm reduction. Focusing only on personal liberty, on the other hand, might lead to laissez faire policies with large increases in harmful use, dependence, and their concomitant consequences for health, families and communities.

In addition, the criteria list has a broader utility beyond the decision-making process. First, the list can help prompt researchers to address a larger set of outcomes when assessing the likely consequences of different policies. This can mitigate the risk that researchers focus largely on the concerns and values emphasised in their own fields, social

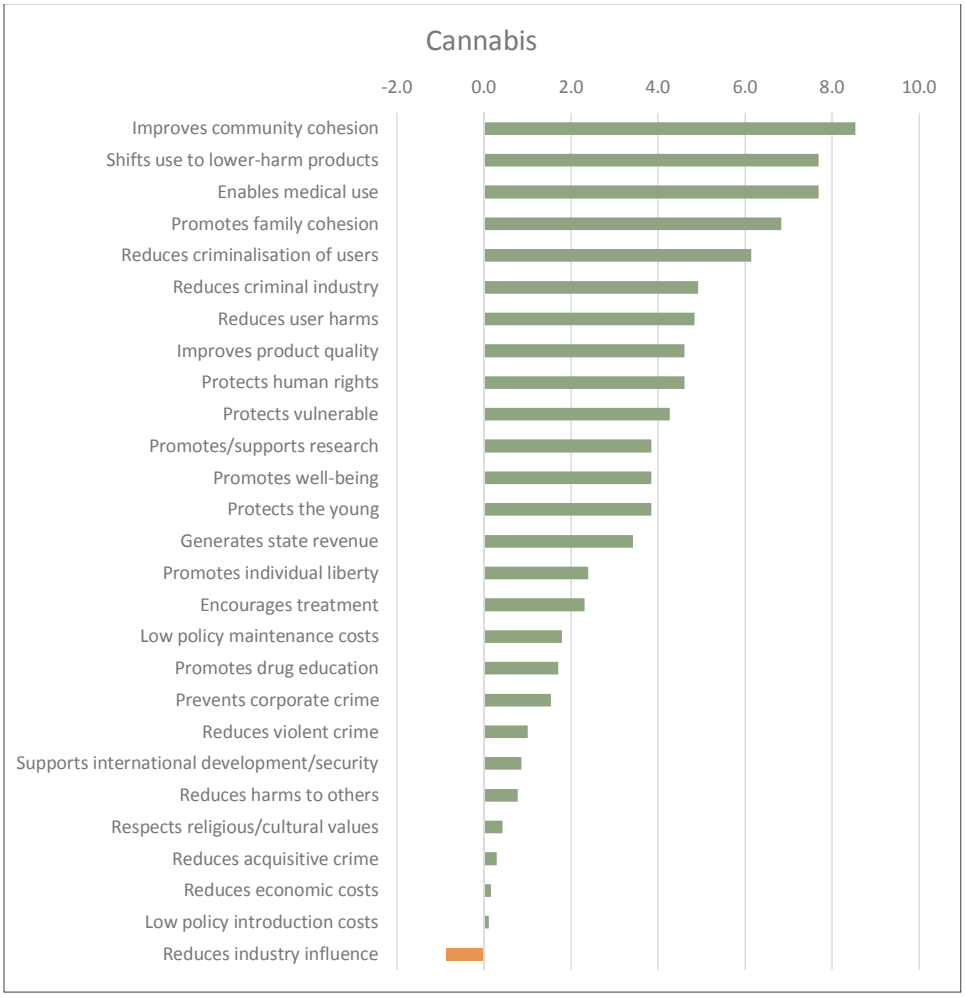

Fig. 4. Cannabis–Comparison of state control to absolute prohibition. The criteria (as defined in Table 1) sorted for cannabis in order of the advantages of State control over absolute prohibition, as given by the weighted difference between their input scores. The green bars show the magnitude of the impacts favouring State control, while the red bar favours prohibition. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

groups or by their funding sources, which could influence the conclusions and implications drawn from the research base (Rogeberg, 2015).

Second, the criteria list may assist ongoing efforts to improve the empirical indicators used to assess and monitor ongoing policy efforts. These have been criticised as being narrow and focused on prevalence of use (LSE, 2016; Reuter, 2013), and proposals drawing on different frameworks have been proposed (Longshore, Reuter, Derks, Grapendaal, & Ebener, 1998; MacCoun, Reuter, & Schelling, 1996; Sevigny & Saisana, 2013). The criteria list could serve as an alternative framework from which to develop a set of indicators, or alternatively as a checklist for assessing the coverage of proposed indicator sets.

Evaluation of policies

Through the MCDA process, the expert panel concluded that a regulatory regime with legal but regulated access would offer the best approach to reducing the overall net harms from alcohol and from cannabis use in Western European societies. Applied to the UK, for example, this would imply a stricter regulation of alcohol, with stronger emphasis on regulatory controls such as those supported by the World Health Organization (WHO): higher taxes, limited marketing and state owned or regulated sales outlets (WHO, 2010). Cannabis, on the other hand, would be shifted from strict prohibition into a legalised but similarly restrictive regulated regime to that recommended for alcohol.

These results have obvious and important implications for current debates regarding the future of cannabis and alcohol policy. For alcohol, the conclusions are in line with existing recommendations from public health agencies and the medical establishment (Babor et al., 2003; WHO, 2010). For cannabis, public health researchers have typically refrained from suggesting legalisation (e.g., Babor, 2010), though this may be changing (Csete et al., 2016b; Godlee & Hurley, 2016). Our analysis suggests that the issues are similar and the conclusion the same for alcohol and cannabis. The asymmetry in how these topics are treated may reflect the current status quo: whereas alcohol tends to be available through commercialised legal markets with excessive use and health impact, cannabis tends to be available through criminal markets with lower use but harms from criminalisation. Since the main benefits to liberalising cannabis policy are a reduction in non-medical harms (e.g., criminalisation), this policy change may go “against the grain” of a public health approach focused on health harms.

Although state control was the preferred option for both drugs, the results indicate that legal access regimes (i.e. free market and state control) were more consistently and clearly preferred for cannabis than for alcohol. This reflects the greater harms to self and others resulting from alcohol use relative to cannabis (Nutt, King, & Phillips, 2010), which means that increased consumption within a free market would be more harmful and damaging for alcohol than for cannabis. This difference in harm had a broad impact across the criteria clusters covering health, public and economic impacts. For cannabis, participants expected legal access regimes to see consumption shift from smoking to less harmful delivery systems involving edibles, vaporisers and «e-cigarettes», a shift away from low-CBD/high THC variants thought to

involve higher health risks, and a reduction in use of more harmful «synthetic» cannabinoids. These effects would to some extent counteract harms from potentially increased consumption expected under legal access regimes.

Limitations

The outcome of an MCDA process is necessarily influenced by the participant group, their knowledge and beliefs, though past research has found that answers from different groups of experts correlate highly when addressing the same question. Strikingly, a replication of the MCDA drug harm ratings using European experts to partially rescore and completely reweight a model previously scored in a UK context reported a correlation of the overall rankings of 0.99 (van Amsterdam, Nutt, Phillips, & van den Brink, 2015).

Since the current process was applied to an often-contentious policy question, the results may to some extent reflect the specific composition of the group. Ideally, such a group should contain representatives from the "full" set of relevant research disciplines (to ensure that different parts of the knowledge base are represented and drawn on in the discussion), as well as representatives from important stakeholder groups (to ensure that different policy preferences and concerns are represented and reflected in the final result). Identifying the set of concerns and the domains of expertise required, however, was in itself part of what the workshop was aiming to do. This means that our participant panel to some extent represents a "convenience panel" of experts and stakeholder representatives given the constraints of our budget and project timeline. Future studies may consider using the identified concerns and issues to implement a more structured and systematic recruitment of relevant participants.

It is worth noting, however, that the conclusions reached are similar to those reported from an interdisciplinary group of 19 Canadian experts and knowledge users (Kirst et al., 2015). Discussing a common public-health oriented framework for cannabis, alcohol and cigarettes, the Canadian group note the importance of balancing the social harms of criminalisation with the harms of use, and argue that "state-centred legal regulation" seemed to provide the best regulatory approach. A related exercise from a group of US-based researchers restricted themselves to considering alternative legal regimes for cannabis, arguing strongly for a regime with strong government regulation (Pacula, Kilmer, Wagenaar, Chaloupka, & Caulkins, 2014).

A larger and more expansive MCDA process could assess this issue further by involving a larger group of experts and stakeholder groups. The UK Committee on radioactive waste management (CoRWM) may serve as an illustration of such an approach (Morton et al., 2009). In this process, the public were consulted about their issues and concerns, experts for each cluster of criteria translated the public's views into workable criteria. The scoring was undertaken by relevant experts, while the criteria weights were set by the CoRWM committee members, taking account of swing-weights generated by different constituencies (old people, young people, nuclear activists, etc.). While we would welcome a similar approach on the drug policy issue, this was beyond the scope of the current study.

Finally, the evaluation of the policies involved a combination of normative judgments, dealing with values, and positive judgments, dealing with facts and mechanisms operating in the world. Put differently, the MCDA process attempts to answer the question: What would be the likely outcomes under the different policies considered, and which of these outcomes would be preferable to others – and by how much? This makes it difficult to disentangle the role played by the expert judgments regarding policy consequences from that played by the normative judgments of the participant group: two individuals may score the same policy differently on a specific criterion either because they disagree on the effects the policies would have in practice, or because they agree on the effects but disagree on the importance these effects should be given when deciding on a policy. Ideally, the two issues should be separated fully so that the assumptions regarding consequences could be surfaced. This could be achieved by first developing a set of concise, written scenarios that describe, for specified substances, the consequences and risks of each of the four regulatory regimes for outcomes relevant to the different criteria. Based on these, different participant groups reflecting different stakeholders could make their own normative judgments on each of the criteria and weight these in accordance with their own ethical judgments.

Conclusions

We convened a decision conference over two one-and-a-half day sessions, where a group of experts on the harms of drugs, addiction, criminology and drug policy were led through a facilitated multi-criteria decision analysis (MCDA) of drug policy in a Western context. This is a process designed to help groups pool knowledge, deconstruct complex issues into simpler judgments, and reconstruct overall judgments in a way that promotes consistency, full consideration of all concerns and alternatives, and a rigorous treatment of trade-offs.

The participants generated a list of 27 criteria for assessing drug policies, identifying a comprehensive set of ethical concerns held by the group and familiar from broader drug policy debates. Using these, the group defined four regulatory regimes – full prohibition, decriminalisation, state control and free markets – and evaluated these four regimes on the 27 criteria for alcohol and cannabis separately. By normalising the 27 criterion-scales to a common scale, the "good" and "bad" aspects of the different policies could be compared and summed, leading to an overall judgment that in both cases favoured state control. This involved a departure from common policies implemented today: for alcohol, the participant group preferred a stricter regulatory regime with more regulation and government control than most countries have today. For cannabis, however, a similarly strict regulatory regime involves a less restrictive policy than the decriminalisation and strict prohibition approaches that are currently in place.

Contributors

OR and DB acquired the funding from the Norwegian Research Council. OR, DB, DN, SR and LP jointly designed the study, OR, DB, DN and LP drafted the first and subsequent versions of the manuscript. DN and LP facilitated the decision conference. AKS helped organising the decision conference and contributed along with the remaining authors in critically revising drafts of the manuscript. All authors have participated in the decision conference, data analysis and interpretation of results, and have approved the final version of the manuscript for publication.

Declaration of interest

FM is the director of The Loop not-for-profit CIC providing drug and alcohol services. SR is employed by Transform Drug Policy Foundation, a UK-registered charity with a campaigning remit focusing on drug policy and law reform, specifically including establishing a just and effective system of regulation for currently illegal or unregulated drugs. The remaining authors have nothing to disclose.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.drugpo.2018.01.019.

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