Trends in drug use in the Spanish population and the role of work-related stress

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There is nothing more deceptive than an obvious fact.
- Arthur Conan Doyle

Als meus pares
i a la Natàlia

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Abstract

Characteristics of drug use are determined geographically and historically, and modelling trends can offer insight into the forces that configure drug use contexts. On the other hand, the workplace may present important sources of stress, including insecurity concerning the future of the job, which may influence drug use. Furthermore, an increase in the prevalence of poor mental health in a context of economic crisis may result in an increase in the use of drugs.

Thus, the three main objectives of this thesis are to identify general trends in drug use, to study work-related stress in relation with drug use, and to examine changes in drug use in a situation of economic crisis in the Spanish population.

The results obtained will indicate the particular evolution and main trends of substance use in Spain, as well as changes in drug use in a context of economic crisis, that could serve as a basis for reconsideration of policies regarding availability of licit and illicit drugs. They will further identify work features that may affect drug use in vulnerable individuals and that may be useful for prevention purposes.

Resum

Les característiques del consum de drogues vénen determinades tant geogràficament com històricament, i la modelització de tendències pot oferir-nos una visió de les forces que configuren els contextos de consum. D'altra banda, l'àmbit laboral pot representar importants fonts d'estrès, incloent la inseguretat respecte al futur del lloc de treball, que poden influir en el consum de drogues. A més, un increment de la prevalença de

mala salut mental en un context de crisi econòmica pot suposar un increment del consum de drogues.

Per tant, els tres principals objectius d'aquesta tesi són identificar tendències generals en el consum de drogues, estudiar l'estrès laboral relacionat amb el consum de drogues, i examinar canvis en el consum en una situació de crisi econòmica en la població espanyola.

Els resultats obtinguts indicaran la particular evolució i tendències generals del consum de drogues a Espanya, així com canvis en un context de crisi econòmica, que podrien servir de base per a la reconsideració de les polítiques sobre disponibilitat de drogues legals i il·legals. A més, s'identificaran característiques del treball que poden afectar el consum de drogues en individus vulnerables i que poden ser útils per a la prevenció.

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1 INTRODUCTION

Part A. Drugs

Explanatory statement: In this thesis the term drug is used to describe a long list of psychoactive substances that can be licit or illicit, mild or potent, used for medical and non-medical purposes. They can be classified as stimulants (amphetamines, cocaine, nicotine…) or depressants (alcohol, barbiturates, opiates…). None is intrinsically evil, but all can be abused and cause addiction.

A.1. Drugs in modern world history: from local cultures to global markets

From the most primitive societies human beings have used substances to alter their mental state or deal with everyday difficulties. Hunter-gatherer communities were already familiar with a wide range of roots, stems, tubers, barks, leaves and fruits of such commendable properties that were often deified. Archaeological evidence suggests that betel nut (Areca catechu), today's most used drug in the world after nicotine, alcohol and caffeine (Marshal 1987), was being chewed more than ten thousand years ago in Timor (Glover 1971) and in Thailand (Gorman 1970). Australian aborigines were using nicotine plants (Watson 1983) at the time of European contact. Tobacco species were spread through most of the Americas by the time of the conquest (Schultes 1979). Similarly, the use of khat (Catha edulis) in Ethiopia and north-east Africa was already an "ancient" practice before the arrival of colonists (Weir 1985). Coca (Erythroxylum coca) was being cultivated in the western Andes some seven thousand years ago (Plowman 1984). This evidence

has led some authors to argue about a co-evolutionary relationship between humans and psychotropic plant substances (Sullivan and Hagen 2002; Hagen et al. 2013).

In today's world drugs have mostly become global commodities and a source of profit. In an inspiring account of the global drug commerce derived from European overseas expansion, Courtwright (Courtwright 2002) describes how drugs typically began as expensive and exclusive medicines, but the spread of their cultivation and manufacturing expanded world supply, drove down prices and "democratised" their consumption.

The key psychoactive substances (wine, spirits, tobacco, coffee, tea, chocolate, opium, morphine, cannabis, coca and cocaine) all became global products. Yet, other substances with attractive psychoactive characteristics and long, culturally sanctioned usage never achieved worldwide cultivation and use. Europeans ignored many psychoactive plants for reasons that ranged from limited shelf life (perishability) to cultural biases against their effects. The ones they found useful and acceptable they traded and cultivated throughout the world with social and environmental consequences that are still evident.

Why some drugs became global products while others did not is an important and complex question that the author tries to explain. For any psychoactive plant to achieve global distribution and cultivation it first had to catch on among western Europeans as a medicine, recreational drug or trade good. Only drugs that were widely used in western societies became global commodities. The big three of the "psychoactive revolution" -alcohol, tobacco and caffeinated products- increased in

production, distribution and consumption and were integrated into cultures around the world. Opium, cannabis and coca were less frequently consumed and reformers eventually succeeded in restricting and prohibiting them, although they remain highly profitable commodities. An important aspect of drugs was their usefulness in acquiring and controlling manual labourers and to exploit indigenous people, therefore, coping drugs that did not entail hallucinations were favoured (Courtwright 2002).

While the official attitude is that drugs are dangerous substances best used in limited amounts under medical supervision, traders, capitalists and the political elites who tax them have long appreciated them as attractive and lucrative products. The clash between opportunities for profit and concerns about health are at the heart of the moral and political conflict in the history of commerce of psychoactive substances.

During the late nineteenth and early twentieth centuries political elites began to reconsider the consequences of the growing drug trade, and were increasingly willing to criminalise the nonmedical sale and use of some drugs. Courtwright (Courtwright 2002) suggests that major political opposition to nonmedical drug use develops from five basic concerns: the first is the direct harm users do to themselves and to others. The second source of opposition is concern over social costs. Private gains might entail unacceptably high and morally indefensible public costs. The third source of opposition is religious disapproval. Prayer, fasting, meditation and exercise are the preferred means of transforming consciousness. The fourth source of opposition is the association of a particular drug with deviant groups. The last concern is the perception that drug use endangers the future of the group. Anxieties about drugs

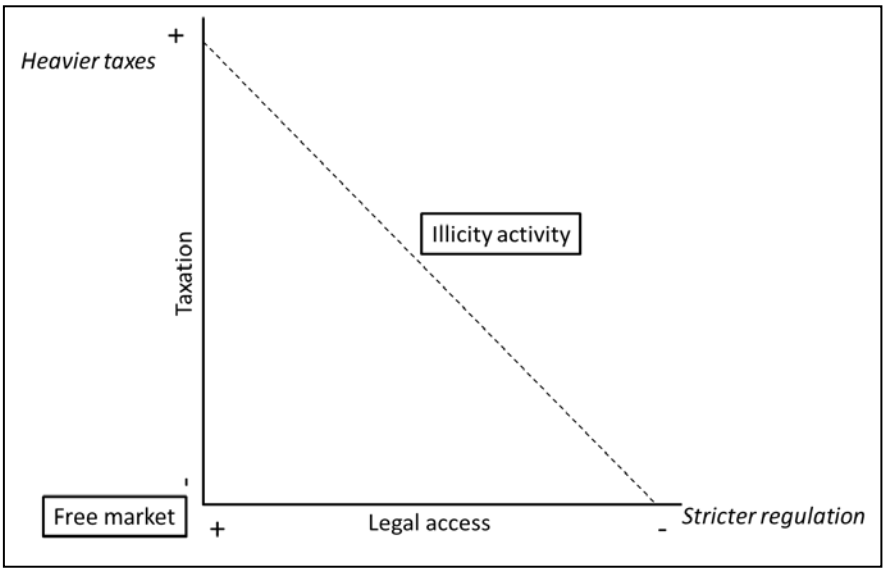
and collective survival are often intertwined with concerns about the young.

Moreover, while consumption of drugs might help to keep workers on the daily grind, over time in certain industrial contexts it interfered with and was detrimental to their work. Employers were worried about maintaining an efficient labour force. The growing cost of the abuse of manufactured drugs turned out to be a fundamental contradiction of capitalism itself (Bacon 1962; Rumbarger 1989). Restrictive or banning regulations were not only imposed as efficiency measures, the more future oriented workers and progressive union leaders also understood the devastating and impoverishing consequences of drinking and viewed abstinence, or at least moderation, as an important means of achieving self-respect and independence. Trade unions also began providing alternatives for after-work association to prevent excessive drinking (Courtwright 2002).

A.2. Licit and illicit drugs

Psychoactive drugs regulatory regimes form a continuum of legal access, ranging from absolute prohibition to unrestricted availability. This continuum intersects with taxation to form a simple graph. The point of intersection (universal access, zero tax) is the free market. Movement away from the free market along either axis toward stricter regulations or heavier taxes prompts illicit activity (Figure A.2-1). The response to such activity requires policies along a third policy axis on the strength of coercive measures that may range from warnings or fines to imprisonment or even execution.

Figure A.2-1. Drug regulatory regime in relation to free market and illicit activity.



Some drugs, notably alcohol and tobacco, are regulated by taxation, sales and restrictions on the age of purchase, while others are scheduled under the mutually supportive and complementary major international drug control treaties. The 1961 Single Convention on Narcotic Drugs and the 1971 Convention of Psychotropic Substances codify internationally applicable control measures to prevent production and supply of drugs except under licence for specific purposes such as medical treatment and research. International control has extended from plant-based drugs - heroin, cocaine and cannabis- to synthetic drugs, such as amphetamines and methylenedioxymetamphetamine (MDMA), and pharmaceutical drugs such as buprenorphine, methadone and benzodiazepines. The 1988 United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances reinforces the obligation of countries to apply criminal sanctions to combat all aspects of illicit production,

possession and trafficking of drugs (United Nations Office on Drugs and Crime).

The four mayor types of illicit drugs are the following (Degenhardt and Hall 2012):

- **Amphetamine-type stimulants**. A class of synthetic, sympatheto-mimetic amines with powerful stimulant effects on the CNS.
- **Cannabis**. Generic term for preparations (e.g. marihuana, hashish and hash oil) derived from *Cannabis sativa* plant that produce euphoria and relaxation, heighten the senses, and increase sociability.
- **Cocaine**. An alkaloid with powerful CNS stimulant effects derived from the coca plant (*Erythroxylum coca*).
- **Opioids**. Include derivatives from the opium poppy (*Papaver somniferum*), such as heroin and morphine, and their synthetic analogues (e.g. methadone, fentanyl). Opioids relieve pain, produce euphoria, and can cause coma and respiratory depression in high doses.

Despite the worldwide trend toward increased regulation, higher taxes and stronger coercive measures during the twentieth century, alcohol and tobacco have remained legally accessible. The most obvious reason for the privileged status of alcohol and tobacco was the industry's size and fiscal importance in the western nations that dominated the world's economic and diplomatic affairs. The scale and location of alcohol production were also important. Viticulture, brewing and distilling flourished in Europe and throughout much of the non-Islamic world. By contrast, poor nations and colonies grew most of the opium and coca. Germany, the most important manufacturer of cocaine and morphine initially resisted control efforts, but after World War I manufacture and

distribution were supervised by the League of Nations under the Convention for Limiting the Manufacture and Regulating the Distribution of Narcotic Drugs, signed in 1931.

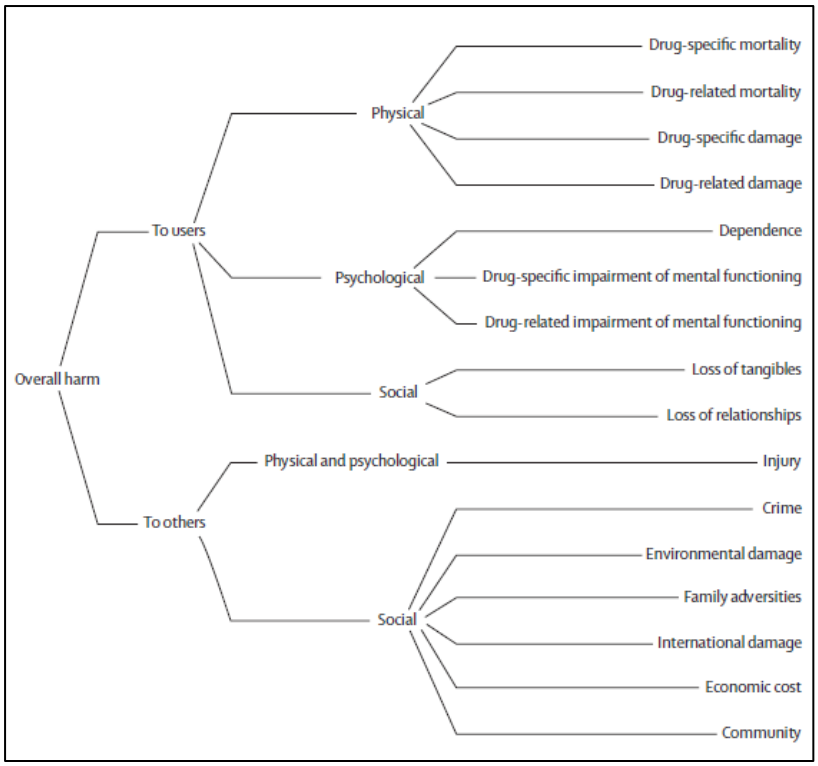
In the case of tobacco, tobacco companies used their power to organise public relations campaigns, suborn the media, make political donations, arts endowments, sponsor sporting events, or to purchase lobbyists, expert witnesses and lawyers. Pharmaceutical companies also proved adept at lobbying to protect endangered products and managed to delay a comprehensive international treaty on psychotropic drugs until 1971, obtaining several concessions in the process (Courtwright 2002).

Many public health authorities and drug-abuse experts have argued that governments should increase the regulatory burden on alcohol and tobacco. Reformers have had some luck with tobacco. Smoke-free environments have multiplied worldwide. Epidemiological and scientific evidence has established that smoking is the most widespread and lethal form of addiction in the world. Alcohol represents a more complicated picture. Alcohol, as a “drug of the many, opposed to alcoholism as a chronic disease of the few” (Courtwright 2002), has attracted increased scrutiny since the last quarter of the twentieth century. Renewed concerns about alcohol-related social harms, such as car crashes, have fuelled a “new temperance movement”. Despite these movements alcohol is less vulnerable to regulatory escalation than tobacco. It is clear that many people can drink moderately with little fear of serious health consequences, but the same cannot be said of smoking.

A.3. Assessing drug harms

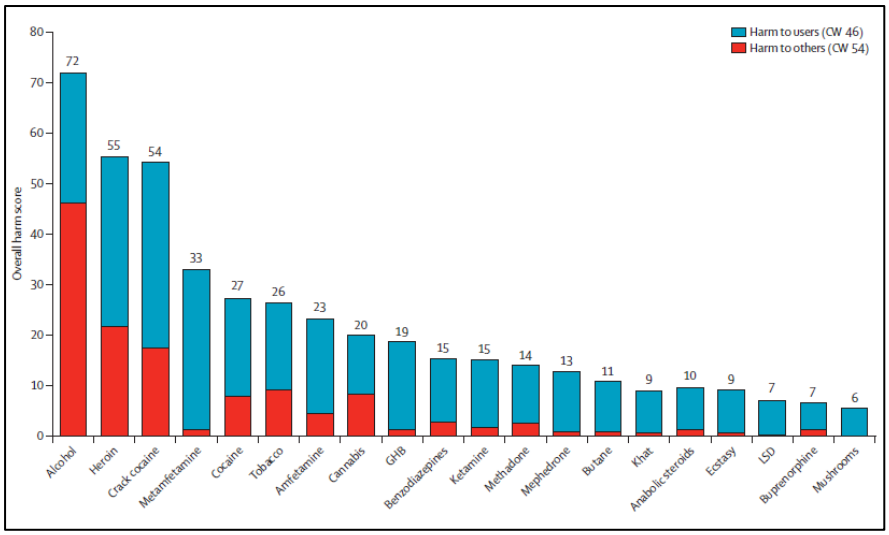
Independently of their legal status, drugs can cause harm in a wide variety of ways. In a recent study (Nutt et al. 2010), an independent scientific committee on drugs developed a multicriteria decision analysis to assess 20 drugs relevant to the United Kingdom. Each drug was scored according to 16 criteria; nine related to the harms that a drug produces in the individual and seven to the harms to others. These harms were clustered into five subgroups representing physical, psychological and social harms. The criteria listed as to others took into account the number of users (Figure A.3-1).

Figure A.3-1. Drug evaluation criteria organised by harms to users and harms to others (Nutt et al. 2010)



According to this assessment, the most harmful drugs to users were heroin, crack cocaine and methamphetamine, whereas the most harmful to others were alcohol, crack cocaine and heroin. When the two scores were combined, alcohol was the most harmful drug followed by heroin and crack cocaine (Figure A.3-2).

Figure A.3-2. Drugs ordered by their overall harm scores, showing the separate contribution of harm to users and harm to others (Nutt et al., 2010).



The findings of this study and those of a similar work in the Netherlands (van Amsterdam et al. 2010) confirm that the present drug classification system has little to do with the evidence of harm.

A.4. Neurobiological aspects of drug use and addiction

Compounds that humans use and to which vulnerable humans become addicted include: opiates, ethyl alcohol, nicotine, cannabis, cocaine, amphetamines, methyl-xanthine stimulants (e.g. caffeine), benzodiazepines, barbiturates and barbiturate-like sedative-hypnotics, anaesthetics, and some volatile solvents and hydrocarbons. Addicting drugs have no pharmacological commonalities according to traditional pharmacological categorization. In fact, the single essential commonality of addictive drugs is the neurobiological one, their ability to acutely enhance the pleasure/reward circuitry of the brain. The hypothesis that addicting drugs act on these brain mechanisms to produce the intense subjective pleasure/reward is, at present, the most convincing hypothesis available on the neurobiology of drug abuse (Gardner and David 1999).

The central topic in the neurophysiological study of addiction is the reward system of the brain. The neurobiology of the positive reinforcing effects of drugs with addiction potential lies on the mesocorticolimbic dopamine system. This system is very important for drug reward. Activation of the mesocorticolimbic dopamine system has multiple functional attributes, including giving incentive salience to stimuli in the environment, to drive performance of goal-directed behaviour or activation in general. Four neurotransmitter/neuromodulator systems have been identified to have a role in the acute reinforcing effects of drugs: dopamine, opioid peptides, γ-aminobutyric acid (GABA) and endocannabinoids (Koob and Volkow 2010). Different addicting substances enter the brain's pleasure/reward circuitry at different sites and affect it by different neuro-pharmacological mechanisms (Koob and Volkow 2010), but all result in the same final common neurochemical

event: augmented dopamine in the nucleus accumbens dopaminergic pleasure/reward synapses.

Addictive drugs activate existing brain reward circuits and affect the reward structure, i.e. brain reward systems structure changes with the development of addiction. If use of an addictive substance is frequently repeated, two correlated changes in hedonic tone occur. Tolerance to the euphorigenic effects of the substance grows, while the withdrawal or abstinence syndrome becomes more intense and of longer duration. Thus, the positively reinforcing properties of the drug diminish while the negatively reinforcing properties (relief of withdrawal-induced anhedonia) strengthen (Gardner and David 1999). The development of substance dependence is marked by a growing motivation to use the drug as a response to its increasing negative reinforcement effects. Much progress in neurobiology has provided a useful neurocircuitry framework with which to identify the neurobiological and neuroadaptative mechanisms involved in the development of drug addiction (Koob and Volkow 2010). Genetic variations in vulnerability to drugs harms and addiction among humans are known and have been especially well documented for alcohol (Cloninger & Begleiter 1990; Pickens et al. 1991).

Addiction raises the paradox of voluntary self-destructive behaviour. By means of their pharmacological action, drugs affect the reward structure and the capacity for making rational choices. The action of drugs is intimately connected with emotional and volitional centres in the brain that might give rise to some form of irrationality. Loewenstein (Loewenstein 1999) argues that visceral factors such as drug craving tend to overcome rational reflexions. According to this author, visceral factors such as hunger, thirst, sexual desire, moods and emotions, physical pain,

and craving for a drug in the case of addiction, are associated with regulatory mechanisms that are essential for survival. At high levels, drug craving and other visceral factors overwhelm decision making altogether, interfering with volitional control of behaviour.

A.5. Drug use as a social product

From the previous sections we can assert that the characteristics of drug use are determined geographically and historically. Socioeconomic and contextual factors will influence availability and the social norms surrounding the toleration of any drug use and the prevalence of any licit or illicit drug use (Neve et al. 1993; Johnson and Gerstein 1998; Holdcraft and Iacono 2004; Kerr et al. 2004; Rahav et al. 2006; Fite et al. 2009), and will also determine the sequence of drug use initiation (Degenhardt et al. 2009, 2010). Potential changes with respect to drug use will arise from changing social norms and social drug consumption behaviour at population level and from policies, laws and economic factors.

A very good example of the shifts in drug use is that provided by Brecher (Brecher and The Editors of Consumer Reports 1988) regarding the use of opiates in the United States. At the end of the nineteenth century women accounted for two-thirds of opiate users. The widespread medical custom of prescribing opiates for “female troubles” is presented as the main reason for this excess of female opiate users. Also, as Brecher puts it “the extent to which alcohol-drinking by women was frowned upon may also have contributed to the excess of women among opiate users. Husbands drank alcohol in the saloon; wives took opium at home”.

After the Harrison Narcotic Act in 1914, the sex ratio of opiate users began to change. In 1918 a report stated that drug addiction was equally

prevalent in both sexes, while estimates during the sixties indicated that males outnumbered females among known addicts by five to one or more. The age of the users also changed. In 1880 a survey showed an average age of about 40 years for male and female users. In contrast, in the 1970s most of the addicts were under 30 years old.

The third interesting change concerns socioeconomic status. Opiate use, unlike alcohol use, prevailed more extensively among the wealthy and educated classes in nineteenth-century America. Opiate use was also lower among black people compared to whites. The proportion of black people among opiate addicts increased after World War II, coinciding with a shift in the channel of heroin distribution. After the 1960s heroin use increased again among young middle class whites (Brecher and The Editors of Consumer Reports 1988).

Social and cultural changes which occurred in the 1960s were accompanied by an increase of illicit drug use in western societies, and mostly among males, that extended worldwide (Nicholi 1983). In 2009 an estimated 149-271 million people worldwide used an illicit drug. The most used drug was cannabis (125-203 million users); 15-39 million were problem users of opioids, amphetamines or cocaine; and 11-21 million injected drugs (Degenhardt and Hall 2012). Information on other drugs such as MDMA (ecstasy), hallucinogenic drugs, inhalants, or non-medical use of benzodiazepines and anabolic steroids is scarce.

High-income countries, countries near major drug production areas and those on drug trade routes, register the highest levels of illicit drug use. Still, data for their use in low-income countries are poor. Illegal and often stigmatised behaviour like illicit drug use prevent an accurate estimation

of the prevalence, especially in cultural settings where illicit drug use can lead to imprisonment (Degenhardt and Hall 2012).

Since recreational use of cannabis was first reported in the United States in the 1960s, its use has spread globally from high-income to low and mid-income countries (Hall and Degenhardt 2007). In the 1990s, when evidence on the health effects of cannabis use was limited, different competing public policies towards cannabis use were discussed (decriminalisation or legalisation of personal use versus intensified public education and law enforcement campaigns to discourage use). At present, when cannabis personal use is legal in many countries epidemiological evidence on adverse health effects has strengthened. Cannabis use increases the risk of accidents and can produce dependence. There are also consistent associations between regular cannabis use and poor psychosocial outcomes and mental health in adulthood (Hall 2014).

A.5.1. The cultural position of drinking

Alcohol, as a legal and widely used drug, offers a paradigmatic case of differences in drinking practices and of the cultural position of drinking across societies. Room and Mäkelä (Room and Mäkelä 2000) define the cultural position of drinking as "the norms about the use of alcohol in a culture and the relation of drinking with other aspects of the culture". The relevance of discussion on the cultural position of drinking lies in the relation of drinking patterns with findings about the rate of drinking problems or the profile of problems related to alcohol in different countries (Gmel et al. 2001; Rehm et al. 2003; Astudillo et al. 2010).

Wet and dry cultures and ongoing changes in alcohol consumption

Focusing on Western societies, the so-called wet or dry cultures have been commonly associated with a history of temperance movements or a dominance of wine versus distilled spirits. The distinction between these two cultures regarding alcohol use has been traditionally described as follows: In wet cultures alcohol is integrated into daily life and activities, it is mainly consumed with meals and is widely available. Abstinence rates are low in these cultures, and wine is largely the beverage of preference. European Mediterranean countries are the traditional examples of wet cultures. In dry cultures alcohol consumption is not as common and access to alcohol is more restricted. Abstinence is more common, but when drinking occurs it is more likely to result in intoxication. Wine is less common. Examples of traditionally dry cultures include the Scandinavian countries and English speaking cultures (Bloomfield et al. 2003).

The dryer pattern described in the context of European and English-speaking cultures associated with a history of strong temperance movements have in common a dominant tradition of Protestant religion. Protestantism emphasises the importance of self-regulation and self-control, and articulates high levels of societal concern about drinking and drunkenness (Room and Mäkelä 2000). Another relevant difference between dryer and wetter societies in Europe which could lie behind the differences in alcohol's cultural position is the industrial revolution. In countries where it came earlier, increased requirements for labour discipline made a stronger cultural impact and temperance movements became strongest (Room 1998).

However, recent comparative research has found that the wet/dry division seems to be disappearing in Europe, where a homogenization of consumption rates and beverage preferences is increasingly evident. Wine consumption has decreased in the traditionally wet Mediterranean countries and overall alcohol consumption has increased in northern European countries (Anderson and Baumberg 2006). Additionally, many aspects of this north-south gradient are much weaker in the younger generations. Young people in southern European countries are more likely to drink beer and to drink in public places than older generations and less likely to drink wine with meals (Anderson and Baumberg 2006).

Different sets of reasons have been proposed for this partial harmonization in European drinking patterns. The first one involves changes in living conditions, including changing patterns of time use, urbanization and move from agriculture to industrial/service sectors in the Mediterranean areas (Allamani 2001). Economic changes, including the recession in the mid-eighties and the relative increase in wine prices compared to beer, may have contributed to a decline in consumption and change in beverage choices in Spain (Gual and Colom 1997). The globalization of the alcoholic drink industry and of its business and marketing practices has increased international availability of alcoholic drinks. The globalization of cultural forms alongside the globalization of commerce (Simpura 1997) may be important to shape styles and tastes associated with particular drinking practices, leading to increasing harmonization. The converging and generally increased public health policies on alcohol may have also contributed to the observed harmonization of drinking levels (Anderson and Baumberg 2006).

A.5.2. Drug use and social interaction

Individual desires and beliefs are shaped and reshaped through social interaction and can therefore be viewed as social products. In order to understand variations in the prevalence of different types of drug use across cultures and historical times the interdependencies among individual actors has to be taken into consideration. Moene (Moene 1999) has proposed a model of behaviour change whereby individuals and groups shift their behaviour and then these changes spread via social networks and accumulate into long waves of gradual population-level effects that impact across society.

The strong collective component of the drinking culture has been made clear in the relationship found between the overall per capita alcohol consumption in a given population and the number of individuals with harmful alcohol use and alcohol use disorders (Rose and Day 1990; Skog 1991; Lemmens 2001). The conclusion of these studies is that changes in average consumption will reflect the behaviour of the heaviest drinkers more than lighter drinkers, and also inform of the wider tendency for populations to change their levels of consumption collectively.

Age, period and cohort effects

Although changes in consumption tend to happen across the whole population (Mäkelä 2002), some groups may show distinct trends according to age (Garretsen et al. 1999), gender (Neve et al. 1993) and other combinations of factors including socio-economic status (Romelsjö and Lundberg 1996).

Some studies have considered different demographic components of change and have tried to separate population trends into three types of demographic trends: (i) Trends across the life-course or the

consequences of growing older (age effects); (ii) trends across the whole population over time (period effects); and (iii) trends across successive generations or the consequences of being born at different times (cohort effects) (Glenn 2007).

Results of international studies show that generally alcohol consumption peaks in early adulthood, but that period and cohort effects vary by country (Levenson et al. 1998; Kerr et al. 2004, 2009; Meng et al. 2014). These studies help to identify the demographic origins of general population trends by disentangling age, period and birth cohort effects.

A.5.3. Gender differences in drug use

Men are more likely than women to use any drugs other than prescription drugs. Epidemiological studies on gender differences in alcohol use report that men are more likely to drink alcohol, to drink more when they do and to have more alcohol-related problems (Fillmore et al. 1991; Wilsnack et al. 2000; Rahav et al. 2006). Similarly, women are more likely than men to abstain from drinking. This gender gap in drinking seems to be common in every society where alcohol use has been measured or surveyed.

Two theoretical perspectives have been proposed that can help to explain gender differences with respect to alcohol use. One perspective focuses on biological differences, while the other stresses cultural and socio-structural reasons. The biological perspective pays attention to gender differences in biological sensitivity to alcohol effects. Women have lower body water level to distribute alcohol, which would lead them to reach higher alcohol levels than men with the same amount of alcohol (Cole-Harding and Wilson 1987; Mumenthaler et al. 1999). Also, a lower proportion of gastric agents to metabolize alcohol in women compared

to men would favour a greater absorption of alcohol in blood (Pozzato et al. 1995). All this means that women would need to drink less than men to obtain the same effects (York and Welte 1994). However, there is no evidence to support the hypothesis that women restrict their drinking more than men do because of higher subjective intoxication at lower doses. Besides, the reasoning based on differential body water could also be used to explain differences in drinking within sexes, and this has not been proven.

The alternative perspective that emphasizes cultural and socio-structural reasons focuses on men's and women's social roles to explain differences in use. Alcohol consumption among men has been promoted as a sign of masculinity, to show resistance, self-control, non-conformity and willingness to take risks. Drinking in all-male groups has also been a way to encourage social support and to establish strong personal ties. In the case of women, drinking has been more socially restricted than in men for fear that this would affect their social conduct and responsibilities. The effects of alcohol would reduce control over women's sexuality as alcohol use would make them either more sexually disinhibited or more vulnerable to sexual advances. Besides, the effects of alcohol have also been considered incompatible with women's traditional domestic roles as caregivers. Alcohol abuse among women might also indicate a failure of social control over women's public behaviour (Wilsnack et al. 2000).

From this perspective it might be argued that if gender differences in alcohol use can be explained by socio-cultural causes linked with gender roles, these differences would reduce if differences in roles between men and women were to diminish (Bloomfield et al. 2006a). Since the latter part of the last century and especially in western countries, women are

experiencing changes in their social role involving better opportunities for education, employment and delayed childbearing, which would have provided a social and political framework for a shift in the norms surrounding their use of drugs (Bond et al. 2010) and would eventually explain an increase of drugs use by women in recent cohorts (Rahav et al. 2006). Gender role changes toward women's increased education, independence, and employment outside the home are often linked to perceived increases in women's alcohol consumption.

Besides, a comparative study within Europe noted that a more egalitarian drinking pattern could be found in countries where drinking was well-integrated in everyday life. Female's drinking seemed also more affected than male's drinking by educational attainment, employment status and parenthood (Ahlström et al. 2001). Different drinking trends in the "age effect" between men and women have been found in a longitudinal study in the UK on labour market categories as predictors of weekly alcohol consumption in midlife (Colell et al. 2014)[1]. In men alcohol consumption typically declined while women made modest increases in their intake from age 33 through 50. This could be explained by the fact that men's drinking level at age 33 is still influenced by large amounts of alcohol use at younger age, and that decreases in alcohol use due to "maturing out" are still in progress. Conversely, women may increase their alcohol use after lower levels of intake due to pregnancy and motherhood.

[1] This work was done during the author's research stay at the University College London (UK) as part of the international PhD program. A copy of the article is included in the annexes.

Wilsnack et al (Wilsnack et al. 2000) conclude that while gender differences in drinking seem too consistent for explanations based solely on social or cultural influences, they are also too variable in size for explanations based only on biology. An inclusive perspective that recognises both biological and cultural influences on men's and women's drinking might come closer to explaining why gender differences in drinking are both so universal and so variable.

Societies use biological phenomena as a basis for creating rules for social behaviour and relationships. Women's unique ability to bear and nurse children commonly becomes the basis for much more elaborated differences in men's and women's social roles (Rosaldo 1974). Likewise, minor gender differences in sensitivity to alcohol could be used to justify lower normative limits and greater restrictions for women's drinking.

It has been argued that employment would affect women's drinking. Role overloads on women with responsibilities at home while also working outside the home may result in increased alcohol use to relieve tension (Wilsnack and Wilsnack 1992). On the other hand, increased income under their control, greater opportunities to drink and the need to conform to job related drinking norms developed around male drinking patterns would promote drinking among women (Wilsnack and Wilsnack 1992; Thundal and Allebeck 1998).

On the other hand, women are more likely than men to use any psychotropic prescription drug (Alonso et al. 2004). Gender has been presented as a key element in the physician-patient relationship to explain differences between men and women in prescription (Baumann et al. 1996; Markez et al. 2004; Chilet-Rosell et al. 2013) and treatment

(Bösner et al. 2011). Differences in the management and expression of anxiety and stress between men and women and the higher propensity of women to seek medical care may make it more likely for them to be diagnosed and treated for mental disorders (Markez et al. 2004).

A.5.4. Social inequalities and drug use

Given the powerful cultural associations of drug use it is reasonable to think that different socioeconomic groups would vary in their use of drugs. With respect to alcohol, the most consistent pattern is that groups with less education, lower occupational level or less income, as well as unemployed, are more likely to abstain from alcohol (Hupkens et al. 1993; Marmot 1997).

Although many studies have found that socio-economically disadvantaged groups exhibit heavier patterns of drinking (Bobak et al. 1999; Droomers et al. 1999; Bloomfield et al. 2006b), the relationships between socioeconomic status and drinking are not straightforward. Some studies have found that differences in drinking among socioeconomic groups relate to drinking patterns (i.e. quantity and frequency) so that those with higher socioeconomic status drink more frequently while lower socio-economic groups drink larger amounts (Casswell et al. 2003; Huckle et al. 2010). On the other hand, the relationship between the total amount drunk and socioeconomic position does not seem to be stable. A study from Sweden (Romelsjö and Lundberg 1996; Norström and Romelsjö 1998) found that managerial non-manual workers were replaced by manual workers over the period from 1970 to 1994 as the heaviest drinking group.

Socioeconomic differences have also been reported to affect men's and women's alcohol use differently. Men with lower level of education are

more likely to drink more than other men (Casswell et al. 2003; Bloomfield et al. 2006b), while among women those with higher education would tend to consume more alcohol (Ahlström et al. 2001; Casswell et al. 2003; Bloomfield et al. 2006b). The fact that women with higher education are more likely to be employed than other women also has to be considered in the relationship between socioeconomic status, employment and alcohol use in women.

In any case, poorer populations may experience disproportionately higher levels of alcohol-attributable harm with the same level of consumption and irrespective of the pattern of drinking (Hemmingsson et al. 1998; Mäkelä 1999; Bloomfield et al. 2006b; Mäkelä and Paljärvi 2008). In most European countries, inequities in alcohol-related deaths and health problems are more pronounced than the differences in alcohol consumption across the social gradient (Schmidt et al. 2009). An explanation for this is that the most disadvantaged groups, people with no qualifications, the unemployed and those with below-average income will have fewer resources to protect them from the ill effects of heavy drinking.

A.5.5. Prescription drugs

Many medications with sedative, anxiolytic, analgesic or stimulant properties have the potential to be inappropriately used. However, because these substances have legitimate therapeutic benefits and are prescribed for their beneficial effects, many issues relevant to defining and characterising their inappropriate use may not be adequately addressed by frameworks that have been developed to describe use and misuse of alcohol and illicit substances.

Inappropriate medication use has been frequently defined in terms of prescription status (uses that occur without a prescription), reasons for use (use for recreational purposes), the presence or absence of symptoms of abuse or dependence, or some combination of these factors (Barrett et al. 2008). However, the health care system has also been noted as additionally contributing to prescription drug misuse (Chassin and Galvin 1998). Physicians may play a role in medication misuse by misdiagnosing the patient or over-prescribing the medication (Kisely et al. 2000; Prueksaritanond et al. 2009).

In a social context that tends to the "medicalization" of human suffering and social problems (Conrad and Leiter 2004; Conrad 2007), availability and demand for such medications have been rising steadily. The increase of use of this type of drugs represents an important public health problem due to its relation with cognitive impairment and the occurrence of accidents (Wadsworth et al. 2005).

Part B. Work

B.1. The redefinition of work

During the nineteenth and twentieth centuries work became a measurable and exchangeable commodity. Labour became a core product of the so-called "society of work", where rationality and economic profit rule the material production of life. The characteristics of this particular commodity have substantial implications for the individuals selling it and for the social structure as a whole. According to André Gorz (Gorz 1997), the main characteristics of **work as a commodity** in its liberal-bourgeoisie sense can be defined as follows: it is done in the public sphere, it is meant for the use of others (has a value of use for others), it is sold as any other merchandise (acquires an abstract meaning), and it is done in a measurable time and aiming at the highest performance.

This model of work spread gradually to all industrialised countries and is known as the model of **salaried work**. This model of economic society has progressively situated the salaried condition at the core of social organisation (Castel 1997). The hegemony of this model reached its peak in the period following World War II and has persisted in all western countries, where the vast majority of the active population works for a salary. Factory work is the archetypical image linked to this model.

Changes in the model arose first of all from the transformations suffered by industry during the last three decades. These transformations, referred to as restructuration, reconversion or deindustrialisation, have altered the definition of employment that fitted well for factory work but has limitations in the current tertiary and informational societies. The

structure of employment in the services sector is different and much more heterogeneous than in industry. Employment in the service sector not only includes a large group of clerks and service workers, a gradually increasing portion of self-employed and small-scale independent workers, but also a growing number of non-qualified workers with very low earnings who lack stability and job security (Mingione 1993). The transformations which have occurred in the industrial and services sectors make it necessary to revise the current basis for defining salaried work.

The proliferation of new hiring forms in the last fifty years has also cast a shadow over the dominance of employment stability. The hegemony of the stable worker defined as the standard of employment, is now being questioned by a vast number of employment situations provoked by the temporality and flexibility of work: short-term, part-time jobs, working for different companies at the same time, only in week-ends, etc. Employment diversity replaces the hegemonic homogeneity.

In many occasions this diversity implies **precariousness**, a very important element of change in the definition of work. In the past, stability linked work with social progress as having a job implied access to prosperity. This equation falls apart with the emergence of job insecurity and the spread of low-paying jobs. Both trends have increased the number of low-salaried workers and of the working poor whose incomes keep them below the poverty threshold. These circumstances are undermining the principles of the ethics of work that ensured social promotion in exchange for work effort while questioning the status of the integrated worker, especially in disadvantaged occupational categories (Santos Ortega and Poveda Rosa 2002).

B.1.1. Informational society and globalization

Manuel Castells (Castells 1997) has analysed the new and complex **informational society** that has developed around the information technology. According to him, we are now facing a new techno-economic system, the so-called *informational capitalism*, which has been useful to revitalize capitalism after the crisis at the beginning of the seventies. The new technologies have favoured the intensification of work and have therefore helped to increase capital profitability by making labour more profitable. They have also contributed to increase economic and productive diversification by innovating in products, processes and new forms of capital circulation.

Technological revolutions entail changes in economic activities and employment. The ability of informational technologies to automate and improve the organization of production contrasts with the persistency and increase of low-qualified jobs in the service economy and the increase of noxiousness in certain occupations (carrying heavy loads, working in environments with noise, or maintaining awkward postures) (The European Foundation for the Improvement of Living and Working Conditions 1998).

Informational technologies have also favoured reorganization of production at international level and have guided a new strategic model of company management. According to Thomas Coutrot (Coutrot 1999), the main objective of the change in work organization and business management is to get rid of any obstacle that may hinder profitability and, in order to achieve this, organizational and market uncertainties are passed on to other domains (workers, small companies, the State) thus

aggravating the problem of capitalist organization of work: the trend to dissociate economic efficacy from social justice.

The operational basis of this new corporate model that has been spreading since the eighties is a new division of work based on increasing techno-productive flexibility through procedures and production strategies such as just-in-time, company networks, productive decentralization and polyvalence. In order to grow and maintain competitiveness, companies merge, create alliances and accrue capital, making worldwide financing the core of the business. The logic of speculative profit imposes the need to reach a certain profitability quota as a condition to continue attracting capital. Financial audits and profitability credentials impose a dictatorship of profit on companies. The efficacy in accumulating benefits is a continuous requirement for company managers who may otherwise be facing business restructuration (Coutrot 1999).

In this context, employees suffer a great degree of uncertainty that forces them to cooperate with the company. Companies' human resources are managed on the basis of flexibility and fluidity. Internal flexibility, based on cooperation, polyvalence, training and team-work, is coupled with external flexibility focused on layoffs and a wide variety of temporary work (Coutrot 1999).

Changes in the way production has been organised during the last thirty years also relate to **globalization** processes. These changes focus on the international arena as the scenario for designing production processes. The transnational economy has contributed to the dynamics of deindustrialization in western countries. Productive delocalization

processes guided by salary advantages have worsened working conditions of those employed in the affected economic activities. Apart from being a menace for the continuity of work it also limits the power of workers' claims and collective actions. Besides, the activity of smaller sub-contracted companies intensifies. Transnational companies are supported by an ensemble of local companies on which they put pressure in order to achieve greater competitiveness (Santos Ortega and Poveda Rosa 2002).

B.2. Changes in the labour market: a socio-historical approach

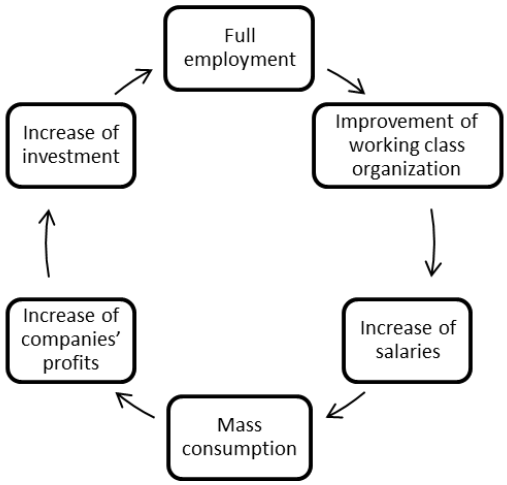
In order to understand the present labour market situation it is necessary to identify the immediate antecedents that have contributed to form the contemporary labour market framework. To interpret changes in economic activity, professional structure and types of contract we will use a socio-historical approach that allows contextualisation of the recent transformations in this field.

After World War II and for about three decades (1945-1973) industrial societies adopted **Fordism** as a model of development. The fundamental characteristics of Fordism were: (i) a strong and active role of the State in the regulation of socioeconomic life, (ii) a sustained economic growth based on production and mass consumption, and (iii) the improvement of the standards of living of large population segments. Scarcity of all kinds of goods, particularly basic consumer goods, led to the hegemony of the productive system (taylorism-fordism) that assured a quick economic recovery thanks to its high productive efficiency.

Fordism stimulated an economic model that guided western economic growth in what has been called the virtuous circle of Fordism (Figure B.2-

1). Its functioning was based on the high productivity of the system and the need for a massive labour force. The distribution of profits to increase workers' purchasing power would maintain the stability of companies' profits. Full employment, mass consumption, high productivity and reinvestment of companies' profits formed a spiral of economic expansion that would reflect in most of the major economic indicators.

Figure B.2-1. The virtuous circle of Fordism.



The 1973 oil crisis altered the equilibrium systems of Fordism and heralded a period of economic instability marked by unemployment and increase of social inequalities. The crisis also involved a deceleration of public spending with the subsequent paralysis of the welfare state as universal model, and a turning point in the mediator-regulator role of the State in the relations between capital and work.

Capital profitability index is an indicator that measures company profits and is a key variable in the functioning of the system. Capital investment is directly associated with profit expectations. When the prospects are

low, the accumulation model stops and governments and companies need to set up new policies and strategies to revitalise profits and reconfigure a productive economic model with a growing profitability rate. Company profits have suffered cyclic fluctuations from the beginning of industrialization that have been always accompanied by important transformations in the functioning of the economy and of policies aimed at consolidating profit rates. The profitability crisis that began in 1973 questioned the model of capital accumulation based on Fordism and the dynamics of recreation of the process of capital accumulation gave rise to a series of strategies that have led to profound changes in the structure of capitalism.

Governments imposed adjustment programmes that included salary reductions, reduction in the provision of social benefits, tax measures and deregulation of the labour market. Among employers the key idea behind their new strategies, and one that has become a topic present in all their discourses since then, is the concept of **flexibility** applied to all fields. From the organisation of production and the use of technologies to the management of the workforce, it is presented as the solution to former rigidities. The vagueness of the concept has facilitated its use as an ideological basis to justify all types of reforms within companies (Santos Ortega and Poveda Rosa 2002).

At this point it is important to discuss changes to the model of employment that derived from Fordism. A pattern of stable employment characterised by permanent contracts (for life), with promotion systems, union protection and predictable and regularised work schedules for the majority of the workforce, has been replaced by a model where different situations coexist. Along with the stable jobs, unstable jobs have become

"normal": temporary contracts, part-time, training contracts, apprenticeships. All these contract forms aim at assuring a company's adaptation to a highly competitive economic system. Their costs, however, have resulted in an **increase of uncertainty and insecurity** with respect to the future for a high proportion of workers. Young workers and women are the most affected by this type of contracts. In Spain, the percentage of workers with a temporary contract rose from 16% in 1987 to 32% 2001. In 2013 this percentage had decreased to 23% (Instituto Nacional de Estadística), due in all probability to the increase of unemployment mostly among those holding temporary contracts.

Workforce has become a variable of adjustment for companies and labour flexibility the base of the current dynamics of modernization. Flexibility spreads as a strategy of personnel selection mainly among the less protected sectors of the workforce. Currently, the exhaustion of this model is connected with the new uses of the workforce, considered only a resource aimed at producing value and detached from the life itinerary of the person providing it (Santos Ortega and Poveda Rosa 2002).

The **spread of precariousness**, articulated in the increasingly tight link between employment conditions and unemployment, particularly in the weaker sectors of the labour market, coincides with the so-called **disintegration of the labour ideologies** (Bilbao 1993). The fragmentation of labour identities at the end of the twentieth century has been identified as an historic rupture with the homogeneity of identities generated between the 50s and the 70s (Palmade and Dorval 2000). The current breakdown of workers by income, category and qualification has weakened the more integrative notion of trade. Workers perceive the new order of labour as more individualistic, highly authority-dependent,

competitive, greatly intensified, more involvement, and loaded with uncertainty (Palmade and Dorval 2000). Other authors have pointed at the personal consequences of work in the new capitalism. Richard Sennett (Sennett 2000) describes the impact on individual and collective identities of the new labour representations and their relation with the crisis in the ethics of work and in the value of the experience. The growth of situations of exclusion, linked to massive and long-term unemployment and the new uses of the workforce, have resulted in vast economic and social vulnerability.

B.3. The sexual division of work

The term **gender** helps us to understand how social and individual identities are defined and how masculine and feminine are defined through tasks and activities and social relations, creating work-based identities. Differences in the working trajectory derived from the unequal distribution of roles within the family sphere account for the basic asymmetry between men and women in the work domain. The model of worker derived from Fordism discussed in the previous section has its reflection in a male industrial worker, head of the family and responsible for earning the main income within the family unit.

The symbolic meaning assigned by our society to the work performed by women can be summarised in the phrase from Susana Narotzky (Narotzky 1988) “work is help”. The processes carried out at home, procreation, child nurturing and education, fall within the field of “the natural” which is not considered work. The production of goods at home and biological reproduction are considered natural and a “help” to maintain the family. In contrast, we have men’s salaried work which is

not natural and produces merchandise. In opposition to women's "work is help", we have men's "work is money".

The metaphor "work is help" expresses itself in four important domains fully defining the sexual division of work and providing an interesting starting point to understand the gender asymmetry in the division of work. The first one is the extrapolation of the notion of "help" ascribed to women's functions and activities within the family group to the global socioeconomic order. Thus, even if women carry out remunerated work, it is not considered as their chief activity, as help is "the economic function of women in society". Secondly, it is help because the income derived from women economic activity is considered a complement to that of the head of the family, ideally a male. Thirdly, it is help because women's participation in the salaried work domain is considered provisional and circumstantial. The implication of men in productive work is regarded as continuous while for women it is discontinuous due to her reproductive responsibilities. Any working woman can be seen as a potential mother and, consequently, a worker with a discontinuous working trajectory and with reduced availability of time and energy. This assumption has legitimated the use of discriminatory labour practices against women. Lastly, it is help because the factors defining the character of the work (qualification, training and professionalism) have been taken up by male salaried workers and legally institutionalised while, traditionally, the training of women working outside home came from the work at home in order to carry out low-qualification tasks. For many years the female labour force has been technically qualified - knowledgeable of the techniques and possessing the skills- but formally disqualified -lacking titles and credentials (Narotzky 1988). However,

these claims should be revised as presently women are reaching higher educational levels than men.

A second important term is the relation between **reproduction and production**. Just as the notion of gender exposes the non-natural dimension or the relationship between sexes, the pair of concepts production/reproduction reveals a series of core socio-political processes crucial to understand social functioning. Social reproduction includes the set of organisational conditions that allow human survival in contexts of groups (Mingione 1993). According to this, the concept of social reproduction refers to survival strategies and the maintenance of social groups.

The advent of the industrial society created a physical (domestic domain and workshop) and symbolic (productive and unproductive work, work and no-work) separation of the production and reproduction practices. While in pre-capitalist societies the overall objective of survival and reproduction of the group did not clearly distinguish separate contexts for the production -carried out within the family embedded in the community-, under capitalism the productive sphere separates from the reproductive and determines places and division of works: the factory for production, and the home for reproduction. The priority given to the production of goods when explaining the development of capitalism and secondarily to the activities of social reproduction has been a problem in countless studies about the sexual division of work.

Any conceptualization of economic activity has to include the production of goods and services aimed at the subsistence and reproduction of individuals, independently of the relationships under which these are

produced (Borderías et al. 1994). In this respect, the most fruitful line of work articulates the two logics of professional and domestic work so that both are explained jointly. The work on "dual presence" (Balbo 1991) and on female labour identities (Bertaux-Wiame et al. 1988), are examples of lines of research that have adopted a more global focus about work. From this perspective it is important to understand how domestic and professional spheres articulate and the transitions between employment and unemployment, precariousness and stability, full-time employment and sub-employment have to be re-thought (Maruani 1994).

Women's difficulties to access salaried work and the place they occupy in labour market, differences in the use of time between working men and women, and the strategies of withdrawal and reinsertion to work, are aspects to which economists and sociologists of work have recently been paying attention. The particularities of female employment have been analysed critically from the theories of segmentation (Gordon et al. 1986). These theorists state that companies make intensive use of the female workforce to occupy jobs in the less favoured peripheral segment of economy, contrary to males who would occupy mainly jobs in the central segment. Qualifications, availability to perform these jobs, fewer requirements of promotion and remuneration and, lastly, lower level of organisation are the alleged reasons to relegate women to this type of secondary employments.

The transformations of western economies, changes in demography and in the family structure along with cultural and educational changes have affected women's relationship with the labour market. The most optimistic points of view emphasise the size and importance of the increment of female activity in the labour market as the highest type of

social modernization. The increased participation of women in the labour market is an unquestionable fact. Nevertheless, it is necessary to analyse the sort of participation and the segregation and exclusion movements. The presence of an important number of women in salaried work since the last quarter of the twentieth century should not make us forget the more precarious form of inclusion (Carrasco 1995).

The rise in the age of first maternity and the increase of educational level have undoubtedly had an impact in the labour market participation of recent cohorts of women. Nevertheless, this increase coexists with the persistence of traditional inequalities. Women have a higher unemployment rates than men, and inequalities in employment between men and women can be summarized as follows:

1. The types of work that women perform tend to be an extension of their occupations at home. There is a similarity between the types of work more frequently performed by women and the typical domestic activities.
2. Horizontal segregation of female workers means a comparatively higher concentration of women in certain economic sectors and jobs.
3. Vertical segregation reveals a lower female presence in the higher hierarchical ranks of work.
4. The lower remuneration in general of female workers compared with males and other differences in employment conditions.

B.4. Current trends in the Spanish labour market

In 1984, in an attempt to reduce unemployment, the reform of the labour market liberalized the use of temporary contracts in Spain, allowing employers to use this type of contract even for workers engaged in the company's usual tasks. The main features of this contract were a lower compensation for dismissal compared to permanent contracts and a maximum duration of three years, after which the employer could either terminate it or transform it into a permanent contract. The result was an increase of temporary contracts that peaked in the early 1990s and remained stable at about one third of the total contracts (Instituto Nacional de Estadística). This created a persistent duality in the Spanish labour market between temporary and permanent workers that subsequent reforms have failed to correct. While some employees enjoy the conditions of "employment for life" with high salaries and social benefits, others are relegated to temporary jobs that alternate with periods of unemployment

The most disturbing effect of the current economic crisis in Spain has been the deterioration of the labour market. Apart from the huge increase of unemployment, employment conditions among those currently working and of the jobs being offered have worsened substantially.

A reform of the labour market in 2012 was meant to stop employment destruction and stimulate employment. Moreover this reform intended to lay foundations for economic growth and the creation of stable jobs. But it has failed to correct the duality in employment conditions between permanent and temporary jobs (Kranz 2013). Furthermore, employment

conditions of the jobs now being offered have significantly worsened, especially with reference to salaries (Alcaide 2014).

The reform has favoured internal flexibility in terms of reductions in working hours and salaries, instead of external flexibility based on layoffs. The percentage of full-time jobs has decreased while that of part-time jobs has increased since the enforcement of the law. This has reduced labour costs, increasing productivity and generating low-cost employment, but the duality in salaries and employment conditions persists between permanent and temporary/part-time workers.

Part C. Drugs and work

C.1. Drugs and work: a two way relationship

The use of drugs -basically alcohol- in relation with the workplace has been the object of substantial attention in recent decades from an occupational health perspective. Evidence on the effects of drinking in the workplace has highlighted the loss of productivity and the increased risk of injuries, absence from work and disciplinary problems (Ames et al. 1997; Frone 1998, 2006; Mangione et al. 1999). Research on the use of drugs and the workplace has focused on ascertaining the causes and consequences of substance use in the workplace while broadening the scope to overall substance use.

Ames and Janes (Ames and Janes 1992) proposed four general approaches to address problematic alcohol use by the working population that provide a comprehensive and flexible theoretical framework to which different theories present in the literature can be incorporated. Firstly, the **normative regulations** on alcohol use refer to a series of processes through which beliefs, values and behaviours related to drinking are developed and sustained through existing workplace social and structural mechanisms. These mechanisms can be summarised in social control and availability of the drug to be consumed in the workplace. Secondly, the **quality of work and work organisation** refers to the quality of the working life. Job characteristics such as complexity or work content, degree of dangerousness, lack of control over working conditions and fear of dismissal all relate to stress mechanisms that could lead to workers substance abuse. The third approach would focus on factors **beyond the workplace** such as the family or the influence of the community, i.e. individuals' different social roles that may interact with

working demands and influence drug-related behaviour. Finally, the existence of **occupational subcultures** that share values and expectations regarding alcohol use is also acknowledged.

Most of the research on substance use and workplace has revolved around two central axes: the influence of the workplace normative context to shape drug use and the ability of some workplace characteristics, typically known as the psychosocial risks of work, to generate stress and impact drug behaviour. A recent perspective focuses on the assessment of workplace interventions to prevent or manage drug-related problems among employees (Webb et al. 2009; Ames and Bennett 2011).

C.1.1. Workplace normative context

The studies based on the influence of workplace normative context suggest that a group's shared social norms with respect to drug use will define standards of appropriate behaviour, creating social controls that regulate drug availability and attitudes about drug use. Availability is defined both as *physical availability* or the degree of difficulty to obtain or use drugs during working hours, pauses or at work-related events, and *social availability* or workplace normative support affecting drug use (Frone and Brown 2010).

This approach will focus on supervision and control of employees' behaviour and their integration into a regulated workplace environment to avoid drug consumption (Ames et al. 2000). It has been argued that workplaces where alcohol is easily available will encourage its use among employees (Ames and Grube 1999). An association has also been found between alcohol use and workplace social norms regarding alcohol use (Ames et al. 2000; Barrientos-Gutierrez et al. 2007; Hodgins et al. 2009;

Frone and Brown 2010; Biron et al. 2011). Differences in drinking patterns between business sectors (Berry et al. 2007; Benavides et al. 2013) may be related to different cultural models of alcohol use and availability in the workplace.

C.1.2. Work-related stress

The way work is organised, the technical and social arrangements and the characteristics of workplace production processes may present important sources of stress. Work-related stress may arise through perceived/real pressures, deadlines, threats or anxieties with respect to the working environment.

Stress may result from a wide range of work circumstances. The World Health Organisation (Leka et al. 2003) classifies work-related stress hazards in two broad categories associated with the content and the context of work. Table C.1-1 provides a summary of contextual and content factors defining the hazards of work-related stress.

Table C.1-1. Work-related stress hazards (Leka et al. 2003).

Work context	
Career development, status and pay	- Job insecurity. - Lack of promotion prospects. - Under-promotion or over-promotion. - Work of 'low social value'. - Piece rate payments schemes. - Unclear or unfair performance evaluation systems. - Being over-skilled or under-skilled for the job.
Role in the organisation	- Unclear role. - Conflicting roles within the same job. - Responsibility for people. - Continuously dealing with other people and their problems.

Interpersonal relationships	- Inadequate, inconsiderate or unsupportive supervision. - Poor relationships with co-workers. - Bullying, harassment and violence. - Isolated or solitary work. - No agreed procedures for dealing with problems or complaints.
Organisational culture	- Poor communication. - Poor leadership. - Lack of clarity about organisational objectives and structure.
Home-work interface	- Conflicting demands of work and home. - Lack of support for domestic problems at work. - Lack of support for work problems at home.
Work content	
Job content	- Monotonous, under-stimulating, meaningless tasks. - Lack of variety. - Unpleasant tasks. - Aversive tasks.
Workload and work pace	- Having too much or too little to do. - Working under time pressures.
Working hours	- Strict and inflexible working schedules. - Long and unsocial hours. - Unpredictable working hours. - Badly designed shift systems.
Participation and control	- Lack of participation in decision making. - Lack of control (e.g. over work methods, work pace, working hours and the work environment).

Measuring work-related stress

The most commonly used instruments to measure work-related stress in public health studies are based on the Demand-Control (DC) (Karasek and Theorell 1990) and the Effort-Reward Imbalance models (ERI) (Siegrist 1996). According to the DC model, jobs combining high quantitative

demands and low control produce stressful work environments. Low social support from colleagues and supervisors would increase the risk. High demands imply work intensity, time pressure and interruptions, while control is based on the variety of work (use of skills), and the ability to make autonomous decisions (decision latitude). Alternatively, the ERI model is based on reciprocity in the working sphere where an imbalance (high effort/low reward) is considered particularly stressful. Thus, work compensations, besides an adequate salary, are measured by the perceived esteem (respect, support and fair treatment) and the *status control* derived from the importance of the social role of work to define individual identities. Promotion prospects, unwanted professional changes, job insecurity and status inconsistency (job held inconsistent with educational background) are relevant in order to maintain *status control* in the crucial social role of work in peoples' life.

The two models can be regarded as complementary because, while the DC model focuses mainly on job characteristics and the level of control over work performed, the ERI model defines structural conditions of asymmetric arrangements. Besides, the latter includes information on workers' personal characteristics, i.e. individual motivational patterns that indicate the degree of involvement with work that may result in a differential perception of imbalance.

The simplicity of these two models has advantages for their use in research but they have some limitations to capture all possible psychosocial hazards (Netterstrøm 2012). Demands derived from jobs involving dealing with people (users, clients, students, patients) are not captured in either of them. The need to manage emotions is particularly relevant in these jobs, as has been emphasised in studies on the burnout

syndrome with medical professions or teachers (Maslach et al. 2001). Besides, the dimension *use of skills and decision autonomy* of the DC model fails to take account of control over working schedules, pauses, holidays and days off; the implication with the work and, in general, the influence on working conditions. Finally, its *social support* dimension can be viewed both as instrumental (receiving adequate help to perform the job) as well as emotional (group awareness), while a third relevant aspect regarding the quality of leadership (i.e. clarity in the definition of tasks, receiving relevant and timely information and feed-back mechanisms about work performance) is also missing.

The Copenhagen Psychosocial Questionnaire (COPSOQ) (Kristensen et al. 2005) integrates and enhances the dimensions of the DC and ERI models while incorporating the double presence theory. Double presence is understood as the need to respond simultaneously to the demands of paid and domestic-family work, especially important when assessing the health of women (Sorensen and Verbrugge 1987). Combining family and job responsibilities may result in workload excess in some circumstances that may negatively affect health (Chandola et al. 2004). Also, the role conflict derived from the inability to satisfactorily combine both tasks may be an extra source of stress (Moreno et al. 2010).

Finally, in the present context of occupational flexibility and increase of precarious employment conditions, a study on the dimensions involved in the definition of precarious work has resulted in the development of a scale to measure precariousness in salaried workers (EPRES) (Amable 2006; Vives et al. 2010). This scale comprises six sub-scales defined to measure 1) temporality (duration of the contract), 2) disempowerment (negotiation power of employment conditions), 3) vulnerability

(defencelessness against authoritarian treatment), 4) salary, 5) rights (labour rights and social security), and 6) exercise of rights (practical ability to exercise labour rights).

C.2. Drug use as a response to stress

Work-related stress can affect health directly via the main biological stress axes (Stansfeld and Marmot 2002) and indirectly though health risk behaviours (e.g. lack of exercise, smoking or alcohol consumption) (Lynch et al. 1996). The relation between stress and drinking is mainly sustained by the tension-reduction hypothesis. According to this theory, workers will drink to cope with stress or to overcome negative feelings arising from the work environment. The following two sections will outline the main components of the stress process and describe the fundamentals of the tension reduction theory.

C.2.1. The stress process

The so-called stress process is formed by three domains: **stressors, stress mediators and stress outcomes** (Pearlin 1989). Stressors, or stressful life experiences, are defined as circumstances that threaten a major goal, including the maintenance of physical integrity (physical stressors) or psychological well-being (psychological stressors) (Lazarus and Folkman 1984). Distress, when exposure to stress is severe, prolonged, or both, is a negative psychological response to such threats and can include a variety of affective and cognitive states such as anxiety, sadness, frustration, the sense of being overwhelmed or helplessness.

Exposure to stressors has a powerful effect on a variety of physiological systems. These physiological changes are believed to have evolved to support the behaviours that allow the organism to deal with a threat. In order for the organism to respond efficiently, physiological systems that

are needed to deal with threats are mobilized and physiological systems that are not needed are suppressed. Chronic or repeated activation of systems that deal with threats can have adverse long-term health effects (Sapolsky 1992; McEwen 1998). Impact on the autonomic nervous system, the hypothalamic-pituitary-adrenal axis, and on the immune systems during exposure to a stressor is adaptive in the short–term under certain circumstances, but can become maladaptive if the systems are repeatedly or chronically activated or if they fail to shut down when the threat no longer exists. The term coined by McEwen (McEwen 1998) of allostatic load, refers to the cumulative chronic over-activation of physiological systems whose function is to respond to environmental alarms. Chronic exposure to stressful circumstances has been shown to increase vulnerability to upper respiratory infections (Cohen et al. 2012).

Stress mediators are a variety of psychological and environmental factors that can moderate the relationships between exposure to stressors, distress, and physiological activation. Cognitive appraisal processes can significantly shape the specific nature of the physiological response to stressful circumstances. Cognitive appraisal is the process of categorizing a situation in terms of its significance for well-being (Lazarus and Folkman 1984). Primary appraisal relates to perceptions of threat and secondary appraisal relates to perceptions of resources available to meet the demands of the circumstances (intellectual, social, financial). Different cognitive appraisals can result in different patterns of autonomous nervous system activation. The way an individual thinks about the situation and the control perceived over the circumstance, social support versus social isolation, the place in a dominance hierarchy (subordination and social status threat) all mediate the distress and

physiological response experiences (Kemeny 2003). An individual's location in the social structure is framed by several stratification systems such as gender, social class and age. Thus, components of the stress process (i.e. stressors, mediators and outcomes) will exhibit patterns of social distribution (Pearlin 1989).

C.2.2. The tension reduction theory

Several psychological theories of addiction explain drug use as coping behaviour in relation to some perceived problem. The so-called **tension reduction theory** is based on the hypotheses that alcohol reduces tension and that individuals drink alcohol for its tension-reducing properties (Greeley and Oei 1999). The view that alcohol reduces tension has been widely accepted by the research community since the forties when Hull (Hull 1943) formulated the *drive reduction theory*. An aversive state such as anxiety is conceived of as a drive (stimulus for behaviour), with anxiety reduction playing the role of reinforcement.

The closely related model of **stress-response dampening** has a major advantage in that it is more specific in describing stress responses and focuses on individual differences in regard to alcohol's stress-response dampening effects (Sher et al. 1999, 2007). It has been suggested that the stress-response dampening effect of alcohol could be due to an analgesic effect that reduces the stressfulness of the stimulus. Although individual differences in subjects' susceptibility to this effect may be found, with "problem" drinkers showing greater analgesia after a dose of alcohol than moderate drinkers, the general consensus has been that alcohol, at certain dosages, is capable of reducing some signs of tension in some individuals under certain conditions. (Greeley and Oei 1999)

Anyhow, the relationship between alcohol-drinking behavior and stress is a complex one. Alcohol has anxiety-reducing properties and can relieve stress, while at the same time acting as a stressor and activating the body's stress response systems (Becker 2012). The stress-response dampening effects of alcohol tend to occur at moderate dosage levels, while at lower levels alcohol produces a sense of excitation and exhilaration and at higher levels increased anxiety and aggressiveness (Mello 1968).

Besides, many studies have demonstrated that many factors can act as moderators or mediators of alcohol as a stress-response dampening agent. Individual factors including genetic predisposition and personality have been linked with increased alcohol use. Related personality traits include self-defeating personality, impulsivity, anxiety, hostility in men, and powerlessness. Also men who score high on avoidant forms of emotion-focused coping tend to respond to stress with increased alcohol consumption (Greeley and Oei 1999). Individual beliefs or expectancies regarding the effects of alcohol are also an important mediator factor. Those who hold stronger beliefs about alcohol's positive effects tend to drink more and be more likely to drink in response to stressors (McKirnan and Peterson 1988; Cooper et al. 1992).

Although other drugs such as the benzodiazepines may have a much better therapeutic index as stress-reducing agents than alcohol (Capell and Greeley 1987), studies on the relationship between stress and other drug use are rare and appear to be as inconclusive as those investigating alcohol-stress interactions (Greeley and Oei 1999). Confounding factors such as the stress-producing effects of drug use make it difficult to disentangle the causal direction of any relationship between stress and

drug use. When stress is found to be associated with drug use, it may be possible that this is because drug use creates its own stressful situations (Becker 2012).

From the results of a literature review on the use of alcohol and other drugs to reduce stress, Greely and Oei (Greeley and Oei 1999) concluded that some individuals, for example those who may be genetically predisposed to experience greater stress-buffering effects from alcohol, who hold certain beliefs about alcohol (that alcohol produces positive mood-enhancing effects), will, under certain stressful situations (in which the individual experiences powerlessness), consume alcohol for its stress-response dampening effects. However, they also conclude that these same individuals may also consume alcohol at other times for other reasons (e.g. to enhance a pleasurable experience).

Other traditions trying to explain individuals' addictive behaviours are more concerned with deprivation, inadequate socialization, poor socioeconomic conditions, etc. as predisposing factors. In general, lower socioeconomic groups experience higher levels of alcohol-related harm than wealthier groups. The main reasons are a differential exposure to chronic life stressors such as poverty, living in deprived neighbourhoods and insecure and low-paying jobs, and less resilience/support to cope with stressors (Loring 2014). However, in all of these approaches use, and ultimately abuse, are seen as attempts to handle subjectively perceived problems.

To summarize, tension reduction theory or the stress-reduction dampening model of alcohol consumption only consider one aspect of drug use, seem to fail as comprehensive explanations of alcohol or other

drug use and are inadequate to account for most problem-drinking behaviours. Models that incorporate the effects of individual differences in responsiveness to stress, beliefs about alcohol, and in alcohol's impact on stress responses may replace simpler, single factor explanatory models.

Part D. Justification of the thesis

The first part of this introduction has provided some key elements to understand drug use from a socio-historical perspective. The second part has dwelt on the notion of work and on the latest economic and political developments that have shaped the present context of work and labour market relations. Lastly, the third part has tried to identify the links between drug use and work focusing on work-related stress, and drug use as a response to stress.

Under the National Plan on Drugs, the Spanish health authorities have been carrying out a biennial household survey since 1995, the *Encuesta Domiciliaria sobre Alcohol y Drogas en España* (EDADES). EDADES represents a unique source of information about substance use by the Spanish general population. The information collected by EDADES can be very useful to detect trends in Spain's particular dynamics of drug use. Furthermore, the inclusion of a set of items on working conditions in the 2007 edition of EDADES presents an excellent opportunity to study drug use in relation with the working environment. Finally, we are interested to see if the present economic crisis in which Spain has been engulfed since 2008 is affecting the use of drugs by the Spanish economically active population (i.e. employed and unemployed individuals).

The nucleus of this thesis is thus formed by three main topics, namely, identifying trends in drug use, studying work-related stress in relation with drug use, and examining changes in drug use in a context of economic crisis, that are further elaborated in the following points:

D.1. Identifying trends in drug use

Men show significantly higher rates of substance use, abuse and dependence than women, yet, a recent epidemiological survey worldwide registered an increase in drug use and a narrowing of the gender gap in more recent cohorts, particularly in western countries (Degenhardt et al. 2008). Similarly, a literature review of birth cohort effects and gender differences in alcohol epidemiology (Keyes et al. 2011) found more problematic drinking among younger birth cohorts and a reduction of the gender gap in alcohol problems, particularly in the US and in northern and eastern Europe. Recent trends in the UK show that average consumption for young women nearly doubled between 1992 and 2002 while young men's drinking remained relatively stable (Rickards et al. 2004)

Equally, evidence suggests that the onset age of substance use has become earlier (Degenhardt et al. 2000, 2007), particularly for women (Johnson and Gerstein 2000; Kerr et al. 2007). An early onset of use of a specific substance is a risk factor for substance use disorder related to this specific substance (Pitkänen et al. 2005; Dawson et al. 2008; Grucza et al. 2008; Behrendt et al. 2009). Moreover, a younger age at first alcohol use has been associated with increased risk of cannabis use (Behrendt et al. 2012).

In Spain, the use of drugs in the general population is more prevalent in men except for the use of hypnotics-sedatives which is more prevalent in women. Still, the differences in tobacco and alcohol use between sexes have decreased in recent years, particularly for the group aged 15-34 years (Plan Nacional sobre Drogas 2009). Most significantly, the prevalence of daily tobacco use is higher among 14-18 year-old females

(Plan Nacional sobre Drogas 2010). With respect to illicit drugs, while overall prevalence of use continues to be several times higher in men, differences between the sexes have narrowed among young people.

Modelling trends in drug use can offer insight into the underlying cultural, political, economic and demographic forces that shape behaviours and configure drug use contexts. All cohorts face diverse social, economic and political conditions that may impact their use of drugs. The identification of changes in the cumulative incidence of drug use by birth cohort can provide key information on the dynamics of changes in Spanish society that may help to predict future drug-related harm.

D.2. Work-related stress as a determinant of drug use

Understanding drug use among working individuals is of particular interest not only for public and occupational health professionals, but also for researchers in the fields of management and economy.

A recent report has acknowledged that psychosocial work indicators are worsening in Spain (Instituto Nacional de Seguridad e Higiene en el Trabajo 2011). Conversely, the proliferation of flexible forms of employment, as opposed to full-time permanent employment, has resulted in a growing insecurity concerning job loss and a deterioration of employment conditions (Vives et al. 2011). Work is a key social role in defining an individual's identity. Holding an unstable job with low pay and no promotion prospects implies social reward deficiency, which may impair personal self-regulation, predisposing to addictive behaviours (Siegrist 2000). Interest in the effects of precarious employment on health has increased in recent years and various studies have found a relationship between precarious or unstable work and poor mental

health (Sirviö et al. 2012; Vives et al. 2013) and with changes in health-related lifestyle, including alcohol consumption (Virtanen et al. 2008).

To our knowledge, no studies on work-related stress in relation to drug use have been carried out in Spain.

D.2.1. Work-related stress and alcohol use

Alcohol consumption in the European Union (EU) is more than double the global average and is responsible for a substantial health burden. Conservative estimates indicate that in 2004 almost 95,000 men and over 25,000 women from 15 to 64 years old died from alcohol-attributable causes, corresponding to 11.8% of all deaths in this age category. The overall burden of disease is also high. Over four million disability-adjusted years of life lost (DALYs) were caused by alcohol consumption in the UE, corresponding to 15% of all DALYs in men and 4% in women (Shield et al. 2012). Alcohol consumption has been deeply rooted in European and Spanish culture for centuries.

Most of the studies that have analysed the association of work-related stress with alcohol consumption or alcohol problems have based their work-related stress measures on the Demand-Control model (Karasek and Theorell 1990) or the Effort-Reward Imbalance model (Siegrist 1996). Although longitudinal studies (Crum et al. 1995; Head et al. 2004; Allard et al. 2011) have yielded more consistent results than cross-sectional studies (San José et al. 2000; Bobak et al. 2005; Kouvonen et al. 2005; Hiro et al. 2007; Gimeno et al. 2009), in general these are contradictory and inconclusive about the specific work features or their combinations affecting alcohol use.

Other studies focusing on occupational self-direction, measured as closeness of supervision, routinisation and complexity of work, have reported higher alcohol consumption among people working in low complexity jobs compared with those in jobs with high substantive complexity (Roxburgh 1998; Wiesner et al. 2005; Gimeno et al. 2009). Moreover, noxious or hazardous physical working conditions have also been associated with higher levels of alcohol use (Roxburgh 1998; San José et al. 2000).

D.2.2. Work-related stress and use of hypnotics and sedatives

Hypnotics and sedatives have become the third most used type of drug after alcohol and tobacco in Spain among the general population. Prevalence of use in the last year doubled from 2005 to 2011 (5.1% and 11.4%, respectively) (Plan Nacional sobre Drogas 2013). The increase of this type of drug is not new and sustained increases in use were already registered in Spain between 1995 and 2002 (García del Pozo et al. 2004) Additionally, there is ample evidence that their use increases with age and that is higher among women (Alonso et al. 2004).

Increased use of hypnotics and sedatives, especially benzodiazepines, could relate to an increase of anxiety disorders. According to one review (Wittchen et al. 2011), the most common mental disorders in Europe are anxiety and insomnia, with 14% and 7% prevalence respectively, more common among women.

Employed individuals are considered a group that enjoys good health (healthy worker effect). However, certain working and employment conditions may cause stress and give rise to symptoms of anxiety and insomnia (Cohen et al. 2007). Several studies have established a relationship between work-related stress and mental disorders such as

depression or anxiety (Virtanen et al. 2007; Wang et al. 2012). Similarly, the few recent studies on how the working environment influences use of psychotropic medication have registered higher use among employees reporting an adverse working environment (Jacquinet-Salord et al. 1993), those reporting being dissatisfied with work (Empereur et al. 2003), and those subject to workplace bullying (Niedhammer et al. 2011). Associations have also been found between the use of benzodiazepines in situations of job strain and high demands (Pelfrene et al. 2004), and between low levels of control/reward at work and psychotropic prescription drug use initiation (Boeuf-Cazou et al. 2010).

D.3. Changes in drug use in a context of economic crisis among the economically-active population

Economic downturns are associated with increased psychological distress, use of mental health facilities and suicide rates (Dooley and Catalano 1984; Catalano 1991; Stuckler et al. 2009). There is also extensive evidence that both unemployment and the fear of unemployment have adverse consequences for the health of individuals (Martikainen and Valkonen 1996; Burgard et al. 2009; Paul and Moser 2009; Perlman and Bobak 2009). Recent research on the health effects of the economic crisis in the Spanish population has found an increase in the prevalence of poor mental health among men (Bartoll et al. 2014), a negative impact of unemployment on self-assessed health and mental health (Urbanos-Garrido and Lopez-Valcarcel 2014), and an increase in mental health disorders, including alcohol-related disorders, in people attending primary care centres (Gili et al. 2013).

Poor mental health is a predictor of health-compromising behaviours (Walsh et al. 2013) and unemployment has been associated with

increased unhealthy behaviours, including drug use (Hammarström 1994; Henkel 2011). Therefore, it could be hypothesized that an increase in either poor mental health or unemployment as a result of the economic crisis has resulted in an increase in the use of addictive substances.

Research on changes in substance use in periods of economic downturn has chiefly focused on alcohol. Alcohol is the most widely used drug in Spain, as in most European countries, but the use of illegal substances such as cannabis or of prescription drugs such as hypnotics and sedatives is not negligible, particularly among specific population segments. Prevalence of cannabis use in the last year among people under 35 years old in Spain is one of the highest in Europe (European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) 2012), while the use of psychotropic drugs in Spain also ranks high among European countries (Alonso et al. 2004).

The relationship between alcohol use and economic conditions is not straightforward. Some studies have found an association between unemployment peaks and significant declines in alcohol use (Freeman 1999; Ruhm and Black 2002) and alcohol problems (Ettner 1997), concluding that alcohol consumption is pro-cyclical (i.e. it increases in periods of economic growth). Conversely, other studies have found binge drinking to be correlated with deteriorating macroeconomic conditions (Dee 2001; Dávalos et al. 2012; Bor et al. 2013), even among those who remained employed (Dee 2001), and despite an overall decline in the prevalence of alcohol use.

The few studies that have analysed the effects of macroeconomic circumstances on illicit drug use suggest that young individuals might use

them more frequently during periods of recession with high unemployment rates (Arkes 2007, 2011; Chalmers and Ritter 2011). It has been argued that recessions would directly lead to more drug dealing, mostly due to the lack of legal employment opportunities. Moreover, with less income available, some people may start selling to help pay for their own drugs. An increase in the number of people selling drugs would make it easier to obtain drugs and the price may also be lower due to greater competition, all leading to increases in drug use (Arkes 2011). Besides, as with alcohol, people would tend to use more cannabis to cope with increasing levels of anxiety and distress, and with more free time available the relative value of drug use may be greater (Ettner 1997; Dee 2001; Arkes 2007).

The use of prescription drugs such as anxiolytics and hypnotics typically lacks the recreational component of alcohol or cannabis and its use can be more easily linked to poor mental health. Moreover, it has been argued that the use of prescribed mood altering drugs is more common among groups of people who are less likely to use alcohol or other drugs, e.g. women (Mellinger et al. 1971).

2 OBJECTIVES AND HYPOTHESIS

Objective 1

To identify changes in drug use initiation in men and women that would inform of changing patterns for alcohol, tobacco, cannabis and cocaine use by birth cohort in Spain.

- To ascertain changes in the age of onset between older and younger cohorts.
- To detect differences in the life-time prevalence and cumulative incidence of licit and illicit drug use by birth cohort.

Hypothesis:

Life-time prevalence and age of onset of alcohol, tobacco, cannabis, and cocaine use has changed in Spain in the last 50 years.

- Age of onset of drug use is earlier in the youngest cohorts compared to the oldest.
- Changes in the life-time prevalence and age of onset are bigger for women than for men.
- Magnitudes of changes in life-time prevalence and age of onset vary by drug type.

Objective 2

To estimate the association between work-related stress and the use of alcohol and hypnotics/sedatives among the working population in Spain.

Hypothesis:

Individuals exposed to work-related stress are more likely to drink heavily and to use hypnotics/sedatives than those not exposed.

- The relation between work-related stress and use of alcohol or of hypnotics/sedatives differs by sex.

- Different patterns of heavy drinking have different associations with work-related stress.

The 2007 edition of EDADES included a series of questions on employment and working conditions, but the absence of a formal structure in these questions limits their usefulness for the analysis.

Sub-objective: To identify and validate a structure of latent factors from the items on working conditions included in the 2007 edition of EDADES to be used in this research.

Hypothesis: The resulting structure has a connection with recognised work-related stress factors.

Objective 3

To analyse changes in the use of alcohol, cannabis and hypnotics/sedatives between two periods (pre-crisis and crisis) and to identify differences in the change between employed and unemployed individuals.

Hypothesis:

Overall use of alcohol, cannabis and hypnotics/sedatives has increased in the period after the start of the economic crisis.

- Unemployed individuals have increased use of alcohol, cannabis and hypnotics/sedatives more than their employed counterparts.
- Changes between periods in the use of alcohol, cannabis and hypnotics/sedatives differ by age group.
- Unemployed men have increased use of alcohol and cannabis.
- Unemployed women have increased use of hypnotics/sedatives.

1 SOURCE OF INFORMATION

All data used in the studies forming part of this thesis come from the *Encuesta Domiciliaria sobre Alcohol y Drogas en España* (EDADES). EDADES is a biennial nation-wide representative household survey on drug use organised by the Spanish health authorities since 1995 to monitor the use, perceptions and opinions of the Spanish population with respect to drugs. Currently, a total of nine survey editions are available, corresponding to the years 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009 and 2011. Use of the same methodology ensures the comparability between editions.

General information on sample design, questionnaires, fieldwork and participation rates are provided below. Detailed information on each survey edition and sample questionnaires can be consulted at: http://www.pnsd.msc.es/Categoria2/observa/estudios/home.htm

Sampling frame and sample design

The population of reference is the population aged 15 to 64 years, resident in Spain, including the autonomous cities of Ceuta and Melilla. However, selection of the sample only includes individuals living in households, i.e. it excludes those residing in institutions (army quarters, religious communities, jails, nursing homes, etc.), collective establishments (hotels, boarding houses, etc.) and homeless people.

Sample size has varied over the years (1995=8,888, 1997=12,304, 1999=12,234, 2001=14,113, 2003=12,033, 2005=27,934, 2007=23,715, 2009=20,109 and 2011=22,128).

The distribution of the sample by autonomous regions is disproportional with respect to their population in all survey editions in order to over-represent the smallest regions. Furthermore, some regions financed sample supplements in certain editions to allow deeper analyses of the data. Age distribution is also disproportional, with over-sampling of young population (15-39 years old) to facilitate a detailed analysis of this age group, the one most exposed to drug use. The number of individuals interviewed nationwide is over 2,000 for each five-year age-group up to 44 years old, and over 1,500 for each five-year age-group from 45 to 64 years old.

The technique used is a tri-stage clustered probability sample without substitution:

- The first phase considers census tracts corresponding to a certain number of municipalities randomly selected with a probability proportional to the census tract size. A prior stratification of census tracts is done according to size in eight categories: less than 2,000 inhabitants, from 2,001 to 10,000 inhabitants, from 10,001 to 20,000, from 20,001 to 50,000, from 50,001 to 100,000, from 100,001 to 400,000, from 400,001 to 1,000,000, and more than 1,000,000 inhabitants.
- In the second phase households are selected following a systematic random procedure. This process is done by the field personnel using a roadmap and a census tract street guide. A household is considered occupied and usual home when someone 15-64 years old has been living there for at least eight months in the last twelve months, or intends to live there at least for eight months. Collective residences (army quarters, religious communities, jails, nursing homes, hotels,

etc.), vacation homes, offices, company premises, and uninhabited homes are discarded.

- The third phase selects an individual from the selected household using ad-hoc random number tables which increase the probability of an individual 15-39 years old being selected.

No substitution of households or individuals is done. The sample is originally oversized in order to make up for interviews that could not be carried out (refusal to open the door, prolonged absence from home, refusal by the selected person, etc.).

Questionnaires

The composition of the questionnaire has remained mostly stable since 1997. In 2007 some modifications were incorporated to conform to the model proposed by the European Monitoring Centre for Drugs and Drug Addiction.

From 1997, questions on drug use form a separate questionnaire to be self-administered by the interviewee. Once completed, in order to guarantee confidentiality of the process, the field worker introduces the questionnaire in an envelope and seals it in front of the interviewee together with the second questionnaire. In any case, for individuals who refuse the self-administration, or have difficulties for some reason (blind, disabled to write, illiterate, etc.) a face-to-face interview is carried out. The second questionnaire includes questions about socio-demographic characteristics, health, perceived risks of drug use and drug availability, visibility of the phenomena and opinions and responses regarding drug-related problems.

The self-administered questionnaire on drug use has no filters or skips, in order to facilitate its completion. The questions do not provide the option of "*don't know/refuse to answer"* to encourage a useful answer by the interviewee and are organised by type of drug: alcohol, tobacco, cannabis, cocaine, tranquilisers, hypnotics, heroin, ecstasy (MDMA), amphetamines, hallucinogens and volatile inhalers.

Participation rates and fieldwork

Information on participation rates is not available for survey editions from 1995 to 2001, while for surveys from 2003 to 2011 the average of response over the sample originally selected was just over 50%. As an example, in the 2009 edition non-response was distributed as follows: household negatives, which include not opening the door and refusing to let anyone from the household be interviewed (22%); absence of all household members (14.6%); refusal of the selected person (7.8%), and absence of the selected person (5.5%). The fieldwork protocol establishes that at least three calls have to be made to the household originally selected on different days at different times before classifying the household or the person as absent.

Fieldwork periods are designed to avoid the influence of Christmas in the questions regarding drug use in the last 30 days. Regarding supervision, about 27% of the interviews are supervised (22% by phone and 5% personally with a household visit).

Weighting

The disproportionate distribution of the sample by age and autonomous region prevents direct aggregation of the results. To restore proportionality, the results of each survey edition have to be weighted by

autonomous region (19 groups), age (10 groups) and sex (2 groups). This is done by assigning 380 different weight coefficients individually. Weighting by autonomous region and age corrects for the disproportion of the sample on these variables derived from the sample design. Weights are also applied by sex to balance the possible sample disproportion derived from the greater probability of men to be absent from home.

4 THESIS STUDIES. METHODS AND MAIN RESULTS

4.1 Study 1: Sex differences in the cumulative incidence of substance use by birth cohort

4.1.1. Methods

This study used data from eight editions of EDADES survey with a combined sample size of 131,330 (1995=8,888, 1997=12,304, 1999=12,234, 2001=14,113, 2003=12,033, 2005=27,934, 2007=23,715 and 2009=20,109), with 48% men and 52% women.

Measures

Information of substance use was obtained through the self-administered questionnaire with separate modules for each substance. For the purpose of this research we focused on the most prevalent substances: alcohol, tobacco, cannabis and cocaine, adding together the data obtained for cocaine base and cocaine power. The first question on each module is designed to identify the use of the substance ever: *"have you ever tried any kind of alcoholic beverage/smoked a cigarette or any type of tobacco/used cannabis or marihuana/used cocaine base/cocaine powder?"*

In each module the age of first use was registered for people reporting ever having used the substance: *"How old were you when you first tried any alcoholic beverage/smoked a cigarette or any other type of tobacco/used cannabis or marihuana/used cocaine base or powder cocaine?"* For analytical purposes the minimum and maximum ages of first substance use were restricted to ranges of 5-64 years of age for alcohol and tobacco, and of 10-64 for cannabis and cocaine; 99.9% of the responses fell within these ranges. An early use was defined for those

initiating alcohol or tobacco use by 14 years of age, and by 16 years for cannabis, well before organic and emotional maturity is reached.

Year or birth was grouped to form three 15-year cohorts: cohort 1, born 1930-1944 (N=9,583); cohort 2, born 1945-1959 (N=26,220); cohort 3, born 1960-1974 (N=46,437); and two ten-year groups for the youngest: cohort 4, born 1975-1984 (N=32,498); and cohort 5, born 1985-1994 (N=16,592).

The cumulative occurrence is a *cumulative incidence proportion* estimated among surviving cohort members at the date of their survey participation (Degenhardt et al. 2007). This parameter determines the initiation of substance use and is often referred to as lifetime substance use. Since substance use in the youngest cohort is right censored as it is necessarily reported at a younger age as they have not yet reached older ages, we estimated the mean age of onset of substance use restricted to substance initiation between 10 and 24 years for each cohort in addition to the unrestricted mean age onset (10-64), to level up all cohorts with the youngest.

Statistical analysis

Following the retrospective method developed by Gfroerer and Brodsky (Gfroerer and Brodsky 1992) composite estimates of incidence proportions for each substance by sex, age of onset and birth cohort, were calculated as a weighted mean of their respective incidence figures for each survey. Weights were calculated as the inverse of the variance of the incidence proportion within the survey, and this variance was calculated using the non-parametric bootstrap approach with 1000 iterations with replacement of the questionnaire respondents. The 95%

confidence interval of the incidence proportion was also calculated via the non-parametric bootstrap approach with 1000 iterations more with replacement. In all cases, survey sample design was considered. Composite incidence proportions were converted into cumulative incidence curves.

As the composite incidence proportions were distributed by age of onset of substance use, we obtained the mean age of onset considering only subjects that had started use of the specific substance. Note that the sum of the incidence proportions of all ages of onset equals the life-time prevalence.

The software used for the statistical analysis was R version 2.14.0 (R Development Core Team 2011).

4.1.2. Main results

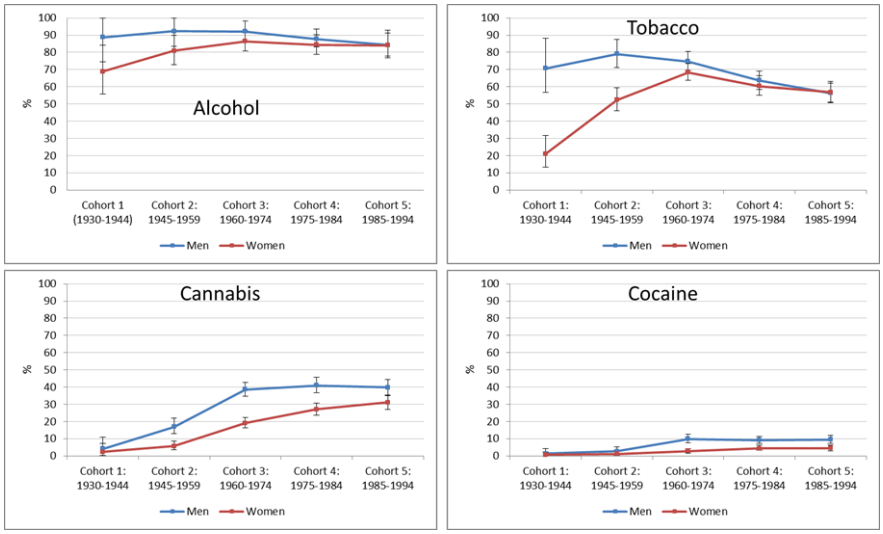
Life-time prevalence (LTP) and onset of substance use

Alcohol is the most prevalent substance for both sexes, overall LTP being 91.5% for men and 84.4% for women. The analysis by birth cohort shows that sex differences in LTP of alcohol decline in successive birth cohorts, with no significant differences between sexes from cohort 3 onwards (Figure 4.1-1).

LTP of tobacco use for the total sample is bigger for men (74.1%) than for women (58.8%), but again this outcome is nuanced when the results are examined by birth cohort. Cohort 1 shows the biggest differences with men having a LTP of tobacco use over three times that of women, but the gap diminishes in subsequent birth cohorts and disappears from cohort 4 (Figure 4.1-1).

For cannabis, the estimated overall LTP of men doubles that of women (30.8% and 16.0%, respectively). Analyses by birth cohort indicate a significant shift in LTP of cannabis use in cohort 3. Cohort 4 carries on this rise, especially in women, resulting in a reduction of the differences between sexes. Finally, cohort 5 shows a slight reduction of LTP in men while it continues to grow in women. However, prevalence remains significantly higher for men across birth cohorts (Figure 4.1-1).

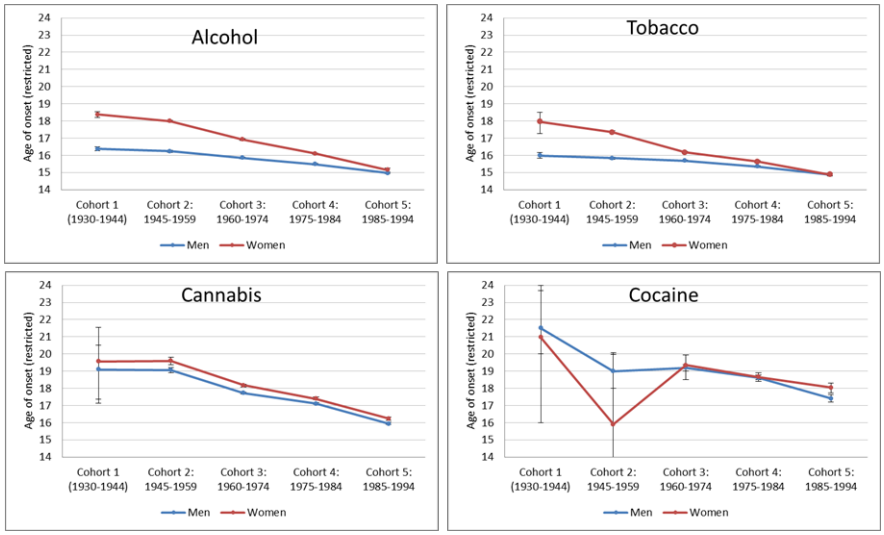
Figure 4.1-1. Estimated life-time prevalence of substance use by birth cohort and sex.



Finally, estimated LTP of cocaine for the total sample is more than three times higher for men compared to women (7.3% and 2.3%). As with cannabis, cohort 3 presents a major change with LTP of cocaine more than doubling that of previous cohorts. In subsequent cohorts, LTP slightly decreases for men and increases for women, but remains significantly higher for men (Figure 4.1-1).

With respect to the age of onset of alcohol use, men report an earlier onset than women in each birth cohort in both restricted (10-24 years) and unrestricted (10-64 years) estimates. Major differences between the two estimates are registered for women in the two oldest cohorts, meaning that women in older cohorts started much later than men. Thus, while onset of use becomes earlier for both men and women in successive birth cohorts the age reduction is larger among women. Figure 4.1-2 shows the results of restricted estimates.

Figure 4.1-2. Estimated mean age of onset of substance use by birth cohort and sex (restricted to ages 10-24).



Age of onset of tobacco use declines for both sexes, each cohort reporting a lower age of onset than its predecessor, this reduction being again more manifest in women. Estimates of age of onset of cannabis use register a decline in each successive cohort starting in cohort 3 for both sexes. Interpretation of estimates of age of onset of cocaine use need to take into account the small number of observations registered in older

cohorts, especially for women. Still, age of onset falls in successive cohorts from cohort 3. (Figure 4.1-2).

Cumulative incidence

Sex-cohort variations are also clear when we examine the cumulative incidence of substance use determined by the age of initiation. Figure 4.1-3 presents the data for the four substances studied. A close examination of the results shows, in the case of alcohol, that 69% of males of cohort 1 had used alcohol by age 18 years, compared to only 26% of women. In contrast, 83% of men and 82% of women had used alcohol by the time they turned 18 in the youngest cohort. Similarly, 27% of women of the youngest cohort had used alcohol by age 14 years, compared to only 5% in cohorts 1 and 2. For men, the cumulative proportion for starting alcohol use by age 14 years goes from 19% in the older cohorts to 30% in the youngest.

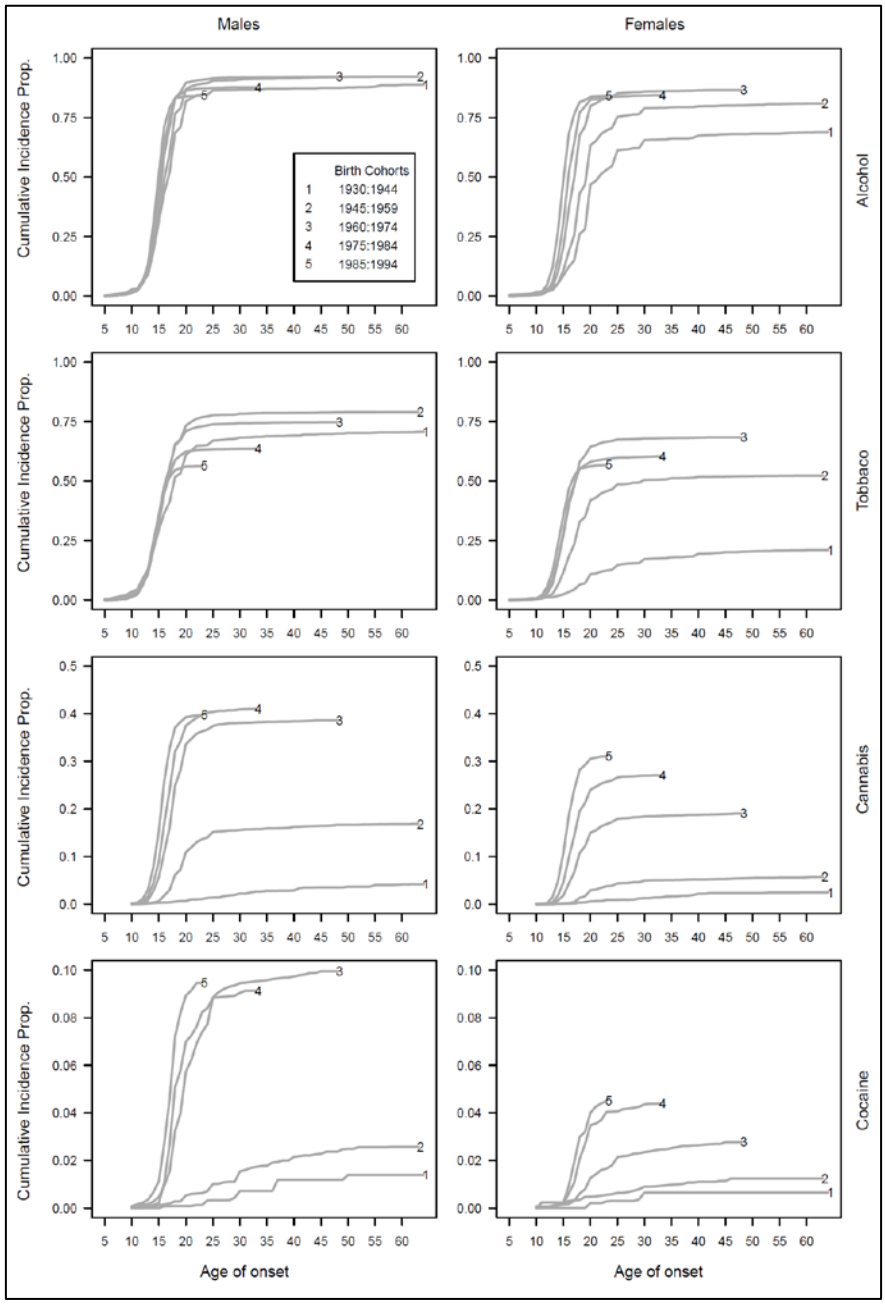
Sex-cohort variations for tobacco are even more manifest: only 6% of women had started tobacco use at age 18 years in cohort 1, whereas in cohort 5 the cumulative proportion was 55%. In contrast, roughly the same proportion of men (50%) had started tobacco use by the time they turned 18 in cohorts 1 and 5. Similarly, the same proportions of men and women initiated early tobacco use in the youngest cohort (23%), but while the pattern in men has barely changed compared to older cohorts, women present a clear upward trend of early use of tobacco.

With respect to cannabis, major differences are registered between older and younger cohorts as early initiation is almost nil in older cohorts for both sexes. It begins to show up in cohort 3 and becomes progressively more evident in subsequent cohorts in both sexes, especially among

women. In the youngest cohort 26% of men and 19% of women had tried cannabis by the time they turned 16.

Finally, 9% of men and 4% of women had started cocaine use by age 21 in the youngest cohort, while 6% of men and only 1% of women had done so in cohort 3.

Figure 4.1-3. Cumulative incidence proportions of alcohol, tobacco, cannabis and cocaine by sex and birth cohort. Graph scales differ by substance according to the highest cumulative incidence.



4.2 Study 2: Exploration and validation of working conditions questionnaire items included in the Spanish Household Survey on Alcohol and Drugs (EDADES)

4.2.1. Methods

Edition 2007 of the EDADES survey included a total sample of 23,715 individuals. For the present study we used a sub-sample of individuals over 15 years old who held paid jobs at the time of the survey, resulting in a total of 13,005 individuals (60% men and 40% women) with an average age of 39 years (SD 10.9) for men and 38 years (SD 10.7) for women. Distribution of this sub-sample according to sex, age and occupation by industry group was very similar to that registered by the Active Population Survey that year (Instituto Nacional de Estadística).

EDADES-2007 included a module with 18 questions aimed at collecting information on working and employment conditions, addressed to individuals currently working or unemployed who had worked before. The 18 questions had 5 Likert-type response categories ranging from (1) very much to (5) nothing. Table 4.2-1 presents a list of the questions in the order they were included in the questionnaire and their main descriptive information.

Table 4.2-1. Questions about employment and working conditions of the questionnaire of EDADES 2007 and main descriptive data.

		N	% No resp.	Avg.	Stand. Dev.	Mode	% Answer 5 (nothing)	% Answer 1 (very much)
1	Does the execution of your work involve any dangerousness?	12877	0.99	3.79	1.130	5	35.4	2.7
2	Does your work include piecework or working at high speed?	12818	1.45	3.56	1.205	5	29.2	4.8
3	Do you normally work long hours with limited time to rest?	12852	1.19	3.66	1.190	5	32.3	4.6
4	Does your work include routine or monotonous tasks?	12834	1.33	2.96	1.243	2	15.2	12.0
5	Is your work carried out in hot or cold conditions?	12855	1.17	3.67	1.376	5	41.8	8.6
6	Does your work involve long trips or absences from home?	12826	1.40	4.08	1.195	5	54.1	4.2
7	Is your job position below your level of education or knowledge?	12689	2.49	3.68	1.287	5	38.0	6.0
8	Are you satisfied with the function or work you perform?	12842	1.27	2.12	0.930	2	2.2	25.2
9	Are you satisfied with the consideration and treatment from your supervisors at work?	11987	8.49	2.11	0.948	2	2.9	25.7
10	Are you satisfied with the consideration and treatment from your colleagues at work?	11845	9.79	1.87	0.833	2	1.6	34.4
11	Do you often feel deeply tired or exhausted after work?	12869	1.06	3.17	1.102	3	13.9	6.5
12	Do you often feel tense or stressed during your work?	12857	1.15	3.46	1.129	3	22.6	4.8
13	Do you work under conditions of noise, unpleasant odours, awkward positions, excessive efforts, out in the open, etc.?	12858	1.14	3.62	1.273	5	35.6	5.7

14	Are you worried or feel insecure about the future of your work?	12755	1.96	3.67	1.201	5	33.4	4.8
15	Do you feel adequately paid for the work you do or the post you occupy?	12671	2.64	3.36	1.227	3	24.8	7.6
16	Do you feel adequately trained for the work you perform?	12826	1.40	1.68	0.798	1	1.2	46.5
17	Do you have promotion prospects in your work?	12442	4.5	3.49	1.219	3	27.2	6.3
18	Do you have periods with little work to do?	12817	1.47	3.87	0.995	5	32.4	1.7

Statistical analysis

Three questions were excluded from the analysis in the first instance because we considered that they did not refer to employment or working conditions, but rather to their effects or consequences (questions 8, 11 and 12 of table 1). A factor analysis was carried out with the remaining 15 items by means of a cross validation procedure (Fabrigar et al. 1999; Batista-Foguet et al. 2004). First, an exploratory analysis was performed with half of the sample randomly selected introducing and extracting items according to the factor load until a factor latent structure was obtained. Then, this structure was validated with the other half of the sample by means of a confirmatory analysis (CFA).

The standard criteria used to evaluate overall goodness of fit were the Comparative Fit Index (CFI) that examines the discrepancy between the observed data and the fitted model; the Tucker-Lewis Index (TLI) that compares the chi-squares of the null model with the fitted model; and the Root Mean Square Error of Approximation (RMSE). CFI above 0.95, TLI above 0.90 and RMSE lower than 0.08 are indicative of good fit (Hu and Bentler 1999).

To test the reliability of the structure obtained in the CFA an internal consistency index based on the model was obtained. This index conforms to the definition of reliability as the ratio between the variance of the true measure and the total variance of the construct. True variance is estimated as the variance of each factor according to the model obtained in the CFA, while total variance is the variance of the items governed by those factors (Bentler 2009). An internal consistency index above 0.5 is considered acceptable, and above 0.6, good. Relevance of each item in the global reliability of the model is signalled by the CFA factor loads.

4.2.2. Main results

Exploratory factor analysis excluded three questions from the resulting structure because they did not contribute with high enough factor loads and worsened the fit (questions 4, 17 and 18 of Table 4.2-1). Table 4.2-2 shows data from exploratory factor analysis with the standardised factor loads and standard deviation of the 12 items finally considered, where four groups of factors with three items each was identified.

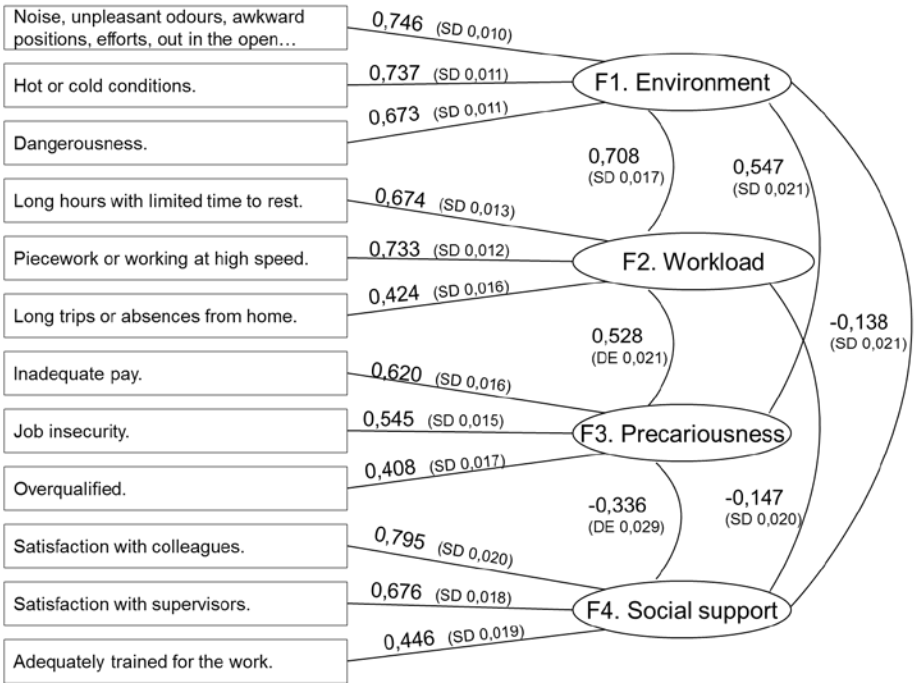
Table 4.2-2. Standardised factor load (SFL) and standard deviation (SD) of the exploratory factor analysis of the relevant questions on working and employment conditions from the questionnaire of EDADES 2007.

	Factor 1		Factor 2		Factor 3		Factor 4	
	SFL	SD	SFL	SD	SFL	SD	SFL	SD
Do you work under conditions of noise, unpleasant odours, awkward positions, excessive efforts, out in the open, etc.?	0.594	0.016	0.216	0.048	0.305	0.04	-0.069	0.012
Is your work carried out in hot or cold conditions?	0.716	0.018	0.158	0.017	0.145	0.019	-0.019	0.011
Does the execution of your work involve any dangerousness?	0.671	0.018	0.227	0.063	0.085	0.07	-0.018	0.011
Do you normally work long hours with limited time to rest?	0.232	0.02	0.682	0.219	0.201	0.221	-0.079	0.012
Does your work include piecework or working at high speed?	0.319	0.024	0.589	0.173	0.206	0.177	-0.047	0.012
Does your work involve long trips or absences from home?	0.301	0.022	0.306	0.09	0.101	0.101	-0.051	0.013
Do you feel adequately paid for the work you do or the post you occupy?	0.138	0.015	0.069	0.292	0.739	0.302	-0.057	0.016
Are you worried or feel insecure about the future of your work?	0.138	0.016	0.153	0.125	0.424	0.123	-0.089	0.013
Is your job position below your level of education or knowledge?	0.079	0.016	0.123	0.092	0.322	0.09	-0.09	0.013
Are you satisfied with the consideration and treatment from your colleagues at work?	-0.026	0.012	0.007	0.046	-0.096	0.048	0.932	0.03
Are you satisfied with the consideration and treatment from your supervisors at work?	-0.076	0.015	-0.014	0.108	-0.26	0.11	0.533	0.02
Do you feel adequately trained for the work you perform?	-0.003	0.013	-0.08	0.036	-0.001	0.039	0.397	0.023

Figure 4.2-1 shows the results of the confirmatory factor analysis and of the correlations between factors. The structure of four factors showed an adequate confirmatory fit: CFI=0.95, TLI=0.94 and RMSE=0.050 (CI90%=0.047-0.053). The obtained internal consistency index confirmed acceptable reliability for both the total structure (0.755) as well as for each factor (F1=0.755, F2=0.661, F3=0.529 and F4=0.680).

A high correlation was observed between factors F1 and F2 (0.708). However, both items also showed internal consistency above 0.6. Correlations above 0.5 were also observed between factors F1 and F2 and factor F3. Factor F4 is the one showing the lowest correlations with the other factors.

Figure 4.2-1. Factor load and standard deviation (SD) of the questions on working and employment conditions from EDADES 2007 questionnaire included in the confirmatory factor analysis.



The factor structure obtained was conceptualised in four dimensions as follows:

F1. *Environment conditions*, including dangerousness, hot or cold conditions, and unpleasant or aversive conditions.

F2. *Workload*, including piecework or working at high speed, long hours with limited rest, and long trips or absences from home.

F3. *Precariousness*, including over-qualification, job insecurity, and inadequate salary.

F4. *Social support*, including satisfaction with supervisors, satisfaction with colleagues, and adequate training.

4.3 Study 3: Work-related stress factors associated with problem drinking: A study of the Spanish working population

4.3.1. Methods

Using data from EDADES-2007, for this study we selected those individuals over 15 years of age who held paid jobs at the time of the survey. The resulting sample consisted of 13,005 individuals (60% men).

Alcohol consumption and problem drinking

The daily average of alcohol intake in the last month was calculated in grams (g) of pure ethanol considering the standard drink unit that varies for each kind of drink, the number of units, and their frequency. A glass of wine was estimated to contain 12.7g of pure ethanol, beer or cider 12.4g, fruit liquors 11.2g, and mixed drinks and hard liquors 24.9g. A total weekly amount was calculated by combining the average weekday (Monday to Thursday) and weekend (Friday to Sunday) consumption.

Individuals were classified in three categories according to their daily average of alcohol intake (Rehm et al. 2007):

1. Non-drinkers: those who reported zero consumption.
2. Moderate drinkers: men consuming up to 39.99g and women consuming up to 23.99g
3. Heavy drinkers: those who reported daily averages above these measures (≥40g for men and ≥24 g for women).

An additional measure of binge drinking was used for those reporting having had five or more drinks on a single drinking occasion (within 2 hours) at least once in the previous month. Heavy drinking and binge drinking were both considered problem drinking.

Work-related stress factors and covariates

Measures of work-related stress were obtained using the structure from the questions on working and employment conditions included in EDADES 2007 (see study 2 above, section 4.2). The structure contained four dimensions:

1. Noxious working environment.
2. Workload.
3. Precariousness.
4. Social support.

We imputed the average of the non-missing items to the missing items for those who had answered at least two items, in order to include the maximum number possible of individuals in the study (9% of the sample). These four scores were calculated and z-standardised (mean 0 and variance 1) separately for men and women, divided in tertiles (cut-points of the standard normal distribution -0.43 and 0.43) and categorised as low, moderate, and high exposure to noxious working conditions, workload, precariousness, or lack of social support. Low levels of exposure were used as the reference category.

Regarding covariates, we included:

- Age as a continuous variable.
- Self-perceived health collapsed into two categories: (1) poor health including very poor, poor and fair, and (2) good health including good and very good (reference category).
- Educational level grouped into three categories and coded as (1) up to primary school, (2) secondary level, and (3) university degree (reference category).

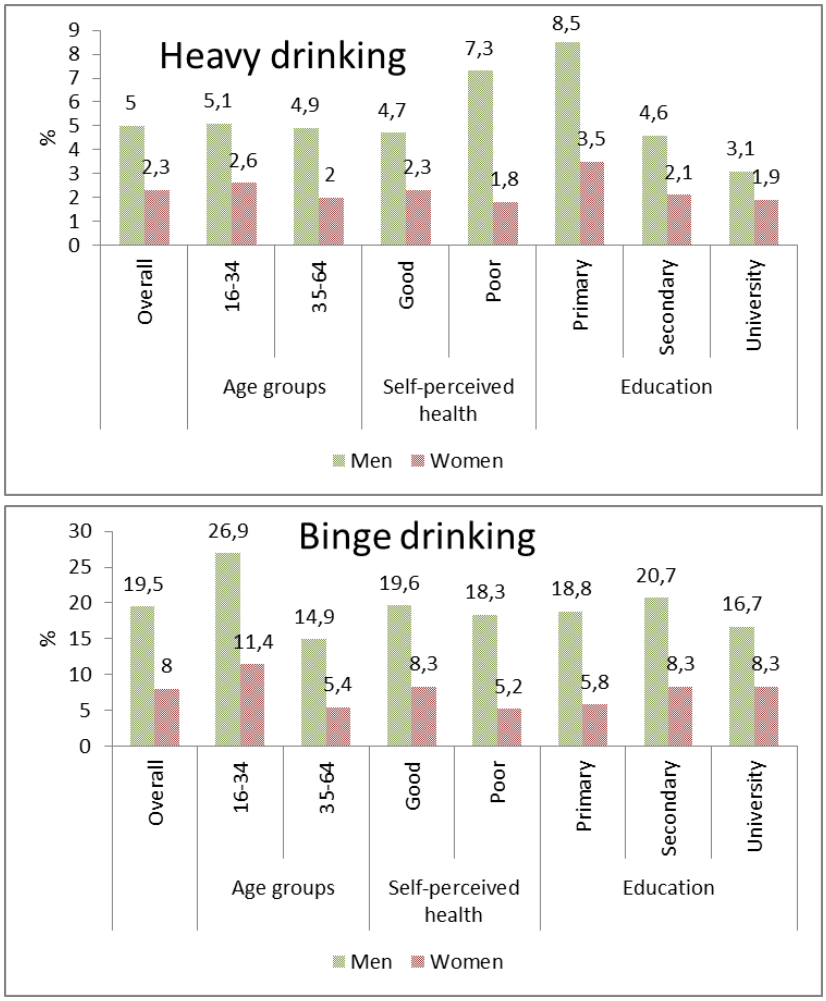
Statistical analysis

We fitted logistic regression models separately for men and women to obtain the odds ratio (OR) and corresponding 95% confidence intervals (95%CI) of the association between the measures of problem drinking and each of the work-related stress factors separately, and a final model including the four work-related stress factors. All models were adjusted for age and education. Among men, models for heavy drinking were also adjusted for self-perceived health as it showed a significant association in prior bivariate models. Non-drinkers were excluded from the analysis to avoid the role of ill health in the current level of abstention affecting the results. Hosmer and Lemeshow tests were carried out to check the goodness of fit of all the models. Analyses were performed using SPSS statistical software v. 18©.

4.3.2. Main results

Figure 4.3-1 shows the distribution of heavy and binge drinking in men and women. Overall, men more than doubled women's level of problem drinking: 5% of men and 2.3% of women reached levels of alcohol use categorised as heavy drinking; and 19.5% of men and 8% of women qualified for binge drinking, the latter clearly more prevalent among the youngest group in both sexes. Besides, men reporting poor health had a higher rate of heavy drinking (7.3%), whereas this was not the case among women.

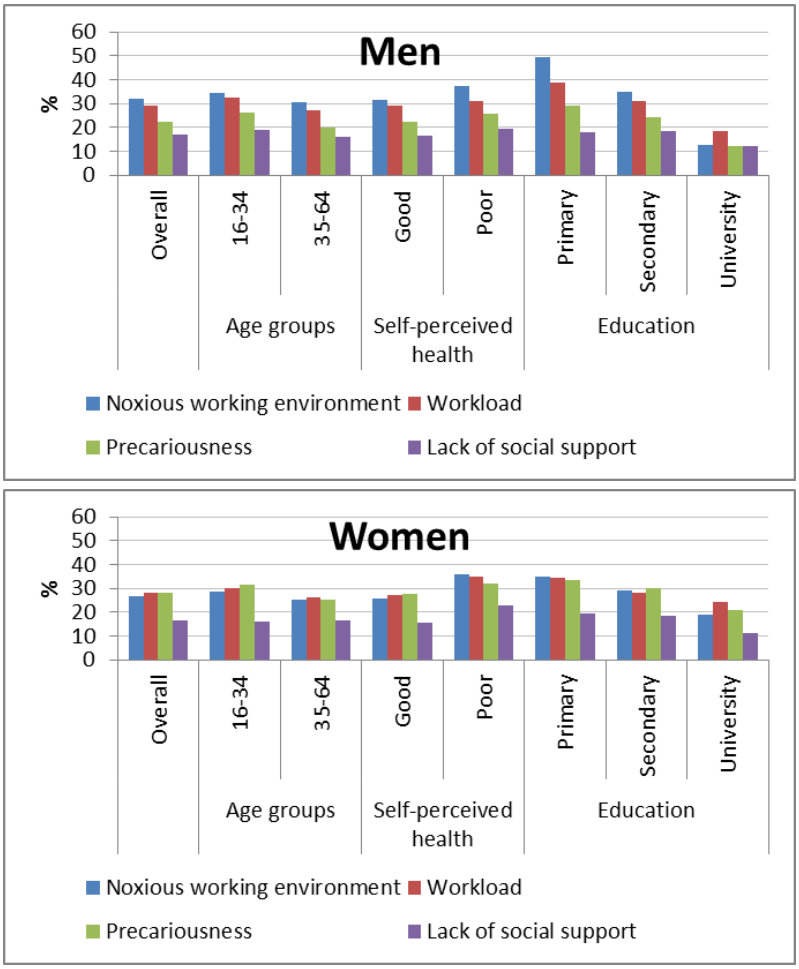
Figure 4.3-1. Distribution of heavy and binge drinking in men and women.



With respect to work-related stress factors, more men reported a high level of exposure to a noxious working environment than women (32% vs. 26%), while women reported a higher level of precariousness (38% vs. 22.5%). Conversely, similar proportions of men and women reported high workload (29% and 28%) and lack of social support (17% and 16%). The youngest age groups registered larger proportions of the high level

of all stress factors except of lack of social support in women that did not show differences by age group. A clear gradient was observed regarding education, with those with only primary schooling registering the greatest proportions of high exposure to all stress factors (Figure 4.3-2).

Figure 4.3-2. Distribution of work-related stress factors in men and women.



Regression analyses showed that the four work-related stress measures were positively associated with heavy drinking in men and women when analysed separately adjusting for covariates. In the joint model (Figure 4.3-3), both moderate and high levels of noxious working environment

(odds ratio [OR]: 2.15 [95% confidence interval [CI]: 1.51-3.06] and OR: 2.23 [95%CI: 1.49-3.36]) and high level of lack of social support (OR=1.62 [95%CI: 1.16-2.28]) maintained a robust association in men, while all associations disappeared in women. Similarly, the four stress measures were positively associated with binge drinking when analysed separately in men, but only precariousness maintained a significant association for both moderate (OR: 1.22 [95%CI 1.01-1.46]) and high (OR: 1.33 [95%CI: 1.04-1.70]) levels in the joint model. In the case of women, high levels of precariousness and lack of social support were significant when analysed separately, but none remained significant in the joint model (Figure 4.3-3).

Similarly, the four stress measures were positively associated with binge drinking when analysed separately in men, but only precariousness maintained a significant association for both moderate (OR: 1.22 [95%CI: 1.01-1.46]) and high (OR: 1.33 [95% CI: 1.04-1.70]) levels in the joint model (Figure 4.3-4). In the case of women, high levels of precariousness and of lack of social support were significant when analysed separately, but neither remained significant in the joint model (Figure 4.3-4).

Figure 4.3-3. Association of heavy drinking with work-related stress factors in men and women. Adjusted odds ratios (OR).

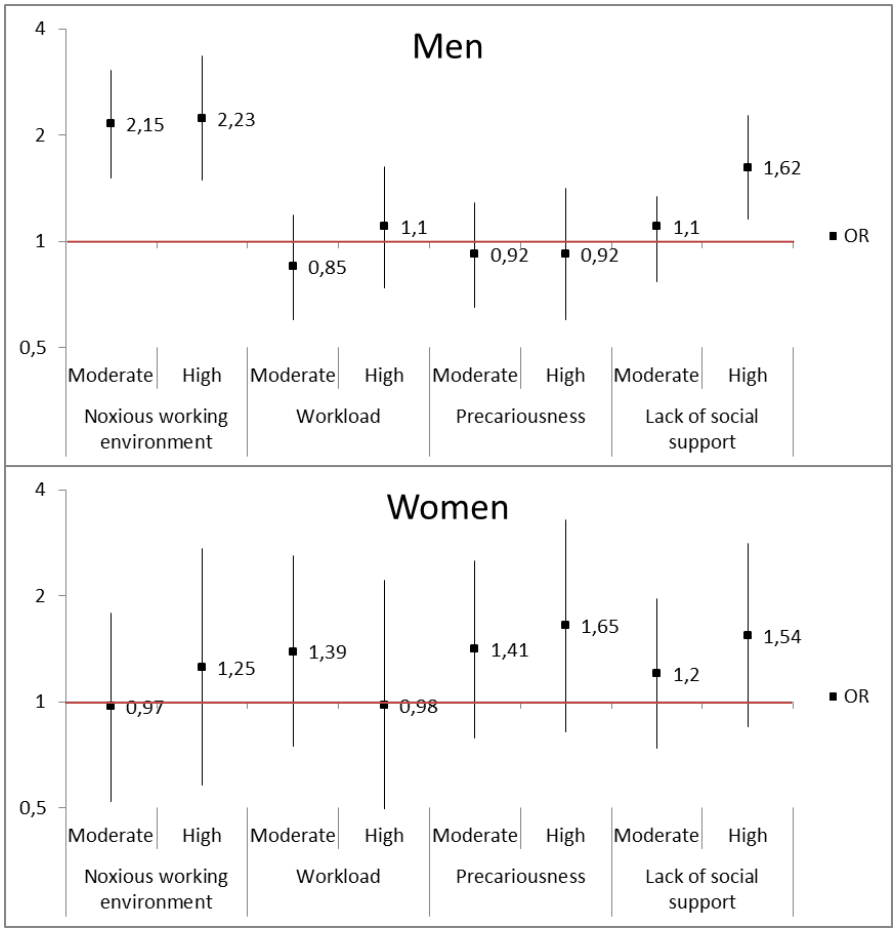
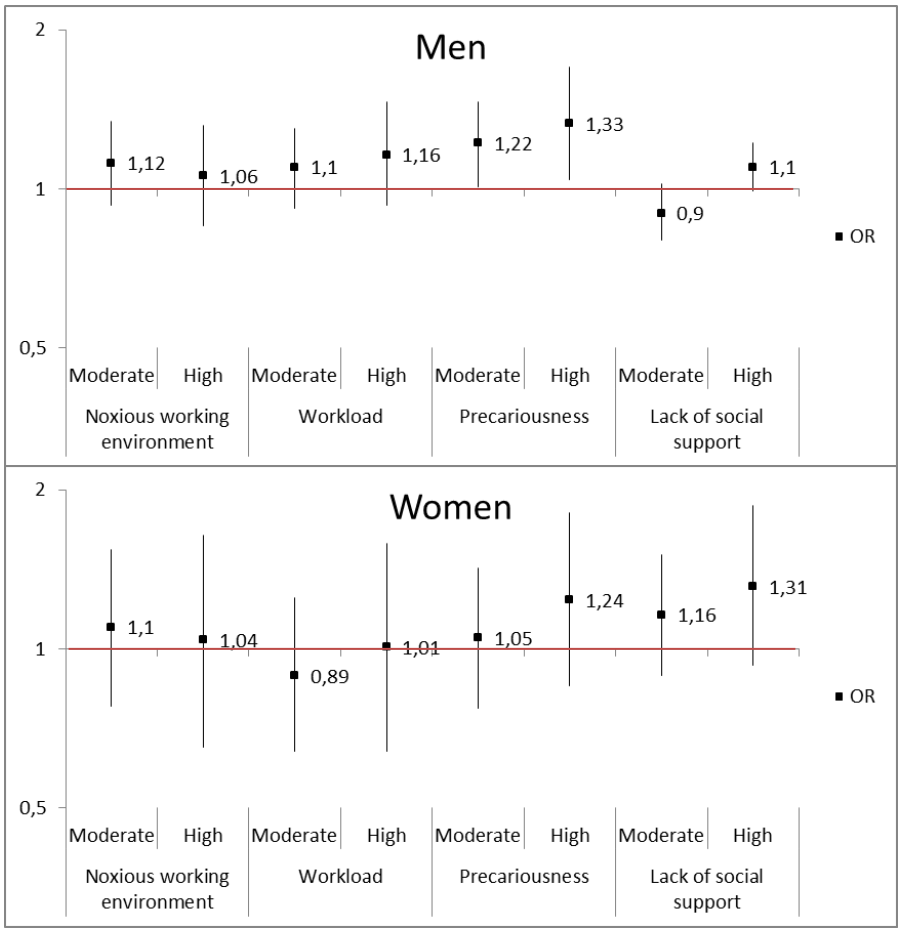


Figure 4.3-4. Association of binge drinking with work-related stress factors in men and women. Adjusted odds ratios (OR).



4.4 Study 4: Prevalence of the use of hypnotics and sedatives among the working population and associated work-related stress factors

4.4.1. Methods

Using data from EDADES-2007, for this study we also selected those individuals over 15 years of age who held paid jobs at the time of the survey. The resulting sample consisted of 13,005 individuals.

Use of hypnotics/sedatives

The self-administered questionnaire on drug use has one module for tranquilisers or sedatives and another for sleeping pills, with respect to use in the last month with no distinction on whether use is with or without prescription. Two subsequent modules focus on the use of these drugs without prescription in the last 12 months. The consumption measure used in the present study was based on the modules registering consumption irrespective of prescription. Individuals reporting use of hypnotics or sedatives at least once in the last 30 days were classified as users.

Work-related stress factors and covariates

Measures of work-related stress were obtained using the structure from the questions on working and employment conditions included in EDADES 2007 (see study 2 above, section 4.2). The structure contained four dimensions:

1. Noxious working environment
2. Workload
3. Precariousness
4. Social support.

We imputed the average of the non-missing items to the missing items for those who had answered at least two items, in order to include the maximum number possible of individuals in the study (9% of the sample). These four scores were calculated and z-standardised (mean 0 and variance 1) separately for men and women, divided in tertiles (cut-points of the standard normal distribution -0.43 and 0.43) and categorised as low, moderate, and high exposure to noxious working conditions, workload, precariousness, or lack of social support. Low levels of exposure were used as the reference category.

As covariates we used:

- Working schedule, including categories: reduced/part-time, split shift, irregular, continuous morning (reference category), continuous afternoon, and continuous nights/rotations.
- Age in two groups, 16 to 44 years old (reference category), and from 45 to 64 years old.
- Living alone (yes/no).
- Country of origin, collapsed into two groups: Spain and other western countries (reference category), and any other country.
- Length of time residing in Spain: five or more years (yes/no).
- Educational level, grouped into three categories: up to primary school (reference category), secondary level, and university degree.
- Self-reported health collapsed into two categories: poor health and good health (reference category).

Statistical analysis

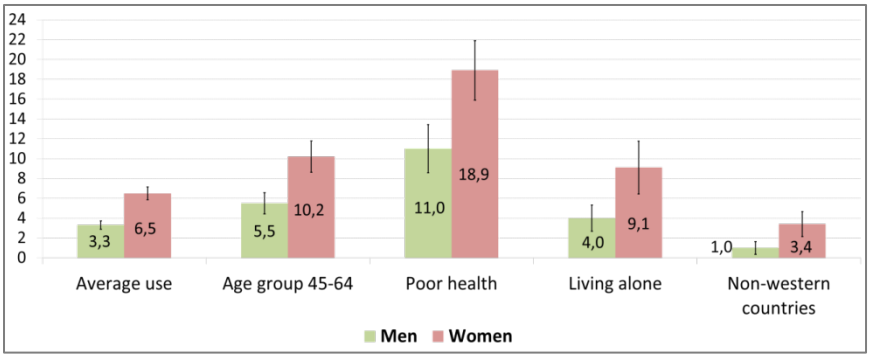
Following a descriptive analysis of the distribution of the use of hypnotics/sedatives, the association between use of hypnotics/sedatives

and the work-related stress factors was analysed using logistic regression models adjusted for the covariates and stratified by sex. Goodness of fit was examined by means of the Hosmer & Lemeshow test. The statistical software used was SPSS v.18©.

4.4.2. Main results

The prevalence of use of hypnotics/sedatives in the last month, as shown in Figure 4.4-1, was twice as high in women (6.5%) compared to men (3.3%). In both sexes, use in the older age group doubled that of the younger (10.2% of women and 5.5% of men between 45 and 64 years old had used hypnotics/sedatives in the last month). Higher use was found among those living alone, but the difference was only significant in women. No differences were observed by educational level. Conversely, use tripled among those reporting poor health compared to those reporting good health. No significant differences in use were observed among the different types of working schedule, while use among individuals from non-western countries was significantly lower compared to those born in Spain or in other western countries.

Figure 4.4-1. Distribution of the use of hypnotics/sedatives in the last month in men and women (%).

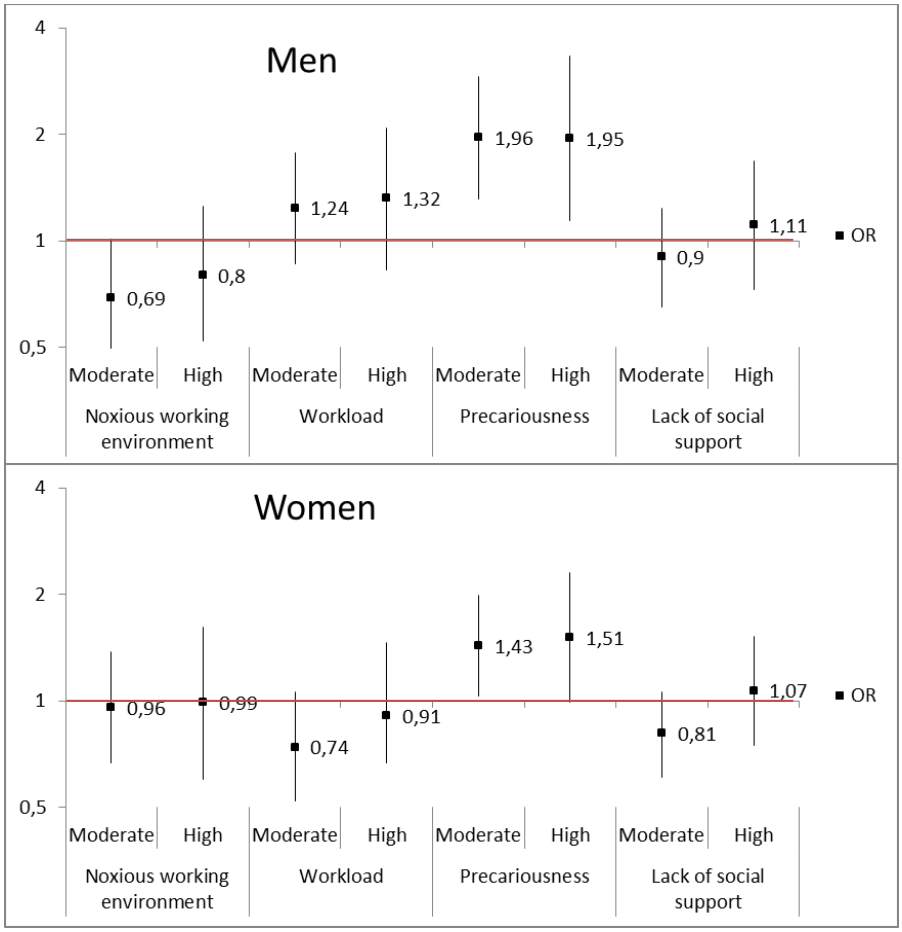


Regarding variables of work-related stress, higher use of hypnotics/sedatives was observed among women reporting exposure to high levels of noxious working environment, of workload and of lack of social support, while among men higher use was registered among those reporting greater precariousness.

Adjusted logistic regression models showed that hypnotics/sedatives use was more likely among men reporting moderate (odds ratio [OR]: 1.96; 95% confidence interval [CI]: 1.31-2.92) and high (OR: 1.95; 95%CI: 1.14-3.34) levels of precariousness, and among women with a moderate level (OR: 1.43; 95%CI: 1.03-1.99) (Figure 4-4.2).

Besides, women working afternoon shifts were less likely to use hypnotics/sedatives compared with those working morning shifts (OR: 0.55; 95%CI: 0.28-0.98). Moreover, men born in non-western countries were less likely to use hypnotics/sedatives compared to those born in Spain or in other western countries (OR: 0.39; 95%CI: 0.18-0.86).

Figure 4.4-2. Association of hypnotics/sedatives use with work-related stress factors in men. Adjusted odds ratios (OR).



4.5 Study 5: Economic crisis and changes in alcohol use in the Spanish economically-active population

4.5.1. Methods

For the purpose of this study we used data from four editions of EDADES survey corresponding to years 2005, 2007, 2009 and 2011. We selected individuals over 15 years old who were currently working or unemployed at the time of the survey, after excluding all economically inactive population (students, homemakers, pensioners and disabled), obtaining a total sample size of 62,440 individuals (2005=18,446; 2007=15,071; 2009=13,048 and 2011=15,875). Response rates of about 50% for each edition were accounted for in the original sample size calculation.

Alcohol use

The daily average of alcohol intake in the last month was calculated in grams of pure ethanol considering the standard drink unit that varies for each kind of drink, the number of units, and their frequency, differentiating between weekday and weekend consumption. Individuals were classified according to their daily average of alcohol intake (Rehm et al. 2007):

1. Non-drinkers: those who reported zero consumption.
2. Moderate drinkers: men consuming up to 39.99g and women consuming up to 23.99g
3. Heavy drinkers: those reporting daily averages above these measures (≥40g for men and ≥24 g for women).

An additional measure of binge drinking was used for those reporting having had five or more drinks on a single drinking occasion (within two hours) at least once in the previous month in editions 2005 and 2007. Editions 2009 and 2011 used five or more drinks for men and four or

more for women to define binge drinking. Heavy drinking and binge drinking were both considered excessive drinking.

Independent variables

A variable period was created with two categories:

- Period 1 (pre-crisis) included Individuals from editions 2005 and 2007 (reference category).
- Period 2 (crisis) included individuals from editions 2009 and 2011.

Regarding employment status, individuals were classified as currently working (reference category) or unemployed in each period.

The following covariates were considered:

- Age.
- Educational level grouped into three categories; up to primary school, secondary level and university degree (reference category).
- Self-reported health collapsed into poor health and good health (reference category).
- Partner status, cohabiting with a partner whether married or not (reference category: partnered).

Statistical analysis

Poisson regression models with robust variance were fitted to obtain the prevalence ratio (PR) and 95% confidence interval (CI) of heavy and binge drinking and with period and employment status. Analysis were done separately for men and women and further stratified by age groups (16-34 and 35-64). The interaction between period (pre-crisis or crisis) and

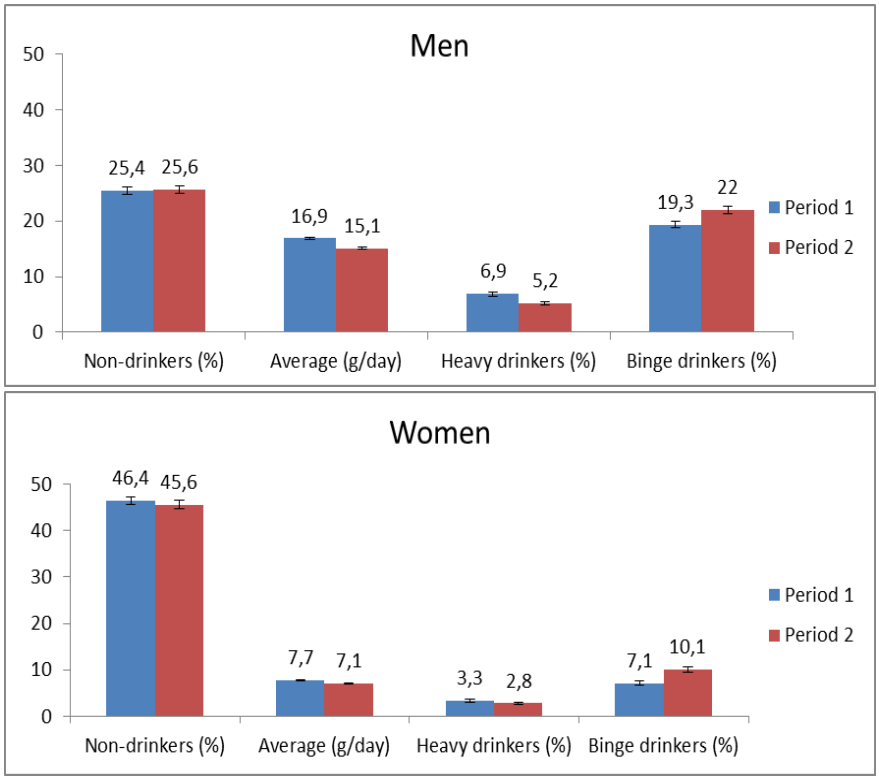
employment status (employed or unemployed) was included in the models if statistically significant.

The models were adjusted for the covariates, including age as a continuous variable in groups of five years for the general models, and also as a continuous variable in the age-stratified models. Analyses for both heavy and binge drinking were done excluding non-drinkers from the reference category, considering the role of ill health on the current level of abstention. Analyses were performed applying sample weights using SPSS statistical software v.18 ©.

4.5.2. Main results

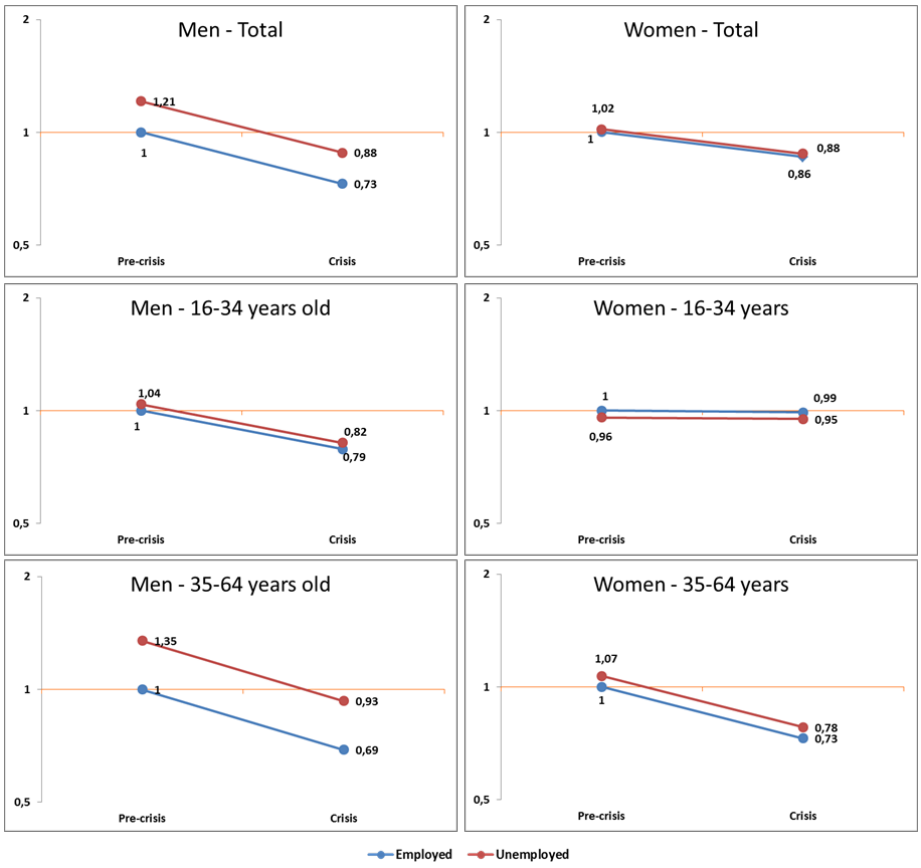
The main descriptive information on alcohol consumption in the sample is presented in Figure 4.5-1. In men, while the prevalence of non-drinking was similar between periods (around 25.5%), mean alcohol use among drinkers differed significantly (16.9 g/day in Period 1 and 15.1 g/day in Period 2, p<.001). Significant differences between periods were also observed in the prevalence of heavy drinking (6.9% and 5.2%, p<.001) and binge drinking (19.3% and 22%, p<.001). In women, differences in mean alcohol uses among drinkers were also significant between periods (7.7 g/day in Period 1 and 7.1 g/day in Period 2, p=.002), with similar prevalence of non-drinking (around 46%). Significant differences between periods were also found in heavy drinking (3.3% and 2.85, p=.013) and in binge drinking (7.1% and 10.1%, p<.001).

Figure 4.5-1. Descriptive information on alcohol use in Period 1 and Period 2 in men and women.



The results of the adjusted Poisson regressions represented in Figure 4.5-2 show that for men, heavy drinking displayed a significant downward trend in Period 2 (crisis) overall (PR: 0.73; 95%CI: 0.67-0.79) and in both age groups (PR: 0.79; 95%CI: 0.69-0.91 in the younger age group and PR: 0.69; 95%CI: 0.62-0.77 in the older). Significant differences were also observed between employed and unemployed individuals with an increased likelihood of heavy drinking among the group of unemployed men overall (PR: 1.21; 95%CI: 1.09-1.34) and in the older age group (PR: 1.35; 95%CI: 1.17-1.55).

Figure 4.5-2. Association of heavy drinking in the last month with period (pre-crisis and crisis) and employment status (employed and unemployed) adjusted for covariates, total and by age group in men and women.

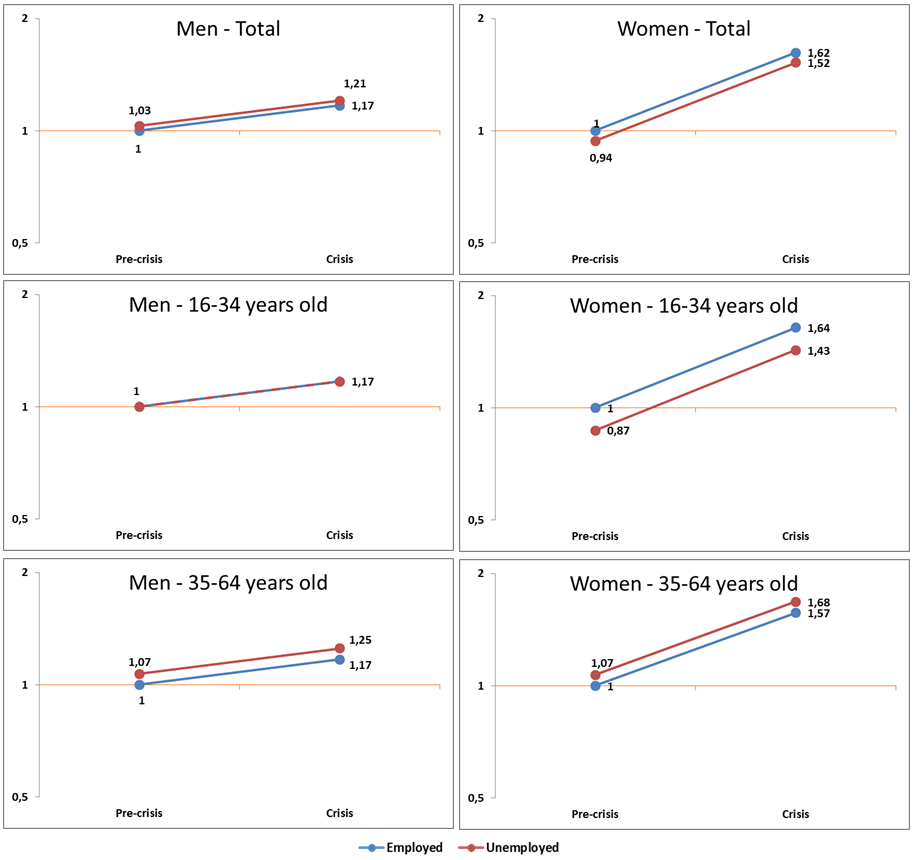


Heavy drinking also showed a downward trend in Period 2 (crisis) among women overall (PR: 0.86; 95%CI: 0.75-0.99) and in the older age group only (PR=0.73; 95%CI: 0.59-0.90). No significant differences were found for heavy drinking between employed and unemployed women (Figure 4.5-2).

In contrast, binge drinking (Figure 4.5-3) displayed a significant upward overall trend in men (PR: 1.17; 95%CI: 1.12-1.22), very similar in both age groups and with no differences between employed and unemployed individuals. As in men, binge drinking also showed a significant upward

trend in Period 2 (crisis) in women overall (PR: 1.62; 95%CI: 1.49-1.76) and in both age groups (PR: 1.64; 95%CI: 1.49-1.82 in the younger age group and PR: 1.57; 95%CI: 1.37-1.81 in the older), while differences among employed and unemployed women were only significant among the younger age group, where unemployed women were less likely to engage in binge drinking (PR: 0.87; 95%CI: 0.78-0.98).

Figure 4.5-3. Association of binge drinking in the last month with period (pre-crisis and crisis) and employment status (employed and unemployed) adjusted for covariates, total and by age group in men and women.



No significant interactions were observed between period and employment status for heavy or binge drinking in either men or women, indicating no differences in the change between periods among employed and unemployed individuals.

4.6 Study 6: Economic crisis and changes in drug use. An analysis of the Spanish economically-active population

4.6.1. Methods

For this study we used data from four editions (2005, 2007, 2009 and 2011) of the EDADES survey and selected those individuals over 15 years old currently working or unemployed at the time of the survey, after excluding economically inactive individuals (students, homemakers, pensioners and disabled), obtaining a total sample size of 62,440 individuals (2005=18,446; 2007=15,071; 2009=13,048 and 2011=15,875). Response rates of about 50% for each edition were accounted for in the original sample size calculation.

Substance use

The use of cannabis was estimated from a question that registers the number of days the individual had smoked cannabis in the last 30 days. Individuals were classified as follows:

- Non-users: Individuals reporting no consumption (reference category).
- Sporadic users: those having used cannabis from 1 to 9 days.
- Heavy users: those reporting use from 10 to 30 days.

Information on hypnotics and sedatives also refers to consumption in the last thirty days. In the 2005 and 2009 editions hypnotics and sedatives were included in a joint module asking about 'other substances' such as heroin, speed, hallucinogens and volatile inhalers; whereas in 2007 and 2011 the questionnaire had separate modules for these substances. In 2011 the question also mentioned the main commercial brands and

generic names. The use is recorded regardless of a mediating prescription. Individuals were classified as follows:

- Non-users: individuals reporting no consumption (reference category).
- Sporadic users: those reporting use of either hypnotics or sedatives from 1 to 9 days.
- Heavy users: those reporting use from 10 to 30 days.

Independent variables

A variable period was created with two categories:

- Period 1 (pre-crisis) included Individuals from editions 2005 and 2007 (reference category).
- Period 2 (crisis) included individuals from editions 2009 and 2011.

Regarding employment status, individuals were classified as currently working (reference category) or unemployed in each period.

The following covariates were considered:

- Age.
- Educational level grouped into three categories; up to primary school, secondary level and university degree (reference category).
- Self-reported health collapsed into poor health and good health (reference category).
- Partner status, cohabiting with a partner whether married or not (reference category: partnered).

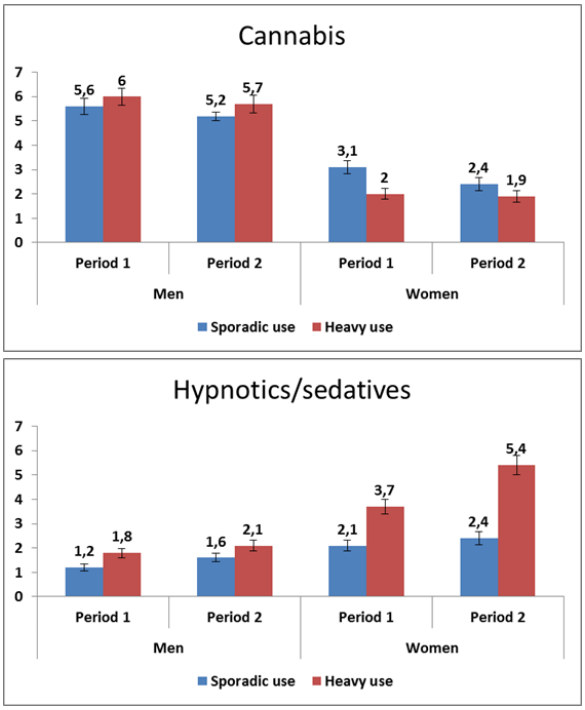
Statistical analysis

Multinomial regression models were fitted to obtain the relative risk ratios (RRR) and 95% confidence interval (CI) of cannabis and hypnotics/sedatives between the two periods in employed and unemployed individuals. Analysis were performed separately for men and women and further stratified by age groups (16-34 and 35-64). The interaction between period and employment status was also included in the models if statistically significant. The models were adjusted for the covariates, including age as a continuous variable in groups of five years for the general models, and also as a continuous variable in the age-stratified models. Analyses were performed applying sample weights using SPSS statistical software v. 18 ©.

4.6.2. Main results

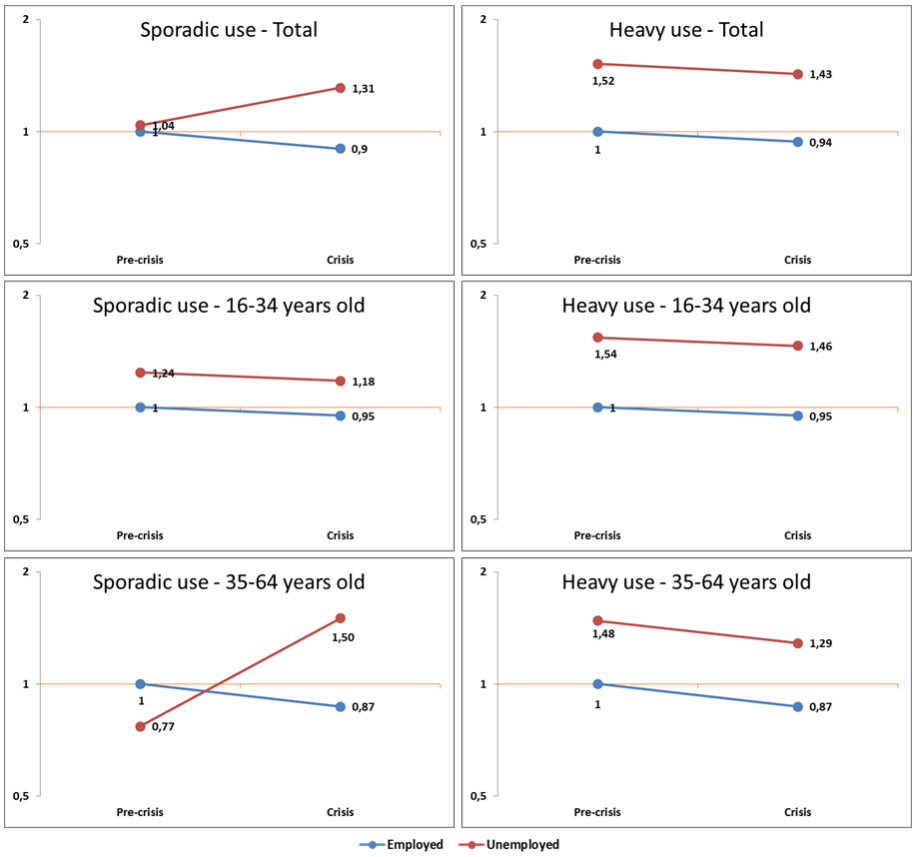
Information on the prevalence of cannabis and hypnotics/sedatives is shown on Figure 4.6-1. No significant differences between periods were found in men for cannabis (5.6% and 5.2% for sporadic use and 6.05 and 5.7% for heavy use, respectively), while in women differences between periods were significant for sporadic use (3.1% in Period 1 and 2.4% in Period 2; p<.001), but not for heavy use (around 2%). With respect to hypnotics/sedatives, differences between periods in men were significant for both sporadic use (1.2% in Period 1 and 1.6% in Period 2; p=.005) and heavy use (1.8% in Period 1 and 2.1% in Period 2; p=.005), while in women differences were non-significant for sporadic use (2.1% and 2.4%), but they were significant for heavy use (3.7% and 5.4%, respectively; p<.001).

Figure 4.6-1. Prevalence of sporadic and heavy use of cannabis and hypnotics/sedatives by period in men and women.



In the adjusted multinomial regression models for men, sporadic cannabis use (SCU) presented a significant interaction between period and employment status overall, whereby unemployed men were more likely to have increased SCU in Period 2 compared to their employed counterparts (RRR: 1.40; 95%CI: 1.10-1.77). This interaction was also observed among the older age group (RRR: 2.24; 95%CI: 1.36-3.68). For the younger group, although SCU was more likely among the unemployed, there were no differences between periods. Regarding heavy cannabis use (HCU), it was significantly more likely among unemployed men, both overall and by age group, but no significant changes were observed between periods (Figure 4.6-2).

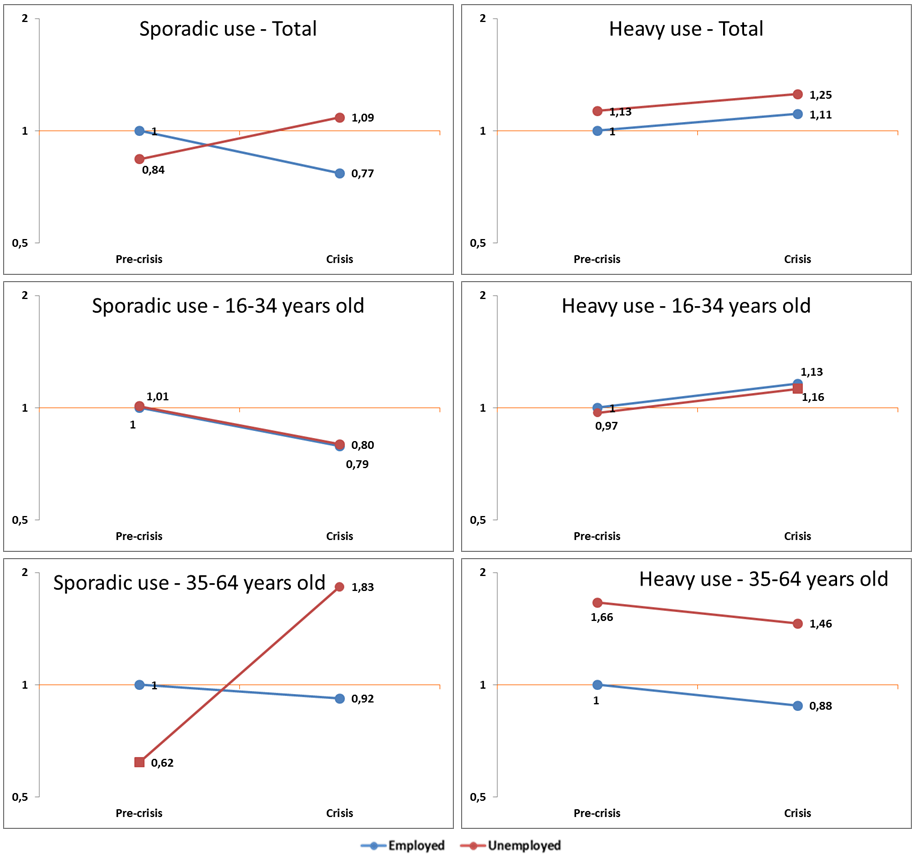
Figure 4.6-2. Association of cannabis use in the last month with period (pre-crisis and crisis) and employment status (employed and unemployed) adjusted for covariates, total and by age group in men.



Similarly, a significant interaction between period and employment status showed that unemployed women were more likely to have increased SCU in Period 2 compared to employed women both overall (RRR: 1.68; 95%CI: 1.17-2.41) and in the older age group (RRR: 3.21; 95%CI: 1.30-7.93), but not among the younger. Differences in HCU between periods were not significant in women either overall or by age groups, while significant differences between employed and unemployed

women were only found among the older age group (RRR: 1.66; 95%CI: 1.11-2.50) (Figure 4.6-3).

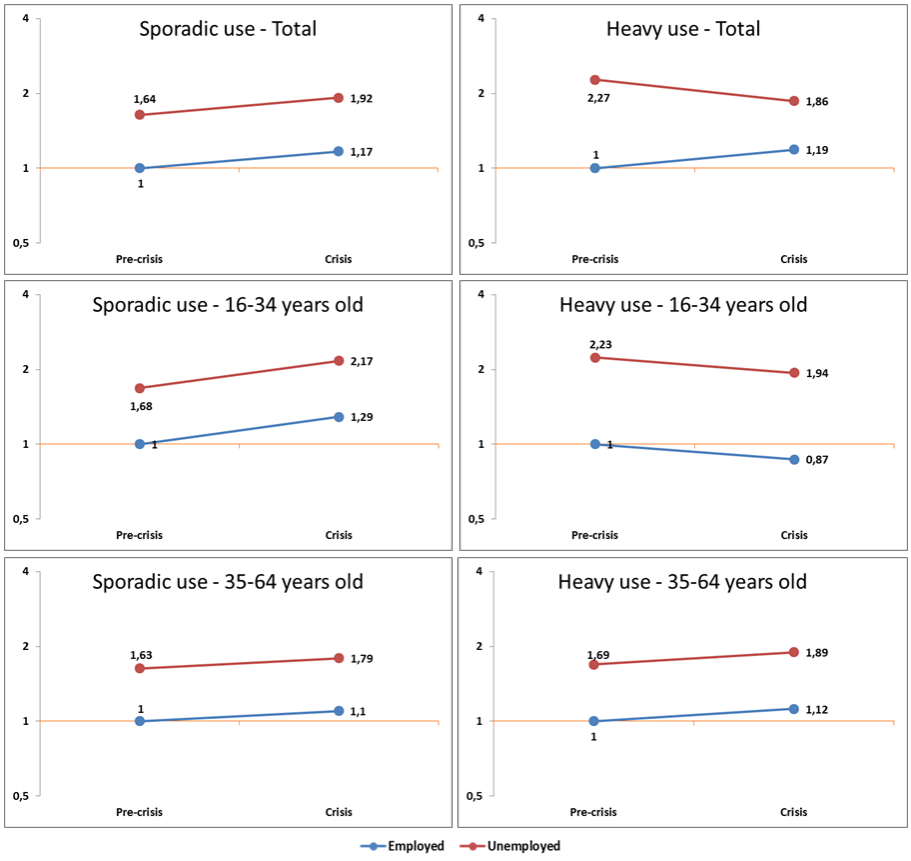
Figure 4.6-3. Association of cannabis use in the last month with period (pre-crisis and crisis) and employment status (employed and unemployed) adjusted for covariates, total and by age group in women



With respect to hypnotics/sedatives, no changes in sporadic use (SUHS) were observed between periods both overall and by age group in men, though unemployed men were more likely to engage in sporadic use than employed men overall (RRR: 1.64; 95%CI: 1.33-2.02) and by age group (RRR: 1.68; 95%CI: 1.19-2.37 for the younger age group, and RRR: 1.63; 95%CI: 1.25-2.13 for the older one). Conversely, although heavy use

of hypnotics/sedatives (HUHS) was also more likely in unemployed men, a significant interaction between employment status and period overall revealed that unemployed men were less likely to have increased heavy use compared to employed men in period 2 (RRR: 0.69; 95%CI: 0.49-0.97), but this interaction did not show up in the age-stratified analyses (Figure 4.6-4).

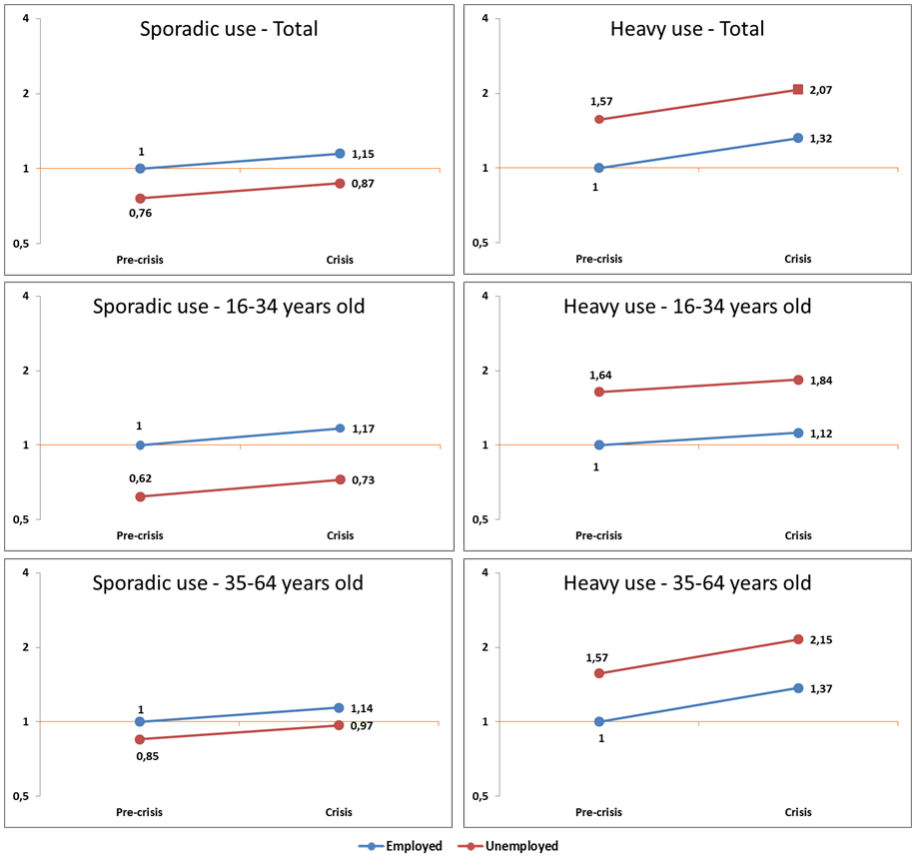
Figure 4.6-4. Association of hypnotics/sedatives use in the last month with period (pre-crisis and crisis) and employment status (employed and unemployed) adjusted for covariates, total and by age group in men.



Similarly, SUHS did not present changes in Period 2 in women. Besides, sporadic use was less likely among unemployed women, both overall

(RRR: 0.76; 95%CI: 0.61-0.94) and in the younger age group (RRR: 0.62; 95%CI: 0.42-0.92) compared to their employed counterparts, but no differences were found among the older group. Concerning HUHS, the results showed an increase in Period 2 overall (RRR: 1.32, 95%CI 1.17-1.49), and in the older age group (RRR: 1.37; 95%CI 1.20-1.57), with a higher likelihood among the unemployed, overall and in both age groups (Figure 4.6-5).

Figure 4.6-5. Association of hypnotics/sedatives use in the last month with period (pre-crisis and crisis) and employment status (employed and unemployed) adjusted for covariates, total and by age group in women.



5 DISCUSSION

Substance use in Spain has been initiated at progressively younger ages, this trend being more pronounced among women. This change, while consistent across the drugs examined, presents differences depending on whether the substance is licit (alcohol and tobacco) or illicit (cannabis and cocaine).

Alcohol is the most prevalent drug with similar LTP for both sexes in the youngest cohort. Moreover, the gender gap of early use of alcohol has almost closed in the youngest cohort with men and women initiating alcohol use at roughly the same age. Similarly, the growing and earlier incorporation of women to tobacco use in recent cohorts has led to an excess LTP of tobacco use among younger women. On the other hand, while the estimated overall LTP of cannabis use for men doubles that of women, the gap has narrowed substantially among the youngest cohort. Differences between sexes in cocaine use remain considerable across cohorts from cohort 3; still, differences in the youngest cohort are smaller.

Similar studies have found comparable cohort patterns across the different drugs overall in the US (Degenhardt et al. 2007) and Australia (Degenhardt et al. 2000); and by sex in the US (Johnson and Gerstein 1998, 2000; Kerr et al. 2007). Conversely, a recent study in Australia (Lenton et al. 2012) registered an overall increase in the age of onset of cannabis use in younger cohorts, pointing to a levelling off of the onset of cannabis use in that country.

Hypnotics-sedatives are the only drugs more prevalently used in females, but disparities in data collection methods between the different survey

editions prevented their inclusion in this study. However, as they typically lack the experimental-recreational qualities linked to other drugs and their use is more common among the older population, the relevance of comparing older and younger cohorts in terms of LTP and age of onset is doubtful.

With this study we have identified cohort effects that inform of changing trends in drug use in Spain among both men and women. The strong embedding of alcohol in Spanish culture and the difficulties to establish preventive measures to limit its availability (Rodríguez-Martos 2007) may account for its widespread use. Besides, the growing incorporation of the younger cohorts of women to tobacco use, along with the decline in prevalence among older men (Plan Nacional sobre Drogas 2009) is consistent with the model of the tobacco epidemics in developed countries described by Lopez et al (Lopez et al. 1994) that would position Spain in the third stage of the epidemic, in which prevalence begins to decline in men while for women it continues to rise, before rates for both sexes decline in stage four.

In the case of illicit substances, our findings present cohort 3 as a turning point. The members of this cohort, born between 1960 and 1974, were in their teens and early twenties during the transition period and the beginning of democracy in Spain (late seventies and eighties). This period symbolised Spain's opening to new social norms that would influence the perception and availability of illegal drugs, especially cannabis. In recent years, a low perception of the risks of cannabis and relaxation of norms surrounding its use (Maldonado 2009) have made cannabis the most prevalent illegal drug. With respect to cocaine, despite the notable increase in recent cohorts, its use is limited among the youngest ones,

possibly due to its higher cost and the perception of it being more dangerous (Plan Nacional sobre Drogas 2009).

After describing the picture of general trends in drug use in Spain, we now turn to discussing the results of the study of work-related stress factors in relation with drug use. First of all, the analysis of questions on employment and working conditions included in the 2007 edition of EDADES identified a structure of four factors with adequate fit and internal consistency that bear a conceptual relationship with some of the factors defining work-related stress: *working environment, workload, precariousness and social support.* From this perspective, the instrument thus obtained may be considered appropriate for analysing use of addictive substances in the context of the EDADES survey.

Taking as reference WHO's classification of potentially harmful work-related stress factors (Leka et al. 2003) (see Table C.1-1 in the Introduction section), the dimensions relating to *working environment* and *workload* found in our analysis would fall within the category "work content" and relate to *job content characteristics* (unpleasant and aversive tasks) and to *workload and work pace*, and *working hours* (excess work and long and/or unsocial hours). Although the WHO classification distinguishes workload and work pace from aspects related to working hours, we justify their inclusion in a single factor on the basis of their factor loadings and fit indexes obtained, and because they belong to closely related work demands. The effort-reward model by Siegrist (Siegrist 1996) includes within the "extrinsic effort" scale elements of workload and work pace and of working hours, among others. On the other hand, the two dimensions named *precariousness* and *social support* would fall within "work context" characteristics,

where the first refers to career development, status and pay (job insecurity, inadequate pay or over-qualification) and the second to interpersonal relationships (quality of supervision and relationship with peers).

The analysis of the relation of work-related stress factors and alcohol use has found independent associations for heavy drinking in men exposed to noxious working environments and to lack of social support at work, and for binge drinking in men experiencing precariousness. No independent associations between work stress measures adjusting for each other in either heavy or binge drinking were found among women.

Although contrasting our results with those of other studies entails some difficulty due to the diversity of measures employed to categorise problem drinking, they can still be compared with those using similar work-related stress measures. Like the main results of our study, a community-based study in Toronto found that job noxiousness (highly dangerous work or involving a lot of dirt and noise) increased alcohol consumption in men but not women (Roxburgh 1998). Conversely, another study of the general population in The Netherlands (San José et al. 2000) found that hazardous physical working conditions were associated with heavy drinking in both men and women. Low rewards in terms of income and job benefits and recognition, equivalent to our measure of precariousness, were associated with higher likelihood of heavy drinking only in men in a study of Finnish municipal sector employees (Kouvonen et al. 2005). Finally, although it has been suggested that the implications of social support in relation to alcohol use will depend on the working context (Hagihara et al. 2003), an

association between low social support and alcohol abuse has also been found in a study of young men (Hemmingsson et al. 1998).

Our results present differential associations between work environment factors and the pattern of drinking in men. A connection has been reported in the literature between certain types of work characterised by their toughness and physical demands and high levels of cirrhosis mortality linked to chronic heavy drinking (Harford and Brooks 1992). Conversely, engaging in binge drinking could represent a response to the frustration generated by perceived insecurity with respect to the future of the job, feeling inadequately remunerated or being overqualified when the position held is inconsistent with the educational background (Siegrist 2000).

Women consistently report lower alcohol consumption levels than men, although the results of our cohorts study suggest that the gender gap for alcohol use is closing in younger cohorts. Evidence of the effects of adverse working conditions on women's alcohol consumption is considerably scarcer compared with that for men. It has been suggested that female workers may tend to manifest work stress through other types of psychopathology, such as depression (Lennon 1987) and be more prone to use other substances, such as sedatives (Benavides et al. 2013).

The results of our study on hypnotics/sedatives use among workers confirm, in line with previous studies in the general population (Empereur et al. 2003; Alonso et al. 2004), that being a woman, older than 45 years and with poor self-reported health defines a clear risk profile for the use of hypnotics/sedatives among the working population.

Furthermore, employment precariousness is identified as a risk factor associated with its use in both men and women.

Interest in the effects of precariousness on health has increased in recent years, as modalities of flexible employment have proliferated in our society and their features have been better defined (Kim et al. 2012). Regarding its relationship with employees' mental health, one study in Spain that used a multidimensional scale of employment precariousness registered an association between precariousness and poor mental health, this association being stronger in women (Vives et al. 2013). Similarly, another study in Finland found an association between a trajectory of employment instability and the number of mental symptoms, the association in this case was stronger in men than in women (Sirviö et al. 2012). Besides, the only study identified on the use of psychotropic medication that included a question on the perception of job insecurity in the analysis (Boeuf-Cazou et al. 2010) did not find differences in psychotropic drug use initiation between those reporting job insecurity compared to those who did not.

Despite claims that in general women have worse employment conditions and poorer quality of work than men (Campos-Serna et al. 2013), in the present study precariousness was more consistently associated with the use of hypnotics/sedatives in men. Other studies posit that psychotropic drug use in men would be influenced by specific socio-occupational factors while in women there would be specific medical factors (Empereur et al. 2003).

The study of changes in drug use among the Spanish economically active population in a context of economic downturn reveals that both men and

women, irrespective of employment status, experienced a reduction in heavy drinking in the period of crisis, except for the younger group of women who did not experience changes. In contrast, binge drinking increased for both men and women and in both age groups, also irrespective of employment status.

Despite manifest differences in the levels of consumption, overall trends between men and women are similar. However, heavy drinking did not register changes in the group of younger women, consistent with the registered increase of alcohol use among the younger cohorts of women. Differences by sex in consumption between employed and unemployed individuals were also noticeable. While unemployed men were more likely to engage in heavy drinking, there were no differences between employed and unemployed women. Moreover, while there were no differences between employed and unemployed men for binge drinking, employed women of the younger age group were more likely to engage in binge drinking than their unemployed counterparts. These results illustrate persistent differences in men's and women's drinking behaviour as well as changes linked to gender roles (Rahav et al. 2006).

Our results match those found in other studies in the United States that have registered a decrease in the prevalence of heavy alcohol use in periods of economic recession (Freeman 1999; Ruhm and Black 2002), and also those that have registered an increase of binge drinking (Dee 2001; Dávalos et al. 2012; Bor et al. 2013). The disparity of results related to drinking patterns could be explained by competing hypotheses dealing with the effects of economic contraction on alcohol abuse, described by Catalano (Catalano 1997). According to this perspective, less income available to purchase alcohol might be behind the decrease of heavy

drinking, a regular pattern of excessive drinking. Conversely, binge drinking, a pattern of excessive drinking involving intoxication, would increase as a means to deal with anxiety and emotional distress related to job loss, whether real or threatened, and to financial hardship.

Other studies considering drinking practices and cultural position of drinking among countries argue that a process of change in the pattern of alcohol use is taking place in Mediterranean countries such as Spain, where alcohol has been traditionally embedded in daily life and wine drunk regularly with meals. This change would involve a decrease in the daily use of wine in parallel with an increase of other types of drinks and of binge drinking episodes, with a tendency towards a homogenisation of drinking patterns across countries (Bloomfield et al. 2003). A decrease in the daily average of alcohol use has been observed in Spain since the late eighties, currently making binge drinking the most common pattern of excessive drinking (Galán et al. 2014). This broader perspective of drinking trends helps us to understand how any influence of economic conditions would develop within these secular changes. The fact that no differences in the change were observed in our study between employed and unemployed individuals would emphasise the relevance of general trends in alcohol use.

Although alcohol dependence or alcohol-related problems were not measured in this study, the exposure to excessive alcohol use in periods of economic downturn may intensify adverse consequences for population health, particularly among the most vulnerable (Schmidt et al. 2009). The spread of the culture of binge drinking presents a serious threat in a period of exceptionally high unemployment rates, even for those currently working. Precarious working conditions, including

insecurity with respect to job future, have been associated with binge drinking among working men. An increase of alcohol-related disorders reported in this period (Gili et al. 2013) may already be reflecting this situation.

The results regarding changes in the use of cannabis and hypnotics/sedatives in the period of crisis showed that while cannabis use remained mostly unchanged, unemployed men and women were more likely to have increased sporadic use in the period of crisis, overall and among the older age group, compared to their employed counterparts. Conversely, employed men were more likely to have increased heavy use of hypnotics/sedatives overall compared to the unemployed while in women it increased overall and in the older age group, irrespective of employment status.

Our results differ from those of other studies that have registered an increase in cannabis use among young individuals in periods of recession (Arkes 2007, 2011; Chalmers and Ritter 2011). According to our results both sporadic and heavy use remained stable among the younger age-group, and sporadic use even decreased among younger women.

As an illegal but increasingly tolerated substance, cannabis use has become very common in Spain. The prevalence of last-month use had been growing steadily since the late nineties and reached a peak in 2005 when it began to show signs of stabilisation (Plan Nacional sobre Drogas 2009). Preventive measures set up in 2004 that included an informative strategy to increase awareness of the risks associated with its use in the general population, and an educational plan addressed to school-age

individuals and key social agents (Grupo de Estudios sobre el Cánnabis 2004), may have favoured this change of trend.

However, our results indicate that unemployed men and women of the older age-group were more likely to have increased sporadic use of cannabis during this period than their employed counterparts. Cannabis use is much more prevalent among young people and it could be argued that the lack of employment opportunities in this period had no impact on the use of the drug among this group in a context of high youth unemployment in Spain. Besides, older people may have initiated or increased use as a way to cope with anxiety in a situation of unemployment, when the relative value of drug use is greater due to the availability of more free time.

Steady increases in the use of hypnotic and sedative drugs have been reported in Spain since the nineties (García del Pozo et al. 2004). As previously stated, the use of this kind of prescription drugs is more prevalent among older women and our results also point to an increase in heavy use among this group in the period studied, with no differences in the increase by employment status. Conversely, employed men were more likely to have increased heavy use in this period compared with their unemployed counterparts. The study of the relation between work-related stress factors and the use of hypnotics/sedatives in the Spanish working population has revealed that those reporting precarious working conditions were more likely to use this type of prescription drugs, especially men.

It has been suggested that men are more affected than women by changes in the economic cycle (Gerdtham and Johannesson 2005;

Edwards 2008). It could be argued that difficulties perceived in the environment and/or threat of job loss would lead to an increase in the prevalence of poor mental health among older men as described in other studies (Bartoll et al. 2014), subsequently increasing their use of psychotropic drugs. Unemployment has affected women to a lesser extent compared to men, however, it has also been contended that in periods of economic crisis women tend to intensify their work, as the production of household goods and services would increase to make up for the loss of income (Floro 1995).

As in the case of alcohol, changes in the use of cannabis and hypnotics/sedatives in a period of economic recession identified in this study have to consider the broader context of national drug use and take into account former developments and policies related with each substance. Likewise, the effects of economic instability on health and on health-related behaviours might also depend on the social systems to protect individuals in situations of unemployment or economic hardships and on active labour market programmes to guarantee secure employment conditions. Large cuts to public budgets in a context of increasing unemployment in Spain might render people more vulnerable to poor mental health (Paul and Moser 2009) and drug abuse.

This work has studied trends in drug use in Spain using representative samples of the Spanish population, and considered the implications of some work features in a transforming labour market context. Drug use and dynamics of change, as in any other social feature, are multifaceted and single explanations are not useful. However, life in modern societies and its reflection in the labour market, make the analysis of changes in drug use particularly relevant. Drug use has increasingly become a

consumption phenomenon rather than a deviant phenomenon, particularly among young people, where licit and illicit drugs compete in the search for pleasure (Beccaria and Sande 2003). In a context of reigning individualism, with high competitiveness and uncertainty with respect to the future of the job, drug use may become a prop to go through life. Under these circumstances, it could be considered that the problem is not drugs but rather the social conditions that can lead vulnerable individuals to drug abuse and dependence (Martí 2004).

Limitations

The limitations affecting these studies have been discussed in depth in each of the papers (see annexes), and here we will only list the main drawbacks encountered. Some of these limitations derive from the source of information and are common to all studies, while others are particular of the methodology used.

Study 1: Research on cumulative incidence of substance use and age of initiation of such use based on cross-sectional data has some limitations:

- A selective attrition process due to drug-related excess mortality.
- Drug use in younger birth cohorts is necessarily reported at a younger age because they have not yet reached older ages.
- Recall bias in retrospective reporting of age of first drug use may be stronger for older cohorts.

Study 2: The instrument to measure work-related stress derived from factor analysis of questions in the 2007 edition of EDADES leaves out important potentially harmful work-related stress factors.

Studies 3 and 4: The studies on the relationship between work-related stress and drug use have the following limitations:

- The cross-sectional design does not allow the identification of the causal chain or its directionality.
- There is the possibility of reporting bias affecting the validity of self-reported measures of drug use and work-stress collected at the same time.
- Survey alcohol measures tend to underestimate the amount of alcohol consumed.
- Prevalence of binge drinking among women may be underestimated due to the use of an identically worded question for both sexes.
- The measure of hypnotics/sedatives used does not distinguish sporadic from heavy use, nor does it differentiate prescribed from non-prescribed use.
- We may have incurred a selection bias (healthy worker effect) as the study population only included individuals currently working.
- Individuals' differences in their responses to stress, coping skills and beliefs about the positive effects of alcohol were not measured.
- The role of domestic responsibilities or the difficulties for combining paid and unpaid work were not measured.

Studies 5 and 6: The main limitations of the studies on economic crisis and changes in drug use would be the following:

- Differences in drug use between two periods have been analysed using cross-sectional data of different individuals; therefore, it is not possible to establish a causal link between an individual's economic situation and his use of alcohol.
- Changes in the data collection between editions may have affected reported use of binge drinking and hypnotic and sedative drugs.

Limitations affecting all studies:

The survey sample design based on households might have led to an underreporting of substance use. A further selection bias may derive from the low response rate (50%), as those not reachable or refusing to answer the questionnaire may share some characteristics with respect to drug use.

6 CONCLUSIONS

1. Our results reflect the particular evolution and main trends of substance use in Spain. The overall increase and earlier onset of substance use, and the change in women's drug use patterns has important implications for prevention and treatment.
2. Policies and preventive measures regarding the use and availability of legal and illegal drugs need to be reassessed, particularly those addressed to young people.
3. Despite its limitations, the tool obtained to measure work-related stress is useful to study the relationship between certain working and employment conditions and the use of drugs in the context of the EDADES survey.
4. Even though the extent to which occupational environments contribute to maintaining or exacerbating potentially damaging drinking behaviours may be modest, identifying work features that affect vulnerable individuals may still be useful for prevention purposes.
5. Drinking patterns were differently associated with work-related stress in men: heavy drinking was associated with noxious working environment and lack of social support, while binge drinking was associated with precariousness.
6. These results suggest that workplaces involving noxious working environments could benefit from interventions targeting primary or secondary prevention of alcohol abuse.
7. Promoting social support in the workplace by enhancing work-group strengths and team awareness, and ensuring better training to perform one's job, would not only provide a buffer for work-related

stress but also favour peer referral and help-seeking in workers with problematic alcohol use.

8. The implementation of prevention policies to reduce the risk of excessive drinking, either specific or embedded in broader workplace programs of health promotion and well-being, may improve wellness and productivity as well as reducing the wider social costs of alcohol.
9. No associations between excessive drinking and work-related stress factors were found among women. The interplay between productive and reproductive work needs to be considered when analysing women's alcohol use.
10. The damaging effects of poor employment conditions on individual's mental health should be further analysed in the present context of economic crisis and labour market restructuring.
11. Considering the increase of the use of hypnotics/sedatives and the ageing working population in Spain, it would be necessary to delve into the study of working conditions, broadening the spectrum of occupational and non-occupational stress factors.
12. Unlike the results of other studies in different countries, cannabis use has not increased in Spain in the period of crisis.
13. The growth of the culture of binge drinking may have important implications for public health in Spain in the future.
14. Policies to limit alcohol availability, the maintenance of social systems to protect individuals in situations of unemployment and economic hardship, and strategies to guarantee secure employment conditions are important to prevent excessive drinking and alcohol-related problems during economic recessions.

7 FUTURE RESEARCH

In the introductory section on the relationship between drugs and work (section C.1) it has been pointed out that most of the research on substance use and workplace has revolved around the influence of the workplace normative context to shape drug use, and the ability of the psychosocial risks of work to generate stress and impact drug behaviour. A recent and much less studied perspective focuses on the assessment of workplace interventions to prevent or manage drug-related problems among employees.

The workplace has been presented as an important setting for implementing programs addressed to prevent excessive drinking among employees, but evidence on the effectiveness of existing programs is not conclusive. Apart from the scarcity of methodologically adequate studies of work-place alcohol interventions (Webb et al. 2009), the reasons for this may include problems in the conceptualization and design of the programs, or failures in their implementation.

In order to contribute to develop the knowledge in this field, a project has been presented to the Spanish National Plan on Drugs to compare cultures and policies on alcohol use in various public transportation companies in Spain and assess their efficacy. The results may be useful to harmonise preventive policies based on optimal intervention standards and guide other companies willing to set up alcohol prevention programmes for their employees.

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Annexes

Published articles of the thesis

Colell E, Sánchez-Niubò A, Domingo-Salvany A. Sex differences in the cumulative incidence of substance use by birth cohort. Int J Drug Policy. 2013;24(4):319-25 . doi: 10.1016/j.drugpo.2012.09.006

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Other works of the thesis

- Economic crisis and changes in alcohol use in the Spanish economically-active population.
  Authors: Colell E, Sánchez-Niubò A, Delclós J, Benavides FG, Domingo-Salvany A.
  Manuscript submitted for publication to *Addiction* and currently under revision.
- Economic crisis and changes in drug use. An analysis of the Spanish economically-active population
  Authors: Colell E, Sánchez-Niubò A, Delclós J, Domingo-Salvany A, Benavides FG.
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Economic crisis and changes in alcohol use in the Spanish economically-active population

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ABSTRACT

Background and aims The effect of economic downturns on alcohol use remains uncertain, probably due to the interplay of several competing hypotheses involving the diverse nature of patterns of alcohol consumption. In this study we examine changes in alcohol use in Spain in a period of severe economic crisis. **Methods** Using cross-sectional data from four editions of the Spanish Household Survey on Alcohol and Drugs we selected economically active individuals aged 16-64 years (N=62,440) and defined two periods, pre-crisis (P1=2005-2007) and crisis (P2=2009-2011). Poisson regression models with robust variance were fitted to obtain prevalence ratio (PR) and 95% confidence interval (CI) of heavy and binge drinking between the two periods, also considering the interaction between period and employment status, in men and women and by age groups (16-34 and 35-64). **Results** While the prevalence of alcohol use remained stable, heavy drinking declined in P2 in men both overall (PR=0.73; 95%CI 0.67-0.79) and in the two age groups, and in women also overall (PR=0.86; 95%CI 0.75-0.99) and in the older age group. In contrast, binge drinking increased overall in men (PR=1.17; 95%CI 1.12-1.22) and in women (PR=1.62; 95%CI 1.49-1.76), and in both age groups. No differences in the change were observed between employed and unemployed individuals. **Conclusion** Alcohol use trends in Spain point to a change in the pattern of excessive drinking. The growth of binge drinking in a period of economic recession may have important future implications for public health.

INTRODUCTION

Spain is one of the European countries most seriously hit by the economic crisis. After more than a decade of continuous growth, by the end of 2007 the Spanish economy began to show signs of collapse following the fall of the real estate market. The economy experienced a rapid contraction (gross domestic product growth rates fell from 3.5% in 2007 to -3.8% in 2009) [1] and this had a devastating impact on employment. Unemployment rates rose from 8.3% in 2007 to 20.1% in 2011 and up to 26.4% in 2013 [2]. Moreover, household average income fell by 8.5% while the risk of poverty and social exclusion rose by 4.7% between 2007 and 2012 [3].

Recent research on the health effects of the economic crisis in the Spanish population has found an increase in the prevalence of poor mental health among men [4], a negative impact of unemployment on self-assessed health and mental health [5], and an increase in mental health disorders, including alcohol-related disorders, in people attending primary care centres [6]. Poor mental health is a predictor of health-compromising behaviours [7] and unemployment has been associated with increased unhealthy behaviours, including substance use [8,9]. Therefore, it could be hypothesized that an increase in either poor mental health

or unemployment as a result of the economic crisis has resulted in an increase in the use of addictive substances.

The relationship between alcohol use and economic conditions is not straightforward. Some studies have found an association between unemployment peaks and significant declines in alcohol use [10,11] and alcohol problems [12], concluding that alcohol consumption is pro-cyclical (i.e. it increases in periods of economic growth) and that changes during economic downturns are mostly driven by decreases in heavy drinking [11], Conversely, other studies have found binge drinking to increase with deteriorating macroeconomic conditions [13-15], even among those who remained employed [13], and despite an overall decline in the prevalence of alcohol use.

These rather contradictory results might be explained by the interplay of several competing hypothesis that would also involve the diverse nature of patterns of alcohol consumption. The 'uncovering' hypothesis argues that heavy drinkers will reduce their drinking due to the threat of job loss. The 'income-effect' hypothesis postulates that alcohol consumption will decrease during economic downturns since there is less income available to purchase alcohol. Finally, the 'provocation' hypothesis posits that heavy alcohol use will increase during recessions through its use for self-medication purposes to cope with emotional distress and anxiety related to real or threatened job loss and financial hardship [16].

The objective of this study was to analyse changes in the use of alcohol between 2005-2007, when Spanish economy was still growing, and 2009-2011, with the recession in progress, using a representative sample of the economically active population (employed and unemployed). Considering that both age and gender can affect the magnitude and patterns of consumption, analyses were performed separately by sex and stratified by age groups.

METHODS

Study population

All data were drawn from the Spanish Household Survey on Alcohol and Drugs (EDADES). EDADES is a biennial nationwide representative survey of the population aged 15 to 64 years to monitor its use of alcohol and drugs. A tri-stage clustered probability sample is applied considering census tracts, homes and individuals. Using data from four editions (2005, 2007, 2009 and 2011), for the purpose of this study we selected those individuals over 15 years old currently working or unemployed at the time of the survey, after excluding all economically inactive population (students, homemakers, pensioners and disabled), obtaining a total sample size of 62,440 individuals (2005=18,446; 2007=15,071; 2009=13,048 and 2011= 15,875). Response rates of about 50% for each edition were accounted for in the original sample size calculation.

Alcohol use

Alcohol use data came from the survey's self-administered standardised questionnaire with separate modules for each substance. Regarding alcohol, the daily average of alcohol intake in the last month was calculated in grams of pure

ethanol considering the standard drink unit that varies for each kind of drink, the number of units, and their frequency, differentiating between weekday and weekend consumption. Individuals were classified according to their daily average of alcohol intake: those who reported zero consumption were categorised as non-drinkers; men consuming up to 39.99g and women consuming up to 23.99g were categorised as moderate drinkers; and those who reported daily averages above these levels (≥40g for men and ≥24g for women) were categorised as heavy drinkers [17]. An additional measure of binge drinking was used for those reporting having had five or more drinks on a single drinking occasion (within two hours) at least once in the previous month in editions 2005 and 2007. Editions 2009 and 2011 used different levels for men and women to define binge drinking (five or more drinks for men and four or more for women). Heavy drinking and binge drinking were both considered excessive drinking.

Independent variables and covariates

A variable was created to identify the two periods of study. Individuals from editions 2005 and 2007 were classified as pre-crisis or Period 1 (reference category) and individuals from editions 2009 and 2011 as crisis or Period 2. Regarding employment status, individuals were classified as currently working (reference category) or unemployed in each period. The following covariates were considered: age; educational level grouped into three categories: up to primary school, secondary level, and university degree (reference category); self-reported health collapsed into poor health including very poor, poor and fair, and good health including good and very good (reference category); and partner status, cohabiting with a partner whether married or not (reference category: partnered).

Statistical analysis

Poisson regression models with robust variance were fitted to obtain the prevalence ratio (PR) and 95% confidence interval (CI) of heavy and binge drinking. Analysis were done separately for men and women and further stratified by age groups (16-34 and 35-64). The interaction between period (pre-crisis or crisis) and employment status (employed or unemployed) was also included in the models if statistically significant. The models were adjusted for the covariates, including age as a continuous variable in groups of five years for the general models, and also as a continuous variable in the age-stratified models. Analyses for both heavy and binge drinking were done excluding non-drinkers from the reference category, considering the role of ill health on the current level of abstention. Analyses were performed applying sample weights using SPSS statistical software v.18©.

RESULTS

Descriptive characteristics of the sample are presented in table 1. In the total sample of 62,440 individuals (58% men), the percentages of unemployed rose from 9.8% for men and 15% for women in Period 1 to 28% and 26%, respectively, in Period 2. Higher rates of unemployment were found among the younger age group, those with low educational level, those reporting poor health and the non-partnered. In men, while the prevalence of non-drinking was similar between periods (around 25.5%), mean alcohol use among drinkers differed

significantly (16.9 g/day in Period 1 and 15.1 g/day in Period 2, p<0.001). Significant differences between periods were also observed in the prevalence of heavy drinking (6.9% and 5.2%, p<0.001) and binge drinking (19.3% and 22%, p<.001). In women, differences in mean alcohol use among drinkers were also significant between periods (7.7 g/day in Period 1 and 7.1 g/day in Period 2, p=.002), with similar prevalence of non-drinking (around 46%). Significant differences between periods were also found in heavy drinking (3.3% and 2.8%, p=.013) and in binge drinking (7.1% and 10.1%, p<.001). Regarding employment status, significant differences in the prevalence of non-drinking, heavy drinking and binge drinking were observed in men, all with higher prevalence among unemployed men, especially in Period 2. In the case of women, a higher prevalence of non-drinkers was also found among the unemployed, whereas binge drinking was more prevalent among the employed, but only in Period 1.

Differences between periods by age group (table 2) in men matched those obtained overall. In women differences between periods among the younger age group were only significant for binge drinking, while in the older age group there were significant differences for both heavy and binge drinking.

The results of the adjusted Poisson regressions (table 3) showed that for men, heavy drinking displayed a significant downward trend in Period 2 overall (PR=0.73; 95%CI 0.67-0.79) and in both age groups (PR=0.79; 95CI% 0.69-0.91 in the younger age group and PR=0.69; 95%CI 0.62-0.77 in the older). Significant differences were also observed between employed and unemployed individuals with an increased likelihood of heavy drinking among the group of unemployed men overall (PR=1.21; 95%CI 1.09-1.34) and in the older age group (PR=1.35; 95%CI 1.17-1.55). In contrast, binge drinking displayed a significant upward overall trend (PR=1.17; 95%CI 1.12-1.22), very similar in both age groups and with no differences between employed and unemployed individuals.

Heavy drinking showed a significant downward trend in Period 2 among women overall (PR=0.86; 95%CI 0.75-0.99) and in the older age group only (PR=0.73; 95%CI 0.59-0.90). No significant differences were found for heavy drinking between employed and unemployed women. As in men, binge drinking also showed a significant upward trend in Period 2 overall (PR=1.62; 95%CI 1.49-1.76) and in both age groups (PR=1.64; 95%CI 1.49-1.82 in the younger age group and PR=1.57; 95%CI 1.37-1.81 in the older), while differences among employed and unemployed women were only significant among the younger age group, where unemployed women were less likely to engage in binge drinking (PR=0.87; 95%CI 0.78-0.98).

No significant interactions were observed between period and employment status for heavy or binge drinking in either men or women, indicating no differences in the change between periods among employed and unemployed individuals.

DISCUSSION

This study of changes in alcohol use among a representative sample of the Spanish economically active population in a period of economic recession reveals that both men and women, irrespective of employment status, showed a reduction

in heavy drinking in Period 2, except for the younger group of women who did not experience changes. In contrast, binge drinking increased for both men and women and in both age groups, also irrespective of employment status.

Despite manifest differences in the levels of consumption, overall trends between men and women are similar. However, heavy drinking did not register changes in the group of younger women, in line with a registered increase of alcohol use among the younger cohorts of women [18]. Differences in consumption between employed and unemployed individuals were also noticeable by sex. While unemployed men were more likely to engage in heavy drinking, there were no differences between employed and unemployed women. Moreover, while there were no differences among employed and unemployed men for binge drinking, employed women of the younger age group were more likely to engage in binge drinking than their unemployed counterparts. These results illustrate persistent differences in men's and women's drinking behaviour as well as changes linked to gender roles [19].

Our results match those found in other studies in the United States that have registered a decrease in the prevalence of heavy alcohol use in periods of economic recession [10,11], and also those that have registered an increase of binge drinking [13-15]. The disparity of results related to drinking patterns could be explained by competing hypotheses dealing with the effects of economic contraction on alcohol abuse, described by Catalano [16]. According to this perspective, less income available to purchase alcohol might be behind the decrease of heavy drinking, a regular pattern of excessive drinking. Conversely, binge drinking, a pattern of excessive drinking involving intoxication, would increase as a means to deal with anxiety and emotional distress related to job loss, whether real or threatened, and to financial hardship.

Other studies considering drinking practices and cultural position of drinking among countries argue that a process of change in the pattern of alcohol use is taking place in Mediterranean countries such as Spain, where alcohol has been traditionally imbedded in daily life and wine drunk regularly with meals. This change would involve a decrease in the daily use of wine in parallel with an increase of other types of drinks and of binge drinking episodes, with a tendency towards a homogenisation of drinking patterns across countries [20]. A decrease in the daily average of alcohol use has been observed in Spain since the late eighties, currently making binge drinking the most common pattern of excessive drinking [21]. This broader perspective of drinking trends helps us to understand how any influence of economic conditions would develop within these secular changes. The fact that no differences in the change were observed in our study between employed and unemployed individuals would emphasise the relevance of general trends in alcohol use.

Although alcohol dependence or alcohol-related problems were not measured in this study, the exposure to excessive alcohol use in periods of economic downturn may intensify adverse consequences for population health, particularly among the most vulnerable [22]. The spread of the culture of binge drinking presents a serious threat in a period of exceptionally high unemployment rates, even for

those currently working. Precarious working conditions, including insecurity with respect to the future of the job, have been associated with binge drinking among working individuals in Spain [23]. An increase of alcohol-related disorders reported in this period [6] may already be reflecting this situation.

Some limitations of this study need to be mentioned. The first is that differences in alcohol use between two periods have been analysed using cross-sectional data of different individuals. This means that we are observing differences in the prevalence in representative samples of the active population of these two periods rather than changes in individuals over time. Therefore, although the period of study was clearly marked by macroeconomic indicators of recession it is not possible to establish a causal chain between an individual economic situation and his use of alcohol. A second limitation is the possibility of reporting bias affecting the validity of self-reported measures of alcohol use. Survey measures tend to underestimate the amount of alcohol consumed [24]; however, other studies suggest that both sporadic and heavy drinkers are likely to declare the actual amount [25]. The design of the EDADES questionnaire permitted an accurate calculation of the average alcohol use per day. However, regarding binge drinking, editions 2005 and 2007 used a single measure for the two sexes while in 2009 and 2011 the question included separate measures. This may have resulted in an underestimation of the prevalence of binge drinking among women in the former editions, thus affecting the differences observed between periods. Lastly, the high rate of non-response might be affecting prevalence estimates as persons unavailable or refusing to participate may share specific characteristics with respect to alcohol use. However, this selection bias would affect both periods similarly.

As a social fact, alcohol use is subject to values, cultural norms and social structures that are mutable and the reasons for changes may be wide-ranging and also shaped by global currents. The changes in alcohol use in a period of economic recession identified in this study have to be understood in a broader context considering ongoing developments. Therefore, some caution must be applied as to how far these results can be generalised, as different circumstances in other countries or settings may lead to different effects [26]. As Stuckler et al put it: 'the extent to which economic changes impact on health depends on the extent to which people are protected from harm' [27]. With respect to alcohol, examples of past experiences stress the importance of public policies to favour or reduce alcohol use in times of economic change. During the Great Depression in the 1930s, alcohol was difficult to obtain in the US following prohibition. In contrast, after the disintegration of the Soviet Union, the wide availability of cheap alcohol encouraged a culture of excessive drinking. The effects of economic instability on health might also depend on the level of social protection as it has also been argued that the effects of unemployment on mental health would be less in countries with strong employment protection systems compared to those with poor employment protection [28].

The growth of the culture of binge drinking may have important implications for public health in Spain in the future. Policies to limit alcohol availability, the maintenance of social systems to protect individuals in situations of

unemployment and economic hardship, and strategies to guarantee secure employment conditions are important to prevent excessive drinking and alcohol-related problems during economic recessions.

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Table 1. Descriptive characteristics of a sample of economically active men and women by period and working status in Spain.

	MEN						WOMEN					
	Period 1 2005-2007	Period 2 2009-2011	Period 1 2005-2007		Period 2 2009-2011		Period 1 2005-2007	Period 2 2009-2011	Period 1 2005-2007		Period 2 2009-2011	
	Total	Total	Employed	Unemployed	Employed	Unemployed	Total	Total	Employed	Unemployed	Employed	Unemployed
N	18712	16303	16616	2096	11534	4769	14805	12620	12367	2438	9122	3498
%	58.6	56.7	90.2	9.8	72.2	27.8	41.1	43.3	85.0	15.0	74.0	26.0
Age mean	38.4 (SD11.2)	39.4 (SD 11.0)	38.8 (SD11.0)	35.2 (SD12.3)	40.2 (SD10.7)	37.4 (SD11.5)	37.0 (SD10.8)	38.8 (SD10.8)	37.2 (SD10.7)	35.6 (SD11.5)	39.4 (SD10.5)	37.2 (SD11.4)
	%	%	%	%	%	%	%	%	%	%	%	%
Age groups			p<.001		p<.001				p<.001		p<.001	
16 to 34	40.5	36.3	86.9	13.1	66.1	33.9	45.8	38.6	83.0	17.0	69.8	30.2
35 to 64	59.5	63.4	92.4	7.6	75.7	24.3	54.2	61.4	86.7	13.3	76.6	23.4
Education			p<.001		p<.001				p<.001		p<.001	
Low	16.2	17.8	84.4	15.6	58.8	41.2	13.1	13.9	79.3	20.7	64.0	36.0
Intermediate	62.5	64.3	90.5	9.5	71.9	28.1	60.3	61.2	84.1	15.9	71.7	28.3
High	21.4	17.9	93.8	6.2	86.6	13.4	26.6	24.8	89.9	10.1	85.1	14.9
Self-reported health			p<.001		p<.001				p<.001		p<.001	
Good	88.3	88.6	89.2	80.0	90.1	84.9	86.9	86.3	87.7	82.8	88.0	81.6
Poor	11.7	11.4	10.8	20.0	9.9	15.1	13.1	13.7	12.3	17.2	12.0	18.4
Partnered			p<.001		p<.001				p=.002		p<.001	
Yes	60.1	61.1	93.9	6.1	77.4	22.6	59.7	60.7	85.8	14.2	75.1	24.9
No	39.9	38.9	84.7	15.3	64.0	36.0	40.3	39.3	83.9	16.1	72.3	27.7
Alcohol use												
	p=.705		p<.001		p<.001		p=.163		p<.001		p<.001	
Non-drinking	25.4	25.6	24.4	34.8	23.3	31.4	46.4	45.6	45.6	50.9	44.0	50.1
	p<.001		p=.001		p<.001		p=.002		p=.305		p=.172	
Mean among drinkers (g/day)	16.9 (SD 20.3)	15.1 (SD 21.7)	16.7 (SD 19.8)	19.3 (SD 25.0)	14.5 (SD 21.4)	16.9 (SD 22.3)	7.7 (SD 10.9)	7.1 (SD 11.6)	7.6 (SD 10.9)	8.0 (SD 10.9)	7.0 (SD 11.8)	7.4 (SD 10.7)
	p<.001		p=.064		p<.001		p=.013		p=.844		p=.911	
Heavy drinking (≥40g/≥24g)	6.9	5.2	6.8	8.0	4.7	6.6	3.3	2.8	3.3	3.3		2.7
	p<.001		p=.006		p<.001		p<.001		p=.049		p=960	
Binge drinking(at least once)	19.3	22.0	19.0	21.6	21.1	24.2	7.1	10.1	7.2	6.0	10.1	10.1

N from raw data; % from weighted data. P-values correspond to X^2 or T-Student tests.

Table 2. Prevalence of alcohol use in the last month by age group and period in a sample of economically active men and women in Spain.

	16 to 34 years old			35 to 64 years old		
	Period 1 2005-2007	Period 2 2009-2011		Period 1 2005-2007	Period 2 2009-2011	
	%	%	p-value	%	%	p-value
MEN						
Non-drinking	25.7	26.1	p=.611	25.2	25.3	p=.877
Mean among drinkers (g/day)	12.7 (SD 19.9)	11.2 (SD 19.6)	p<.001	12.6 (SD 18.4)	11.3 (SD 19.9)	p<.001
Heavy drinking (≥40 g)	7.4	5.5	p<.001	6.6	5.1	p<.001
Binge drinking (at least once)	26.7	30.2	p<.001	14.2	17.2	p<.001
WOMEN						
Non-drinking	44.8	44.5	p=.745	47.8	46.3	p=.055
Mean among drinkers (g/day)	4.6 (SD 9.6)	4.5 (SD 11.0)	p=.588	3.7 (SD 8.2)	3.4 (SD 7.9)	p=.067
Heavy drinking (≥24 g)	4.0	4.0	p=.986	2.7	2.0	p=.005
Binge drinking (at least once)	9.9	15.3	p<.001	4.6	6.9	p<.001

Weighted data. P-values correspond to X^2 or T-Student tests.

Table 3. Association of heavy and binge drinking in the last month with period and employment status adjusted for covariates (total and by age group) in a sample of economically active men and women in Spain.

	Men		Women	
	Heavy drinking **(≥40g/day)**	Binge drinking **(≥5 drinks)**	Heavy drinking **(≥24g/day)**	Binge drinking **(≥4/5 drinks)**
	PR (95%CI)	PR (95%CI)	PR (95%CI)	PR (95%CI)
TOTAL				
Age	1.01 (0.99-1.03)	0.88 (0.87-0.89)***	0.91 (0.87-0.94)***	0.82 (0.80-0.84)***
Education (ref. high)				
Intermediate	1.56 (1.38-1.77)***	1.19 (1.12-1.26)***	1.01 (0.87-1.18)	0.92 (0.84-1.00)
Low	2.37 (2.05-2.74)***	1.33 (1.24-1.43)***	1.45 (1.15-1.83)**	1.05 (0.90-1.21)
Self-assessed health (ref.good)				
Poor	1.55 (1.38-1.73)***	1.13 (1.06-1.21)***	0.87 (0.68-1.10)	1.03 (0.90-1.18)
Partnered (ref. yes)				
No	1.85 (1.69-2.029***	1.47 (1.40-1.54)***	1.57 (1.37-1.81)**	1.48 (1.36-1.61)***
Period (ref. pre-crisis)				
Post-crisis	0.73 (0.67-0.79)***	1.17 (1.12-1.22)***	0.86 (0.75-0.99)*	1.62 (1.49-1.76)***
Employment status (ref. employed)				
Unemployed	1.21 (1.09-1.34)***	1.03 (0.98-1.08)	1.02 (0.86-1.21)	0.94 (0.86-1.04)
16-34 years old				
Age	1.00 (0.98-1.01)	0.98 (0.97-0.98)***	0.97 (0.95-0.99)**	0.46 (0.32-0.66)***
Education (ref. high)				
Intermediate	1.59 (1.30-1.95)***	1.07 (0.99-1.15)	1.09 (0.89-1.35)	0.85 (0.77-0.95)**
Low	2.34 (1.81-3.01)***	1.21 (1.09-1.33)***	1.64 (1.14-2.35)**	1.09 (0.89-1.32)
Self-assessed health (ref.good)				
Poor	1.69 (1.38-2.07)***	1.08 (0.97-1.19)	0.95 (0.67-1.35)	1.09 (0.91-1.30)
Partnered (ref. yes)				
No	1.81 (1.54-2.12)***	1.36 (1.28-1.46)***	1.51 (1.22-1.86)***	1.42 (1.27-1.58)***
Period (ref. pre-crisis)				
Post-crisis	0.79 (0.69-0.91)***	1.17 (1.10-1.23)***	0.99 (0.82-1.19)	1.64 (1.49-1.82)***
Employment status (ref. employed)				
Unemployed	1.04 (0.89-1.23)	1.00 (0.94-1.07)	0.96 (0.76-1.19)	0.87 (0.78-0.98)*
35-64 years old				
Age	1.00 (0.99-1.00)	0.97 (0.97-0.98)***	1.00 (0.98-1.01)	0.96 (0.95-0.97)***
Education (ref. high)				
Intermediate	1.53 (1.30-1.80)***	1.35 (1.23-1.47)***	0.88 (0.70-1.12)	1.04 (0.89-1.21)
Low	2.38 (1.98-2.86)***	1.51 (1.36-1.68)***	1.18 (0.86-1.62)	1.07 (0.85-1.36)
Self-assessed health (ref. good)				
Poor	1.50 (1.31-1.71)***	1.17 (1.07-1.27)**	0.80 (0.58-1.10)	0.97 (0.79-1.19)
Partnered (ref. yes)				
No	1.87 (1.68-2.09)***	1.57 (1.48-1.68)***	1.53 (1.24-1.89)***	1.56 (1.36-1.78)***
Period (ref. pre-crisis)				
Post-crisis	0.69 (0.62-0.77)***	1.17 (1.10-1.25)***	0.73 (0.59-0.90)**	1.57 (1.37-1.81)***
Employmetn status (ref. employed)				
Unemployed	1.35 (1.17-1.55)***	1.07 (0.98-1.16)	1.07 (0.82-1.40)	1.07 (0.90-1.27)

PR: Prevalence ratio. 95%CI: 95% Confidence interval. *= p<0.05; **=p <0.01; ***p=<0.001

Economic crisis and changes in drug use. An analysis of the Spanish economically-active population.

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ABSTRACT

Background and aims Research on the effects of economic downturns in the use of addictive substances other than alcohol is scarce. This study focuses on changes in the use of cannabis and hypnotics/sedatives in Spain in a period of economic crisis. **Methods** Using cross-sectional data from four editions of the Spanish Household Survey on Alcohol and Drugs, we selected economically active individuals aged 16-64 years (N=62,440) and defined two periods, pre-crisis (P1=2005-2007) and crisis (P2=2009-2011). Multinomial regression models were fitted to obtain relative risk ratios (RRR) of cannabis and hypnotics/sedatives use in the last month between the two periods in men and women and by age groups (16-34 and 35-64). Substance use was defined as sporadic if consumed between 1 and 9 days and heavy if consumed between 10 and 30 days. **Results** Unemployed men and women of the older age group were more likely to have increased sporadic use of cannabis compared to their employed counterparts (RRR=2.24; 95%CI 1.36-3.68 and RRR=3.21; 95%CI 1.30-7.93, respectively). Conversely, employed men were more likely to have increased heavy use of hypnotics/sedatives (RRR=0.69; 95%CI 0.49-0.97) compared to the unemployed. Older women increased heavy use of hypnotics/sedatives irrespective of employment status (RRR=1.37; 95%CI 1.20-1.57). **Conclusions** The increase in sporadic use of cannabis among older unemployed men and women and of heavy use of hypnotics/sedatives among older employed men may be reflecting the effects and fear of unemployment on mental health. The increase in heavy use of hypnotics/sedatives among older women deserves further research.

INTRODUCTION

The rapid contraction of the Spanish economy from the end of 2007 resulted in a dramatic increase in unemployment, mostly affecting younger workers, those with lower qualifications and foreigners. Unemployment rates rose from 8.3% in 2007 to 20.1% in 2011 and up to 26.4% in 2013 [1]. The particular characteristics of the Spanish economic recession (marked rise of unemployment and high level of debt, mostly private) make it more severe than a typical cyclical economic downturn and undermine its recovery potential [2].

Economic downturns have been associated with increased psychological distress, use of mental health facilities and suicide rates [3-5]. There is also extensive evidence that both unemployment and the fear of unemployment have adverse consequences for the health of individuals.[6-9] Although those who become unemployed during a recession may have worse health compared with others, those who remain employed may also be affected through a loss of income or job security [10,11]. Increases in the prevalence of poor mental health [12] and of mental health disorders [13] have already been registered in Spain in this period.

Research on changes in substance use in periods of economic downturn has chiefly focused on alcohol, overlooking other substances. Alcohol is the most widely used drug in Spain, as in most European countries, but the use of illegal substances such as cannabis or of prescription drugs such as hypnotics and sedatives is not negligible, particularly among specific population segments. Prevalence of cannabis use in the last year among people under 35 years old in Spain is one of the highest in Europe [14], while the use of psychotropic drugs in Spain also ranks high among European countries [15].

The few studies that have analysed the effects of macroeconomic circumstances on illicit drug use suggest that young individuals might use them more frequently during periods of recession with high unemployment rates [16-18]. It has been argued that recessions would directly lead to more drug dealing, mostly due to the lack of legal employment opportunities. Moreover, with less income available some people may start selling to help pay for their own drugs. An increase in the number of people selling drugs would make it easier to obtain drugs and the price may also be lower due to greater competition, all leading to increases in drug use [17]. Besides, people would tend to use more cannabis to cope with increasing levels of anxiety and distress in a deteriorating economic context, and with more free time available the relative value of drug use may be greater [16,19,20].

The use of prescription drugs such as hypnotics and sedatives typically lack the social-recreational component of alcohol or cannabis and their use can be more easily linked to poor mental health. Therefore, an increase in their use might be indicative of increased levels of anxiety and distress. Moreover, it has been argued that the use of prescribed mood-altering drugs is more common among groups of people who are less likely to use alcohol or other drugs, e.g. women [21].

The objective of this study was to analyse changes in the use of cannabis and hypnotics/sedatives between 2005-2007, when the Spanish economy was still growing, and 2009-2011, with the recession in process, using a representative sample of economically active men and women. Differences in the change of substance use between employed and unemployed individuals during this period were also examined. Considering the differences in substance use between men and women and also the importance of age, analyses were performed separately by sex and stratified by age groups.

METHODS

Study population

All data were drawn from the Spanish Household Survey on Alcohol and Drugs (EDADES). EDADES is a biennial nationwide representative survey of the population aged 15 to 64 years to monitor their use of alcohol and drugs. A tri-stage clustered probability sample is applied considering census tracts, homes and individuals. Using data from four editions (2005, 2007, 2009 and 2011), for the purpose of this study we selected those individuals over 15 years old currently working or unemployed at the time of the survey, after excluding economically inactive individuals (students, homemakers, pensioners and disabled), obtaining a total sample size of 62,440 individuals (2005=18,446; 2007=15,071;

2009=13,048 and 2011= 15,875). Response rates of about 50% for each edition were accounted for in the original sample size calculation.

Substance use

The use of cannabis was estimated from a question that registers the number of days the individual had smoked cannabis in the last thirty days. Individuals reporting no consumption were categorised as non-users, those having used cannabis from 1 to 9 days were categorised as sporadic users, and those reporting use from 10 to 30 days as heavy users (non-users was taken as the reference category).

Information on hypnotics and sedatives also refers to consumption in the last thirty days. In the 2005 and 2009 editions hypnotics and sedatives were included in a joint module asking about 'other substances' such as heroin, speed, hallucinogens and volatile inhalers; whereas in 2007 and 2011 the questionnaire had separate modules for these substances. In 2011 the question also mentioned the main commercial brands and generic names. The use is recorded regardless of a mediating prescription. Individuals reporting no consumption were categorised as non-users, those reporting use of either hypnotics or sedatives from 1 to 9 days were categorised as sporadic users, and those reporting use from 10 to 30 days as heavy users (non-users as reference category).

Independent variables and covariates

To distinguish between the two periods of study, individuals from editions 2005 and 2007 were classified as pre-crisis or Period 1 (reference category) and individuals from editions 2009 and 2011 as crisis or Period 2. Regarding employment status, individuals were classified as currently working (reference category) or unemployed. The following covariates were considered: age; educational level grouped into three categories: up to primary school, secondary level, and university degree (reference category); self-reported health collapsed into poor health including very poor, poor and fair, and good health including good and very good (reference category); and partner status, cohabiting with a partner whether married or not (reference category: partnered).

Statistical analysis

Multinomial regression models were fit to obtain the relative risk ratios (RRR) and 95% confidence interval (CI) of cannabis and hypnotics/sedatives use between the two periods. Analyses were performed separately for men and women and further stratified by age groups (16-34 and 35-64). The interaction between period (pre-crisis and crisis) and employment status (employed and unemployed) was also included in the models if statistically significant. The models were adjusted for the covariates, including age as a continuous variable in groups of five years for the general models, and also as a continuous variable in the age-stratified models. Analyses were performed applying sample weights using SPSS statistical software v.18©.

RESULTS

In the total sample of 62,440 individuals (42% women), the percentage of unemployed rose from 9.8% for men and 15% for women in Period 1 to 28% and

26%, respectively, in Period 2. Higher rates of unemployment were found among the younger age group, those with low educational level, the non-partnered and those reporting poor health (table 1). In men, no significant differences between periods were found for cannabis (5.6% and 5.2% for sporadic use and 6.0% and 5.7% for heavy use, respectively), while differences between periods for hypnotics/sedatives were significant for both sporadic use (1.2% in Period 1 and 1.6% in Period 2) and heavy use (1.8% and 2.1%, respectively). In women, differences between periods were significant for sporadic use of cannabis (3.1% in Period 1 and 2.4% in Period 2), but not for heavy use (around 2%). Conversely, differences were non-significant for sporadic use of hypnotics/sedatives (2.1% and 2.4%), while they were significant for heavy use (3.7% and 5.4%, respectively). Regarding employment status, higher prevalence of sporadic and heavy use of both cannabis and hypnotics/sedatives was observed among unemployed men in both periods. In the case of women, significant differences between employed and unemployed were found for sporadic and heavy use of cannabis only in Period 2 and for heavy use of hypnotics/sedatives in both periods.

Results by age group revealed no differences between periods for cannabis use in men (table 2). Regarding hypnotics/sedatives, significant differences between periods were found in sporadic use only among the younger group and in heavy use among older one. In women differences between periods among the younger age group were only significant for sporadic cannabis use, while in the older age group there were significant differences for heavy use of hypnotics/sedatives.

In the adjusted multinomial regression models (table 3) for men, sporadic cannabis use (SCU) presented a significant interaction between period and employment status overall, whereby unemployed men were more likely to have increased SCU in Period 2 compared to their employed counterparts (RRR=1.40; 95%CI 1.10-1.77). This interaction was also observed among the older age group (RRR=2.24; 95%CI 1.36-3.68). For the younger group, although SCU was more likely among the unemployed, there were no differences between periods. Regarding heavy cannabis use (HCU), it was significantly more likely among unemployed men, both overall and by age group, but no significant changes were observed between periods.

Similarly, a significant interaction between period and employment status showed that unemployed women were more likely to have increased SCU in Period 2 compared to employed women both overall (RRR=1.68; 95%CI 1.17-2.41) and in the older age group (RRR=3.21; 95%CI 1.30-7.93), but not among the younger. Differences in HCU between periods were not significant in women either overall or by age groups, while significant differences between employed and unemployed women were only found among the older age group (RRR=1.66; 95%CI 1.11-2.50).

No changes in sporadic use of hypnotics/sedatives (SUHS) were observed between periods both overall and by age group in men, though unemployed men were more likely to engage in sporadic use than employed men overall (RRR=1.64; 95%CI 1.33-2.02) and by age group (RRR=1.68, 95%CI 1.19-2.37

for the younger age group, and RRR=1.63; 95%CI 1.25-2.13 for the older one). Conversely, although heavy use of hypnotics/sedatives (HUHS) was also more likely in unemployed men, a significant interaction between employment status and period overall revealed that unemployed men were less likely to have increased heavy use compared to employed men in Period 2 (RRR=0.69; 95%CI 0.49-0.97), but this interaction did not show up in the age-stratified analyses.

Similarly, SUHS did not present changes in Period 2 in women. Besides, sporadic use was less likely among unemployed women, both overall (RRR=0.76; 95%CI 0.61-0.94) and in the younger age group (RRR=0.62; 95%CI 0.42-0.92) compared to their employed counterparts, but no differences were found among the older group. Concerning HUHS, the results showed an increase in Period 2, overall (RRR=1.32; 95%CI 1.17-1.49) and in the older age group (RRR=1.37; 95%CI 1.20-1.57), with a higher likelihood among the unemployed, overall and in both age groups.

DISCUSSION

According to our results, while cannabis use remained mostly unchanged between the two periods of study, unemployed men and women were more likely to have increased sporadic use of cannabis in Period 2, overall and among the older age group, compared to their employed counterparts. Conversely, employed men were more likely to have increased heavy use of hypnotics/sedatives overall compared to the unemployed while in women it increased overall and in the older age group, irrespective of employment status.

Our results differ from those of other studies that have registered an increase in cannabis use among young individuals in periods of recession [16-18]. According to our results, both sporadic and heavy use remained stable among the younger age-group, and sporadic use even decreased among younger women.

As an illegal but increasingly tolerated substance, cannabis use has become very common in Spain. The prevalence of last-month use had been growing steadily since the late nineties and reached a peak in 2005 when it began to show signs of stabilisation [22]. Preventive measures set up in 2004 that included an informative strategy to increase awareness of the risks associated with its use in the general population, and an educational plan addressed to school-age individuals and key social agents [23], may have favoured this change of trend.

However, our results indicate that unemployed men and women of the older age-group were more likely to have increased sporadic use of cannabis during this period than their employed counterparts. Cannabis use is much more prevalent among young people and it could be argued that the lack of employment opportunities in this period had no impact on the use of the drug among this group in a context of high youth unemployment in Spain. Besides, older people may have initiated or increased use as a way to cope with anxiety in a situation of unemployment, when the relative value of drug use is greater due to the availability of more free time.

Steady increases in the use of hypnotic and sedative drugs have been reported in Spain since the nineties [24], The use of this kind of prescription drugs is more

prevalent among older women and our results also point to an increase in heavy use among this group in the period studied, with no differences in the increase by employment status. Conversely, employed men were more likely to have increased heavy use in this period compared with their unemployed counterparts. A study of the relation between work-related stress factors and the use of hypnotics/sedatives in the Spanish working population revealed that those reporting precarious working conditions, including insecurity concerning the future of the job, were more likely to use this type of prescription drugs, especially men [25].

It has been suggested that men are more affected than women by changes in the economic cycle [26,27]. Likewise, other studies posit that psychotropic drug use in men would be influenced by specific socio-occupational factors while in women there would be specific medical factors [28]. It could be argued that difficulties perceived in the environment and/or threat of job loss would lead to an increase in the prevalence of poor mental health among older men as described in other studies [12], subsequently increasing their use of psychotropic drugs. Unemployment has affected women to a lesser extent compared to men, however, it has also been contended that in periods of economic crisis women tend to intensify their work, as the production of household goods and services would increase to make up for the loss of income.[29] Therefore, more research including information on domestic workload is necessary in order to better understand women's health and their use of these prescription drugs in times of recession.

Among the limitations of the present study we must mention that, although we are studying differences in substance use in a period marked by macroeconomic indicators of recession, the cross-sectional nature of its design does not allow establishing a causal chain between the economic situation and use of substances. Moreover, changes in the data collection between editions may have affected reported use of hypnotic and sedatives drugs. In the 2005 and 2009 editions information on the use of these substances was collected in a joint module together with other substances, while in 2007 and 2011 they had independent modules. However, the under-reporting derived from shared modules would affect both periods of study alike. Besides, the inclusion in 2011 of the main generic names and commercial brands for these substances in the question may have helped respondents to identify them leading to higher reporting levels. However, while we would expect this change in the question to help sporadic users to recall use, registered increases were stronger in heavy use. Lastly, the high rate of non-response may have affected prevalence estimates as persons unavailable or refusing to participate may have similar drug consumption patterns. However, this selection bias would affect both periods similarly.

Some caution has to be applied as to the generalisation of the results of this research as different contexts in other countries or settings may lead to different effects [5,30]. Changes in the use of cannabis and hypnotics/sedatives in a period of economic recession identified in this study have to consider the broader context of national drug use and take into account former developments and policies related with each substance. Likewise, the effects of economic instability

on health and on health-related behaviours might also depend on the social systems to protect individuals in situations of unemployment or economic hardship and on active labour market programmes to guarantee secure employment conditions. Large cuts to public budgets in a context of increasing unemployment in Spain might render people more vulnerable to poor mental health [7] and substance abuse.

The maintenance of social systems to protect individuals in situations of unemployment and economic hardship and of policies to guarantee secure employment conditions are important to prevent mental health deterioration and substance abuse during economic recessions. Further research is needed on the role of precarious employment in mental health and substance use and on the health and social factors associated to hypnotics/sedatives use among women.

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Table 1. Descriptive characteristics of the sample of economically active men and women by period and working status in Spain.

	MEN						WOMEN					
	Period 1 2005-2007	Period 2 2009-2011	Period 1 2005-2007		Period 2 2009-2011		Period 1 2005-2007	Period 2 2009-2011	Period 1 2005-2007		Period 2 2009-2011	
	Total	Total	Employed	Unemployed	Employed	Unemployed	Total	Total	Employed	Unemployed	Employed	Unemployed
N	18712	16303	16616	2096	11534	4769	14805	12620	12367	2438	9122	3498
%	58,6	56,7	90,2	9,8	72,2	27,8	41,1	43,3	85,0	15,0	74,0	26,0
Age mean	38,4 (SD11,2)	39,4 (SD 11,0)	38,8 (SD11,0)	35,2 (SD12,3)	40,2 (SD10,7)	37,4 (SD11,5)	37,0 (SD10,8)	38,8 (SD10,8)	37,2 (SD10,7)	35,6 (SD11,5)	39,4 (SD10,5)	37,2 (SD11,4)
	%	%	%	%	%	%	%	%	%	%	%	%
Age groups			p<.001		p<.001				p<.001		p<.001	
16 to 34	40,5	36,3	86,9	13,1	66,1	33,9	45,8	38,6	83,0	17,0	69,8	30,2
35 to 64	59,5	63,4	92,4	7,6	75,7	24,3	54,2	61,4	86,7	13,3	76,6	23,4
Education			p<.001		p<.001				p<.001		p<.001	
Low	16,2	17,8	84,4	15,6	58,8	41,2	13,1	13,9	79,3	20,7	64,0	36,0
Intermediate	62,5	64,3	90,5	9,5	71,9	28,1	60,3	61,2	84,1	15,9	71,7	28,3
High	21,4	17,9	93,8	6,2	86,6	13,4	26,6	24,8	89,9	10,1	85,1	14,9
Self-reported health			p<.001		p<.001				p<.001		p<.001	
Good	88,3	88,6	89,2	80,0	90,1	84,9	86,9	86,3	87,7	82,8	88,0	81,6
Poor	11,7	11,4	10,8	20,0	9,9	15,1	13,1	13,7	12,3	17,2	12,0	18,4
Partnered			p<.001		p<.001				p=.002		p<.001	
Yes	60,1	61,1	93,9	6,1	77,4	22,6	59,7	60,7	85,8	14,2	75,1	24,9
No	39,9	38,9	84,7	15,3	64,0	36,0	40,3	39,3	83,9	16,1	72,3	27,7
Cannabis use	p=.164		p=.001		p<.001		p<.001		p=.805		p<.001	
Sporadic (1-9 days)	5,6	5,2	5,4	7,2	4,4	7,4	3,1	2,4	3,2	3,1	2,1	3,4
	p=.344		p<.001		p<.001		p=.588		p=.273		p=.001	
Heavy (10-30 days)	6,0	5,7	5,4	11,3	4,4	9,3	2,0	1,9	1,9	2,3	1,6	2,5
Hypnotics/sedatives use	p=.005		p=.004		p<.001		p=.097		p=.065		p=.041	
Sporadic (1-9 days)	1,2	1,6	1,1	1,9	1,3	2,1	2,1	2,4	2,2	1,6	2,6	2,0
	p=.005		p<.001		p<.001		p<.001		p<.001		p<.001	
Heavy (10-30 days)	1,8	2,1	1,5	4,1	1,8	3,1	3,7	5,4	3,3	5,6	4,6	7,8

N from raw data; % from weighted data. P-values correspond to X^2.

Table 2. Prevalence of cannabis and hypnotic/sedative use in the last month by age group and period in men and women.

	16 to 34 years old			35 to 64 years old		
	Period 1 2005-2007	Period 2 2009-2011		Period 1 2005-2007	Period 2 2009-2011	
	%	%	p-value	%	%	p-value
MEN						
Cannabis sporadic use (1-9 days)	9.5	9.0	p=.288	2.9	3.1	p=.370
Cannabis heavy use (10-30 days)	10.7	11.1	p=.410	2.7	2.6	p=.626
Hypnotics/sedatives sporadic use (1-9 days)	1.0	1.4	p=.015	1.4	1.7	p=.118
Hypnotics/sedatives heavy use (10-30 days)	1.1	1.1	p=.811	2.2	2.7	p=.011
WOMEN						
Cannabis sporadic use (1-9 days)	5.5	4.1	p=.001	1.1	1.3	p=.258
Cannabis heavy use (10-30 days)	3.2	3.5	p=.387	0.9	0.8	p=.669
Hypnotics/sedatives sporadic use (1-9 days)	1.6	1.8	p=.451	2.5	2.8	p=.308
Hypnotics/sedatives heavy use (10-30 days)	1.9	2.4	p=.088	5.1	7.3	p<.001

Weighted data. P-values correspond to X^2

Table 3. Association of cannabis and hypnotics/sedatives use in the last month with period and employment status adjusted for covariates* (total and by age group) in a sample of economically active men and women in Spain.

	MEN		WOMEN	
	Sporadic use (1-9 days) RRR (95%CI)	Heavy use (10-30 days) RRR (95%CI)	Sporadic use (1-9 days) RRR (95%CI)	Heavy use (10-30 days) RRR (95%CI)
	Cannabis		Cannabis	
Total				
Period (ref. pre-crisis)				
Crisis	0.90 (0.81-1.01)	0.94 (0.86-1.03)	0.77 (0.64-0.91)**	1.11 (0.92-1.32)
Activity (ref. employed)				
Unemployed	1.04 (0.86-1.27)	1.52 (1.37-1.69)***	0.84 (0.64-1.11)	1.13 (0.92-1.39)
Interaction Activity/Period	1.40 (1.10-1.77)**		1.68 (1.17-2.41)**	
16-34 years old				
Period (ref. pre-crisis)				
Crisis	0.95 (0.84-1.07)	0.95 (0.85-1.06)	0.79 (0.66-0.94)**	1.16 (0.94-1.43)
Activity (ref. employed)				
Unemployed	1.24 (1.08-1.43)**	1.54 (1.36-1.74)***	1.01 (0.83-1.25)	0.97 (0.77-1.24)
35-64 years old				
Period (ref. pre-crisis)				
Crisis	0.87 (0.73-1.04)	0.87 (0.74-1.03)	0.92 (0.67-1.27)	0.88 (0.62-1.25)
Activity (ref. employed)				
Unemployed	0.77 (0.49-1.21)	1.48 (1.21-1.81)***	0.62 (0.27-1.41)	1.66 (1.11-2.50)**
Interaction Activity/Period	2.24 (1.36-3.68)**		3.21 (1.30-7.93)**	
	Hypnotics/sedatives		Hypnotics/sedatives	
Total				
Period (ref. pre-crisis)				
Crisis	1.17 (0.97-1.40)	1.19 (0.99-1.42)	1.15 (0.98-1.35)	1.32 (1.17-1.49)***
Activity (ref. employed)				
Unemployed	1.64 (1.33-2.02)***	2.27 (1.73-2.97)***	0.76 (0.61-0.94)**	1.57 (1.37-1.79)***
Interaction Activity/Period		0.69 (0.49-0.97)*		
16-34 years old				
Period (ref. pre-crisis)				
Crisis	1.29 (0.93-1.78)	0.87 (0.63-1.22)	1.17 80.88-1.55)	1.12 (0.86-1.45)
Activity (ref. employed)				
Unemployed	1.68 (1.19-2.37)**	2.23 (1.58-3.14)***	0.62 (0.42-0.92)**	1.64 (1.24-2.16)***
35-64 years old				
Period (ref. pre-crisis)				
Crisis	1.10 (0.88-1.37)	1.12 (0.94-1.33)	1.14 (0.93-1.38)	1.37 (1.20-1.57)***
Activity (ref. employed) *Unemployed*	1.63 81.25-2.13)***	1.69 (1.39-2.06)***	0.85 (0.65-1.10)	1.57 81.35-1.82)***

* Adjusted for age, educational level, self-reported health and partner status.
RRR: Relative risk ratio. 95%CI: 95% Confidence interval.
*= p<0.05; **=p <0.01; ***=p<0.001