Marijuana use within the construction workforce: theoretical considerations and a research proposal

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Alcohol and recreational drug use in construction is an area of growing concern, workers often found to have higher prevalence of such behaviours than those in other industries at both global and national levels. Potential reasons for this are many. The social determinants of health (the reasons why people drink or take recreational drugs) negatively associated with work can be readily identified in construction work with temporary contracts, long working hours and a lack of employment security for work within high-pressure and high-hazard environments. The legalisation of marijuana in several states of America has led to concerns from industry that there will be an increase in use amongst the local workforce, but also created the opportunity to study this phenomenon without ethical constraints around legality that may occur in other countries. This paper, presented for discussion rather than the dissemination of completed work, explores the theoretical issues that surround marijuana use within construction, focusing on its impact on construction site safety. This includes necessary considerations of accident causality, worker impairment and physiological issues around the drug itself, as well as inherent problems with drug testing, and its effectiveness as a means of management control. This critical contextual review has been used to inform the development and proposal of a methodological approach to effectively examine this phenomenon empirically in the field, as part of a future research project to be undertaken in Colorado, USA.

Keywords: construction workforce, drug use, marijuana, safety, methodology

Introduction

There is growing concern around the use of alcohol and recreational drugs amongst construction workers, and the consequential impact this can have on sites, particularly around site safety. Indeed, research of drug and alcohol use in the Australia construction industry found that safety managers feel this problem is ' … a major issue that is only getting worse' (Biggs and Williamson 2012:450). The legalisation of marijuana in several US States has resulted in various legal, moral and technical dilemmas for employers. Many assume that legalisation will increase use amongst their workforce with negative consequences for safety and productivity.

Within the high-pressure, high-hazard construction site environment, any form of impairment can have serious repercussions not only for the workers concerned but all those working on the site. Yet marijuana as a drug raises several unique problems. It is a natural product with different potencies which are in turn influenced by how it is used, therefore its effects can vary significantly. There is also a lack of scientific agreement of quantifiable effects on human performance and inherent problems with drug testing using standard methods, as its longevity in the body long outlasts actual intoxication. All are aspects that require careful consideration now the legal context has changed, and states have granted their citizens the freedom to use it recreationally without punishment.

This paper sets the scene for a proposed research project, itself aiming to establish how the legalisation of marijuana has impacted (or not impacted) construction site safety. At present, the impacts of marijuana use on construction safety and worker well-being and legalisation of marijuana are unknown. The theoretical and social context of marijuana legalisation is explored in depth, and then used to inform the development of a methodological approach to effectively examine this phenomenon empirically in the field.

Marijuana and Construction Work

Construction workers take drugs. The industry consistently ranks very highly for illicit drug use (e.g. Gerber and Yacoubian 2002; French et al 2004; Minchin et al 2006; Larson et al 2007; Schofield et al 2013; Bush and Lipar 2015, cited in Fardhosseini and Esmaeili 2016), with statistically significantly higher use than in other comparable high-hazard industries such as oil and gas (Tan and Lloyd 2016).

There are a number of reasons why this could be the case. Researchers have highlighted the links between work related stress and drug use (Fardhosseini and Esmaeili 2016), the contribution of unsocial work patterns, long travel and abnormal shifts to elevated risks of substance abuse (Miller et al 2007), and remote job locations meaning workers are far from family and friends, feel lonely and so become bored and tempted (Pinto et al 2011). Feelings of powerlessness that come from short term employment and job insecurity (Frone 2013) and the very nature and pressure of construction work, including facing hazards on a daily basis (Biggs and Williamson 2012) can also have a major effect, associated as they are with the social determinants of health, the reasons why people take drugs (Wilkinson and Marmot 2003).

It is arguable that this 'why' is perhaps the more critical consideration here, and research could better focus on such fundamental causes of poor worker health, rather than simply examine the symptoms, of which drug use is just one. The reader should be reassured that this work is being undertaken elsewhere (Sherratt 2016a). For the purposes of this paper, focus shall remain on the symptom of drug use amongst the workforce, specifically marijuana, and the concerns this has raised for construction site safety given recent changes in its legal status for recreational use in the USA, alongside due consideration of the potential benefits and positive impacts of marijuana use and legalisation.

Marijuana, Worker Impairment and Safety

The physiological and psychological effects of marijuana have been well researched, not only because it is the most consumed illicit drug in the world (Fernandes and Moreira 2011:95), but also due to its potential medicinal benefits. Effects of its use have been found to include dizziness, tachycardia (accelerated heart rate), psychomotor retardation, alterations to perceptual and motor speeds and coordination, whilst cognitive function, learning and memory are also affected (Fernandes and de Campos Moreira 2011). There has been recent debate around the extents of cognitive impairment caused by marijuana, and no accepted answer has yet been found (Caulkins et al 2015:35), although long-term users can have problems around brain development, intelligence quotient (IQ), reaction time (Caulkins et al 2015), attention, loss of memory and be prone to knee-jerk reactions (Fernandes and de Campos Moreira 2011). Yet as Caulkins et al (2015:33) also note, problems in determining the extent of such cognitive functions are linked to the difficulties of separating the direct effects of marijuana from what they term 'the personality traits' of the user.

However these effects are not consistent from user to user, marijuana affects everyone differently. In part, this is because marijuana is a natural product and its potency varies from plant to plant, resulting in no 'standard' dosages. Active cannabinoids within the plan can vary in concentration from 0.3-30%, which results in variation in the levels in human tissues after use (Fernandes and de Campos Moreira 2011). The way the drug is used also alters its effects, which can fluctuate significantly (bioavailability of the drug can vary from 2-56%) due to what are termed 'smoking dynamics' - hold time, number of puffs, inhalation volume – all of which influence the degree of drug exposure (Huestis 2007). A rough 'time-line' of impairment has been established: peak concentration of the drug comes 10-30 minutes after inhalation, it is then stored in the fatty tissues of the body, from where it is slowly released and removed (Fernandes and de Campos Moreira 2011). The effects last for about 3-5 hours, after which the influence on physiology wear off and the user gradually returns to normal (National Highway Traffic Administration 2015). It should also be noted that marijuana use can also create a 'stone-over' effect, similar to an alcohol-related hangover, in which aspects of impairment can also continue into the following day.

From the above, it is unsurprising that concerns have been raised around marijuana and safety, particularly in the workplace. It is often argued that any substance abuse creates a recognised serious risk to the safety of the user and others (Miller et al 2007), and evidence has been established from controlled laboratory trials that ' … marijuana use reduces psychomotor performance in ways that increase overall risk of accidents, and in particular, impairs driving (e.g. Ramaekers, et al 2004; Ramaekers et al 2006: cited in Caulkins et al (2015:33). Miller et al (2007) also note that although limited, previous studies that have examined the relationship between illicit drug users and occupational injury found that drug users have higher injury rates, , whilst Spicer et al (2003) state simply that illegal drug use causes impairment, which in turn triggers occupational injury. Indeed, there are many studies that have correlated impaired co-ordination and the reduction in worker ability to perceive and respond to hazards (see Miller et al 2007 for a summary of studies around driving vehicles, ships and aircraft). However, this body of research often examines the impacts of impairment within relatively controlled work environments, where decision making can be linear and follow relatively simple and prescriptive sequences. Construction sites are highly complex places, and so impairment within these environments may be even more problematic.

Yet in spite of such findings, and suggestions of correlation between specifically marijuana use and accidents, causality is much harder if not impossible to prove. Indeed, Caulkins et al (2015:xii) state that current literature 'is insufficient to determine the extent to which marijuana use is casually linked to any of these outcomes'. Wickizer et al (2004) suggested that substance abuse may be a risk factor for occupational injuries and accidents, but there is conflicting evidence about the 'risk gradient', with some studies unable to find a link, others establishing a weak link, and others an arguably clearer link, although all vary in the parameters of type of drug, frequency of use and amount of use. The problem is the difficulty in establishing a direct correlation between workplace injury and drug use, and some researchers have even suggested there is no correlation at all (e.g. Pidd and Roche 2014), whilst Frone (2013) goes further to argue that the correlation of drug use, cognitive and psychomotor performance to work safety is not only unconvincing, it is also to some extent prejudiced. Little is known about what proportion of construction site accidents are directly attributable to marijuana use (Biggs and Williamson 2012), yet given the inherent complexities and multiple causes behind almost any accident on a construction site (e.g. Gibb et al 2001) the lack of any statistically significant causal relationship is perhaps not all that surprising.

It should be noted that marijuana use and, by extension marijuana legalisation, may have some positive benefits. Use of marijuana is well-known to induce short-term increase in relaxation, decrease in stress, and increase in appetite. For some construction workers, use of legalised marijuana may be beneficial in the same way that many patients have benefitted from medicinal marijuana for years. In this study no presumptions are made about the net positives or negatives of marijuana use; however, it is recognized that being high at work is unacceptable.

Drug Free WorkPlace Programmes

The response to increasing issues around drug and alcohol use within any industry workforce has often been to implement drug-free workplace (DFW) programmes. As Gerber and Yacoubian (2002:54) note with specific consideration of the construction industry, the ‘…high rates of alcohol and other drug use coupled with the high risk safety-sensitive nature of the industry have prompted the development of a variety of drug surveillance and prevention strategies’, and there has been an increase in policy development to improve safety through addressing problems of worker impairment (Biggs and Williamson 2012). DFW programmes can involve a variety of worker education and assistance elements, but most tend to include some form of drug and alcohol testing of the workforce. This can be introduced in a number of ways, either carried out pre-employment, post-accident, randomly, or because of reasonable suspicion, or some combination of all four (Schofield et al 2013), with the goal of deterring substance abuse amongst currently employed workers, and avoiding hiring drug-using applicants (Minchin et al 2006).

Although testing programmes have been associated with reductions in safety accidents, again causality has not been proved. For example, Schofield et al (2013:99) found that construction companies using drug testing programmes generally exhibited lower, although often non-significant, injury rates than companies not using drug testing programmes, with results varying by trade and injury types. Waehrer et al. (2016) established that drug testing was only effective to lower minor injury rates with no lost-work, but they could not establish any relationship with lost-work injuries. The much-quoted work by Gerber and Yacoubian (2002) found that construction companies with drug testing programmes experienced a 51% reduction in incident rates within 2 years of implementation, although this did not continue to improve beyond the first few years of implementation, and the authors were careful to present this statistic as an association with no claim to causality, despite its misuse since.

Indeed, Gerber and Yacoubian (2002:67) twice reiterate in the conclusions to their work that 'drug testing does not, in and of itself, constitute a drug-abuse prevention programme…only one component.’ Indeed, it is highly probably that the introduction of a new safety-related programme, be it educational or simply involving drug and alcohol testing, reorients the workplace to safety, which then in turn sees improvements in practice. This cyclical relationship in safety management has been established by Lingard et al (2017), where intervention and consequential improvement can readily be seen on sites, followed by an increase in safety failures as the worksite reverts to 'normal' practice. Indeed, ancillary benefits to safety have been found with many different types of intervention, as Goldenhar and Stafford (2015) found with 'stretch and flex' programmes for worker health, which saw unintended improvements in many other areas, including safety. This hypothesis of beneficial consequences around intervention is also acknowledged by Miller et al (2007:566), Schofield et al (2013) and Wickizer et al (2004:107) throughout their DFW research.

Marijuana has certain characteristics that do not facilitate a simple testing process. The 'active' ingredient in marijuana is tetrahydrocannabinol, known as THC, and this is what creates impairment. It has been argued that any presence of THC could be indicative of sufficient impairment, because although THC only lasts for a relatively short time in the body, consequential psychomotor effects can last for 8 or more (Caulkins et al 2015). However, testing methods (using urine, blood or hair) do not test for THC, instead they test for one of the cannabinoid metabolites. This chemical, called C-THC, is actually generated as the impairing effects of THC are wearing off, and has a much longer life in the body than THC itself. This time duration can vary from person to person, depending on the marijuana strength, frequency of use and the individual's physiology. C-THC can last in the body for over 30 days, and varies considerably between users, even in controlled studies, where the does and smoking pace is controlled. A standard positive test for marijuana (e.g. a urine test) therefore only indicates that drug exposure has historically occurred, it is not confirmation of current impairment (Huestis 2007). Despite scientific best efforts, there are not yet accepted quantitative metrics that correlate a level of THC or its metabolites to the more familiar measure of blood-alcohol, although in Washington State, a legal level of impairment has been set at 5nano-grams of THC per millimetre of blood, this has not been adopted countrywide.

Legalisation of Marijuana in the USA

Although marijuana remains a Class 1 Drug under US Federal Law, some State Law has seen a shift towards decriminalisation and the legalisation of its use for medical and most recently recreational purposes. In 2012, Colorado and Washington both legalised recreational marijuana, and although the full impacts of this are unlikely to be established for some time due to their complex social consequences (both good and bad), initial benefits have been sufficient to encourage two other States to follow suit in 2014 and four more in 2016. The rather confusing situation is that marijuana is both technically legal and illegal, although the US Department of Justice has stated it will tolerate state-led legalisation as long as there are effective regulatory and enforcement systems to ensure public safety, health and other law enforcement interests are not compromised (Calukins et al 2015).

Yet, this adds a further level of complexity to that already established around marijuana use. First and foremost, legalisation can influence existing use patterns as well as potentially encouraging more users. Calukins et al. (2015) suggest that changes will also occur around frequency and intensity of use, modalities of use, as well as the potency and quality of the drug now available. Secondly, construction companies can no longer test workers and penalize them for positive marijuana test results simply due to its illegality. Now it is legal for recreational use in the state, and testing struggles to distinguish between current impairment and historical use, this situation becomes more problematic.

Indeed, there was a reported increase in positive drug test of 20% after the law change in 2012 (Assurex Global n.d.), and although supporters of drug testing admit that it is ‘conceivable that and employee could test positive for marijuana despite not showing any outward signs of impairment’ (Halverson 2013), they are reluctant to acknowledge that this is not just conceivable, but given the problems with testing, it is actually highly probable. Yet this possibility does not seem to have tempered practice, indeed Minchin et al (2006) report a case of an organisation that repeatedly fired employees for failed drug tests, rather than any problems with their work or safety performance, with no consideration that their failed test may have had no link to immediate impairment. Organisations and other worker associations have also fallen back on the fact that marijuana remains a Class 1 Drug under Federal Law, and therefore do not allow the use of marijuana either medically or recreationally within their workforce at all (Halverson 2013). The state legalisation laws generally do not prohibit drug testing of workers or organisational DFW policies, despite problems around what testing is actually indicating, or the lack of direct evidence of causality around workplace accidents.

As a consequence for failing drug tests, workers can still be fired even in states where marijuana has been legalised for medicinal and recreational use (Bogot and Neville 2015). In different cases, unemployment benefit has been both awarded and withheld from workers fired due to a failed drug test from using marijuana outside of working hours although it was detected by testing during them. Indeed, the acknowledged problems of under-reporting of accidents on sites (Sherratt 2016b) are only likely to be exacerbated by such legal complexities. Similar inconsistencies exist with regards to worker compensation; in some cases the award has been made and in others it has not, with further complexities added should the claim be made that intoxication was the cause of the accident. Case law is still developing precedent, and so it is perhaps unsurprising that the recommended industry response has been to follow Federal and not State law, to ensure their businesses do not ' … go up in smoke' (Halverson 2013).

Critical Reflections

The above discussion has revealed some interesting considerations about the use of marijuana within the construction workforce, and the implications of its legalisation. Central to this is the continued reliance around testing, particularly pertinent when traditional method of testing are inherently flawed. Furthermore, any testing is arguably an intervention in a workers private life (Fardhosseini and Esmaeili 2016) and raises issues around employer violations of worker privacy, freedoms and autonomy, all the more prominent in a situation where the state has seen fit to specifically grant those freedoms to its residents. Yet, testing is likely to continue, not least because companies with an established testing programme are often able to receive discounts on their worker compensation insurances. Furthermore, the desires of the commercial drug-testing industry should also be acknowledged here, it is an industry worth millions and therefore keen to continue to convince organisations that drug testing does reduce accidents on sites (Wickizer et al 2004).

More worrying is the potential for drug testing programmes to give employers a simple 'get-out' in the case of any on-site accident. Despite the fact that testing positive for marijuana does not necessarily equate to worker impairment, it creates a straightforward 'cause' for any site accident, enabling more systemic problems such as poor management to be ignored. That is, marijuana use can be blamed for accident causation when the actual impacts may be minimal or nil. Whilst worker impairment must be recognised as a potential factor in a site accidents, and should not be tolerated by managers or peers in practice, care must be taken to ensure that this new step in legalisation is not utilised as an excuse for poor safety management, or a way to simply 'blame the worker' (Frederick and Lessin 2000) for wider management failings. This also has the potential to lead to under-reporting and concealment of incidents for fear of the consequences (Miller et al 2007; Morantz 2008; Schofield et al 2013) should a test prove positive after an accident has occurred.

There is a fairly strong disconnect between company drug testing policies, the drug testing methods themselves, and legal drug use. Where tests for impairment due to alcohol directly measures the quantity in the system at the time of testing, marijuana testing can show positive results many days after legal use and impairment. This disconnect causes some employers to adopt blanket policies where no marijuana use is acceptable, citing Federal law. The risk is that workers will not report marijuana use and that employers will cite any positive marijuana tests as a cause of injury when management issues or other human factors are truly at play.

A Research Proposal

It has been established that there are several interrelated factors at play within the scope of this phenomenon. The legalisation of marijuana has led to increased concerns around impairment and safety (and indeed productivity), yet 'science' is struggling to respond in terms of establishing causality, developing appropriate testing, and finding solutions to the ethical and moral questions that have now been raised. As Caulkins et al (2015:36) note, there is an 'inherent ambiguity that accompanies non-experimental findings on complex human phenomena involving many potential causal pathways', and whilst human experiments are possible, generalisability often remains questionable.

Indeed, many of these questions would struggle to be answered by research grounded in a positivistic paradigm, where validity and reliability would quickly become challenging. For example, issues around respondent self-implication and corporate protocol can quickly disrupt any quest for the 'truth' around drug use or safety, whilst the debate is still ongoing as to whether accident causality can ever be truly 'proved' (Hollnagel 2011). Given ongoing arguments around the effectiveness of drug testing as a preventative tool, and the fact that despite its use as a deterrent any post-incident testing actually comes too late for safety, as well as the inherent issues around marijuana longevity in the body, research focused on the science of testing is perhaps best left to the scientists. What should be explored, however, are the social consequences of such testing amongst the workers and management on sites. It could be suggested that this has already been carried out, and indeed 'attitudes' to the legalisation of marijuana have been explored from a positivistic foundation, yet as the caveats such researches note, whether such attitudes are themselves valid or even relevant in terms of future utility is certainly up for debate.

Therefore, an alternative is proposed. A social constructionist approach (Gergen 1999) grounds itself methodologically in the perspective that the world we experience is socially constructed by the people within it through interactions, systems and practices (Gergen and Gergen 2004). This results in shared versions of knowledge within particular communities (Gergen and Gergen, 2003; Filmer et al, 2004), and the ‘truth’ is simply as the current accepted way of understanding the world (Burr, 2003). Social construction is therefore able to accept shifting truths, it allows for conflict or inconsistency between and within individuals' understandings, something that could predictably emerge given the complex nature of the phenomenon under examination here. Indeed, such an approach has been demonstrated to be useful in exploring sensitive issues such as construction site safety, whilst also allowing for inconsistency, complexity and change within individuals (Sherratt et al 2013; Sherratt 2016b).

Such an approach can ask deceptively simple questions, such as 'how is the legalisation of marijuana working on this site?', which will in turn reveal how people are now making sense of this legal change and creating new shared understandings around marijuana use both recreationally and in the workplace. Employing discourse analysis to explore conversations, focus groups, induction scripts or slides, site posters and other documentary data (Sherratt 2016b), marijuana, its legalisation, its role in impairment and its relationship to safety on the construction site can be illuminated and therefore better understood. It is perhaps important to note here that the sample for this study will focus on the workers and site-based management, those for whom safety actually matters, as the majority of previous work in this area has focused on the opinions of employers, human resource or safety managers and not those actually carrying out the work (e.g. Gerber and Yacoubian 2002; Fardhosseini and Esmaeili 2016). Focusing data collection on the site is essential to explore how marijuana legalisation has actually changed understandings and practice. As Miller et al. (2007:570) note, informal norms take precedence over formal policies, and are not readily revealed by a questionnaire completed by a senior manager.

Furthermore, a social constructionist approach, by exploring and highlighting the network of discourses that create our shared social understandings, is also able to better illuminate that highly sought after yet infuriatingly intangible asset - site safety culture. This very much reflects the goal of the approach, if not the methodology, of work currently being undertaken by Biggs and Williamson (2012) around drug and alcohol use on sites in Australia, itself grounded in a 'safety culture' approach seeking effective interventions, with the goal of such interventions 'to render it unacceptable to arrive at a construction workplace with impaired judgement ' (ibid 2012:446). The project presented here seeks a similar goal: to explore how things are currently understood on sites, so as to better inform the development of programmes that seek to support a site safety culture where immediate impairment is not acceptable, yet is able to find fit with the wider societal change around legalisation.

summary

This paper presents a theoretical context and a research proposal. The legalisation of marijuana for recreational use in various States of the USA has led to the emergence of a complex and ethically influenced debate around construction site safety, with no clear way for industry to respond to ensure effective management of this change on their sites. This research proposal, grounded in a social constructionist approach to safety, seeks to explore this through the shared understandings of those who work on sites, and how they are now making sense of the legalisation of marijuana, their work, and their workplace.

The authors have presented this work for discussion, and welcome feedback, comment and critique from our W099 colleagues.

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