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Understanding global patterns of domestic cannabis cultivation

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Abstract

Purpose: Unlike other plant-based drugs, cannabis is increasingly grown within the country of consumption, requires minimal processing before consumption, and can be easily grown almost anywhere using indoor or outdoor cultivation techniques.

Developments in agronomic technologies (e.g., grow-lights, hydroponics, nutrient delivery systems) have led to global growth in domestic cultivation, both by cannabis users for self- and social-supply, and by more commercially-oriented growers. Cross-national research is needed to better understand who is involved in domestic cultivation, the diversity in cultivation practices and motivations, and cultivators' interaction with the criminal justice system and cannabis control policies.

Design/methodology/approach: This article introduces the Global Cannabis Cultivation Research Consortium (GCCRC), describes its evolution and aims, and outlines the methodology of our ongoing cross-national online survey of cannabis cultivation.

Findings: Despite differing national contexts, the GCCRC successfully developed a core questionnaire to be used in different countries. We accommodate varying research interests through the addition of optional survey sections. The benefits to forming an international consortium to conduct web-based survey research include the sharing of expertise, recruitment efforts and problem-solving.

Research limitations/implications: We discuss the limitations of using non-representative online sampling and the strategies we have used to increase validity.

Originality/value: The GCCRC is conducting the largest cross-national study of domestic cannabis cultivation to date. We aim not only to better understand patterns of cannabis cultivation and how they differ between countries but also to build upon online engagement methodology with hidden populations.

Keywords: Cannabis, Cultivation, Cross-national, Internet, Questionnaire, Recruitment

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Introduction

The use, possession, cultivation and supply of cannabis are prohibited by international treaties and drug laws in most countries, yet cannabis is the most widely used illicit drug in the world (United Nations Office on Drugs and Crime, 2012). Cannabis cultivation has proved difficult for law enforcement to eradicate. Unlike other plant-based drugs like opium/heroin and coca/cocaine, cannabis requires minimal processing before consumption, is easily grown in almost any climate using indoor or outdoor cultivation techniques and can be successfully cultivated on a micro-scale: a single plant can produce a sizeable quantity of useable cannabis (Potter *et al.*, 2011). Furthermore, the growth in internet and other digital technologies has facilitated easy dissemination of growing techniques as well as access to seeds and equipment (Hakkarainen *et al.*, 2011a; Potter, 2008, 2010a). Additionally, the ‘normalisation’ and decriminalisation of cannabis use (and, increasingly, cultivation) observed in many countries provides some explanation for the growth in domestic or home-grown cannabis cultivation in an increasing number of consumer countries in the past two decades (Bouchard *et al.*, 2011).

While cannabis traffickers who switch to home-growing may be trying to reduce the risk of detection by avoiding importation across national borders (Bouchard, 2007), non-commercial growers may be motivated more by: green politics or local consumption movements; users’ desires to avoid the ‘real criminals’ of the black-market and to have greater control over the potency and purity of what they consume, or; an ideological commitment to cannabis culture and aesthetic affiliation with the cannabis plant (Decorte, 2010; Potter, 2008; Weisheit, 1991). Further practical considerations may apply for cannabis users who do not have easy access to national or international drug markets (Hakkarainen, *et al.*, 2011a). Thus, it is important to understand cannabis cultivators as a heterogeneous group, motivated to grow for a variety of reasons that may or may not include a desire to make money. Much work has also been done producing typologies of growers (see Potter, *et al.*, 2011, p. 11). Weisheit’s (1991) seminal study identified intangible rewards (‘spiritual’, ‘social’ and ‘intrinsic’) described by commercial cannabis growers in the US. More recent UK work has demonstrated different types of not-for-profit, for-profit, and group enterprises (Potter, 2010a), and in Spain, cannabis social clubs—collaborations of cannabis users working together to produce their own supplies within domestic law—have emerged (Arana and Sánchez, 2011). Given this diversity, policies aimed at taking the profit out of cannabis growing in order to deter cultivation are unlikely to be wholly effective (Potter, 2010b; Weisheit, 1991).

In response to the synchronous growth in cannabis cultivation in so many countries around the world (United Nations Office on Drugs and Crime, 2012), cross-national research is needed to better understand who is involved in domestic cultivation, the diversity in cultivation practices and motivations, cultivators’ experiences with and involvement in other criminal activities, and their interaction with different cannabis

control policies. This article introduces the Global Cannabis Cultivation Research Consortium (GCCRC), a group of scholars actively engaged in such research. It describes its evolution and aims, and outlines the methodology of its ongoing cross-national online survey of domestic cannabis cultivation.

‘World Wide Weed’

After scholars from four different countries (Decorte in Belgium, Potter in the UK, Frank in Denmark, Hakkarainen in Finland) presented their work on cannabis cultivation in their respective countries at successive conferences of the European Society for Social Drug Research (ESSD) in 2007 and 2008, the idea of joint work on cannabis cultivation was born. Other researchers (Bouchard and Nguyen in Canada, Wilkins in New Zealand, Malm in the US, Lenton in Australia) joined the initial group at the International Society for the Study of Drug Policy (ISSDP) conference in 2009 to create the Global Cannabis Cultivation Research Consortium (GCCRC), with other colleagues joining since.

While there has been much research on cannabis grower typologies (e.g., Nguyen and Bouchard, 2010; Potter and Dann, 2005; Weisheit, 1991), and some members of the GCCRC research group have conducted national studies with domestic cannabis cultivators (Bouchard, 2007; Bouchard *et al.*, 2009; Decorte, 2010; Hakkarainen, *et al.*, 2011a; Hakkarainen *et al.*, 2011b; Plecas *et al.*, 2005; Potter, 2010a; Weisheit, 1992), our current study aims to further this work by collecting data in more countries in order to compare who grows cannabis, reasons for growing, methods of growing, and experiences with the criminal justice system – and how these factors differ across national borders.

While all cannabis growers of at least 18 years of age are eligible to participate, we expect to access mainly small-scale cultivators through employing internet research methods to access hidden populations and facilitate anonymous data collection. Our expectation is based on previous research using the same kind of method, where mainly small-scale cannabis cultivators responded (Decorte, 2010; Hakkarainen, *et al.*, 2011a); however, we might see a more varied range of respondents with the inclusion of other countries like Canada and USA where large-scale indoor and outdoor cannabis cultivation is present (Decorte *et al.*, 2011).

The International Cannabis Cultivation Questionnaire (ICCQ)

Scope

Belgium, Denmark, and Finland have already conducted studies of their small-scale cannabis cultivators through administration of online questionnaires (Decorte, 2010; Hakkarainen, *et al.*, 2011a). The ICCQ builds on these experiences, drawing on both the content and methodology previously employed by Belgium, Denmark, and Finland, and expanding the study to include the following countries: United States, Canada, Australia, and the United Kingdom, in addition to the three original countries. Germany, New Zealand, and the Netherlands have also expressed interest

in joining the study. An international survey targeting English-speaking cannabis cultivators not resident in any of the participating above-mentioned countries is also included.

Each survey will be online for approximately 6 months, the first survey was launched in May 2012 and data collection should end approximately in April 2013. Research teams have obtained approval from their own institutional ethics committees, with the international survey obtaining approval through the UK team. How each national survey is funded will be displayed on our website (www.worldwideweeder.nl), as well as in future disseminations.

Content

The ICCQ is a 35-item survey that is designed to measure patterns of small-scale cannabis cultivation (Decorte *et al.*, 2012). The questionnaire includes items on experiences with growing cannabis, methods and scale of growing operations, reasons for growing, the participant's personal use of cannabis and other drugs, participation in cannabis and other drug markets, contacts with the criminal justice system, participant's involvement in other non-drug related illegal activities and demographic characteristics. The ICCQ also includes items to test eligibility and recruitment source, and information to be included in participant information and informed consent sections.

While all members of the GCCRC have a shared interest in studying cannabis cultivation, we are not governed by a homogenous set of research goals. Therefore, all countries are using the ICCQ, but many countries have also added their own additional items or modules. Surveys in the US and Canada are exploring the criminal career of cultivators, mapping their social networks and changes over the life course. In the UK, motivations for starting cannabis cultivation are being compared with motivations to continue growing. The Belgium team is exploring the extent to which cannabis cultivators are also involved in other criminal behaviours. Various surveys in other countries address detailed description of growing practices, medical reasons for growing cannabis, and how growers think cultivation should be regulated if prohibition were repealed.

Design

The questionnaire design drew from Dillman's Tailored Design method (Dillman, 2007). The theory behind this model involves treating the questionnaire as a conversation between the respondent and the researcher. Thus Dillman poses three questions that determine a positive response: (1) "How do we increase the *rewards* for responding?", (2) "How can perceived *costs* be reduced?", and (3) "how can *trust* be established so that the ultimate rewards will outweigh the costs of responding?" (p. 14, original emphasis). These factors need to be in the right balance to get the best response from the target audience.

Table 1 shows how we chose to implement Dillman's method. Various trade-offs have to be considered. Although incentives are commonly provided to online survey respondents due to their positive effect on participant recruitment and retainment (Görizt, 2006; Heerwegh, 2006), we chose not to reward respondents with payments, vouchers or chances in a lottery because we would need to collect IP addresses in order to guard against increased multiple responding (see Bowen *et al.*, 2008; Gosling *et al.*, 2004). Piloting and our familiarity with the target group has demonstrated the critical importance of anonymity, especially not collecting IP addresses. Furthermore, using IP addresses to screen out multiple responders is problematic because individuals intent on responding multiple times could simply assign themselves a new IP address for each occasion using an IP anonymiser like Tor and appear to come from unique locations. Therefore, rather than attracting respondents through a monetary incentive which could increase multiple responding, the success of the ICCQ depends more heavily upon the participants' enjoyment, satisfaction and interest in the survey (Galesic, 2006).

[insert Table 1 about here]

Other trade-offs we considered related to balancing the desire for increased data completeness and information with reducing burden on the respondent and therefore making the survey more attractive to complete. Although missing data can be avoided in online surveys by forcing responses, error messages that arose from a forced-response question-by-question survey design can increase drop-off rates and affect responses for those who do complete the survey (Stieger *et al.*, 2007) and have been shown to increase respondent frustration (Christian *et al.*, 2007). Rather, we accept that there will be a proportion of missing data in our final dataset as a trade-off for offering respondents the option to choose not to answer any particular question, but we also expect a lower drop-out rate as a result.

Participatory online research

Cannabis cultivators are a hidden population. There are good reasons for them to be secretive about their activities and suspicious of people who ask them to share detailed information about their cultivation practices. It is a critical part of our methodology that we acknowledge these concerns of our participant group, as our international comparative study has the capacity to tell more nuanced and varied narratives about cannabis cultivation. Experiences from previous studies on cannabis cultivation using online surveys (Decorte, 2010; Hakkarainen, *et al.*, 2011a) demonstrated the importance of establishing legitimacy to carry out the research. Researchers had discussions with moderators of home pages, responded to individual emails about the research, contacted different cannabis organisations in order to inform about the research before it went online, meet with important stakeholders who debate cannabis online, etc.

Being aware of these issues and this responsibility, all participant countries in the GCCRC have or will approach cannabis growers to inform the study, pilot the

questionnaire, and construct legitimacy around the survey. For example, after viewing an earlier draft of the questionnaire, one cannabis grower in the Australian pilot group wrote 'I can't see one question that gives me a reason to fill out the survey personally. Why help fill in unknown gaps for authorities? My first suggestion would be to put the goal of the survey on page 1 or people won't know why they should answer.' This view was shared by the piloting group. In response, the Australian team argued that the study provides an opportunity to challenge common stereotypes of growers such as assuming that all cannabis growers are part of large criminal enterprises, motivated by large profits, and/or associated with violent crime. To convey this opportunity to prospective participants, the Australian team including the following statement in the ICCQ: 'The general community typically has a very unrealistic view about people who grow cannabis. We want you to help set the record straight by completing this questionnaire'.

This process was part of a wider approach to online methods described previously as 'participatory online research' (Barratt and Lenton, 2010; see also Potter and Chatwin, 2011; Temple and Brown, 2011). This emerging body of work explores online engagement and dialogue with drug users as part of the research process. More meaningful involvement of participant groups in health and medical research has been advocated (Boote *et al.*, 2002), but this kind of involvement in research is more difficult for groups who must identify themselves with a stigmatised and illegal activity (Singer, 2006). The internet may facilitate increased and more meaningful participant information in research through anonymous public dialogue and a reduction in power differences between researcher and participant (Bakardjieva and Feenberg, 2001).

Online communities of cannabis users and growers have been engaged by the research team in dialogues about the study. The Australian team participated in two synchronous online chats with the volunteer forum moderator group from ozstoners.com where they responded to questions and concerns about the project and collected feedback on ways to improve individual questionnaire items. Similar online discussions with other cannabis communities were conducted by the US/Canada team. These chats were not only fruitful piloting exercises that improved the questionnaire. They also allowed the team to demonstrate that they were willing to listen and act on feedback from participant groups and that their time and efforts in improving the survey were valued and seen as important help. The online nature of these communications was imperative given the desire these growers have to remain anonymous. However, in-person meetings also facilitated the development of trust with the targeted group of respondents. For example a researcher from the Australian team attended *Mardi Grass*, the annual Australian cannabis festival in Nimbin, primarily to meet contacts in Australia's cannabis activist groups, and this action helped to solidify their support for the project.

Recruitment and promotion

In order to recruit as varied a sample of cannabis growers as possible and benefit from each country's efforts, we have implemented a broad-based recruitment strategy and techniques to minimise duplication between research teams. Promotion strategies include: an international project website and blog hosted at an .nl address to highlight our association with a model of cannabis control supported by our respondents; Twitter recruitment involving following prominent cannabis Twitter accounts and engaging with cannabis users; discussions hosted on cannabis culture and cultivation online forums where the researchers continue to engage with respondents while answering questions about the study; posting to and engaging with Facebook groups associated with cannabis culture; mainstream media coverage (television, radio, newspaper) planned for halfway through recruitment; alternative media coverage through provision of flyers to alternative music shops, head shops, street press, festivals; distribution of flyers to grow shops; online and hard-copy advertising in cannabis-related magazines and websites; providing social media sharing buttons so respondents can easily share the survey with their social networks; and providing a link to printable flyers so respondents who wish to pass details of the survey to their friends can do so more privately. The mix of strategies will vary from country to country; however many of these strategies are international, leading people to the global website (www.worldwideweed.nl) where they can then choose the survey associated with their country of residence.

Limitations

It is important to acknowledge the limitations of the internet-based research methods reported here. Most importantly, samples of cannabis cultivators are volunteers, and not all cultivators have an equal chance of being included in the sample, resulting in coverage error. Our findings, therefore, cannot be said to represent all cannabis growers, and it is difficult to precisely estimate the importance of bias in our samples. Nevertheless there are various strategies we have taken to minimise sampling limitations. Firstly, we are using a wide variety of recruitment and promotion strategies and we are monitoring where each respondent found out about the study so we will be aware if any one promotion method may bias the findings. Secondly, by removing any financial incentive to respond to the survey, we have reduced the likelihood of fraudulent responding. Thirdly, wherever possible, we will compare results obtained through our online methodology with other sources of information about cannabis cultivation in each country.

While it can be helpful to compare multiple datasets, it does not solve the problem of understanding which is the most representative, as none of the data on cannabis cultivation uses probability sampling frames. Straus (2009) notes that it is common for cross-national comparisons to be made using convenience or purposive sampling, and argues that the overall context effects associated with living in that specific nation may still be discernible in comparative analyses, even though the representativeness of the resultant samples from each country is unknown. It is also important to note

that many of the limitations faced by online purposive sampling are broadly similar to ‘traditional’ face-to-face methods of studying hidden populations. Representative sampling methodology, as used in household surveys, is also prohibitively expensive to administer to the general population in ways that would access large numbers of cannabis cultivators. Additionally, most existing national and transnational research on cannabis cultivation is based on detections and arrests by law enforcement which obviously has its own biases. It is hoped that the results of the current research with self-selected samples of cannabis cultivators completing an online questionnaire will produce a useful counterpoint to the available law enforcement data.

Conclusions

Over the past few decades, domestic cannabis cultivation has increased simultaneously in several countries across the globe. Since the trend appears to cross national borders, a similarly global group of researchers seems best suited to study the phenomenon. Despite varying national contexts, the GCCRC was able to develop a core online questionnaire to be used in different countries and allow for additional differing research modules based on specific research interests as supplement to the core questionnaire. The benefits to forming an international consortium to conduct web-based survey research include the sharing of: expertise, funding and recruitment efforts, and problem-solving. We encourage the use of this collaborative model by others researching other cross-national issues.

We expect that the results from the cross-national study to shed light on important issues that are often limited to national studies, such as experience with police enforcement, motives for growing, distribution networks, criminal careers, use for medicinal purposes, etc. Finally, a multinational survey provides an excellent opportunity for understanding the relationship between objective sanctions for cannabis cultivation and how cannabis cultivators perceive their risks of arrest, and the relationships between cultivation practices and cannabis control policies across national borders.

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Table 1. Increasing rewards, reducing costs and establishing trust with cannabis growers used in the ICCQ

Increasing rewards	Reducing costs	Establishing trust
<ul style="list-style-type: none"> • Positive outcomes of study for cannabis growers are highlighted • Inclusion of questions that interest the target group (eg. motivations to grow) • Opportunity to provide additional information through use of other fields and comment boxes • Respondents have greater control over which questions they answer (responses are not ‘forced’ to complete any one item) 	<ul style="list-style-type: none"> • Shorter length of 15 minutes • Minimise need for text entry to reduce response burden • Multiple questions presented per webpage to reduce response burden • Minimise extra mental effort by specifying ordinal categories rather than continuous scales * • Use of automated skips and item dependencies to ensure participants are only asked questions relevant to their circumstances, where technically feasible 	<ul style="list-style-type: none"> • Complete anonymity – no IP addresses or cookies collected • Statement of intent builds trust that researchers will present heterogenous motivations of cannabis growers • Clearly stating researchers and organisations responsible for the project • Provide many ways of contacting/following the researchers (website, twitter) • Piloting with cannabis growers builds trust that researchers are responding to their concerns

* US/Canada will use continuous scales to increase precision and analytic possibilities whereas other countries will use ordinal categories to decrease burden on respondents.