New indicators of health among adolescent drug users and evaluation of drug policies comparing countries

Elena Ventura[1], Harrison Wagner[2], Carla Rossi[3]

ABSTRACT

By correlating essential features of the national drug legislations and policies of some European countries and various indicators of consumption and health of consumers, interesting patterns emerge. We conclude that it is the correct balance between a drug policy aimed at prevention, rehabilitation, and a less restrictive legislation, that, on the basis of what we have analyzed and measured, has a positive effect on drug consumption and that indicators are efficient and should be applied regularly to compare quantitatively country policies to identify best practices.

Key words: drug users, health, drug policies, evaluation

(1) Illicit Drug Market Institute Rome, Italy
(2) Princeton University Princeton, New Jersey, U.S.A
(3) Centre for Biostatistics and Bioinformatics University of Rome "Tor Vergata" Rome, Italy

CORRESPONDING AUTHOR: Carla Rossi - Consiglio Italiano per le Scienze Sociali - Via della Dogana Vecchia n.5 – 00186 Roma - Phone: +39 3204358686 email prof.carla.rossi@gmail.com

INTRODUCTION

According to a study comparing drug legislations in some European countries and trying to identify best practices[1], there are numerous discrepancies between the "law" and "the concrete effect of the law". Reform and formal improvement of a law does not always mean that the final effects of the change are in line with the initial objectives, because the law has a "social dimension", and there are a number of subjective factors that are necessary to consider.

In all areas of public policy, interventions, designed to achieve a specific goal, may have unpredictable (or not well forecasted) effects; some of these unintended consequences may be rather undesirable and the global outcome more negative than positive and should be measured.

However, even if there are no perfect laws, certain laws are more effective than others, because they try to consider the possible implications of the application of the law itself.

Some new indicators have been introduced recently to evaluate drug laws measuring the health and criminal "consequences". These indicators have been applied to different drug using populations (Fabi et al., 2014). The health indicators have been recently also applied to ESPAD data showing different health consequences in the 38 countries involved in the survey (Mammone et al., 2014) and it is natural to widen the scope of the comparison to include the study of the national drug laws to better understand the actual effects of these laws. We will thus study and compare a sample of different national drug laws on the basis of the new indicators related to harmful drug use among adolescents.

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[1] Comparison of some European legislation on drugs, C. Rossi, E. Ventura, UniversItalia, 2013, Rome

The aim is to verify the possible correlation between the indicators and laws and policies of individual countries, such as, in particular, Italy, Portugal and Czech Republic, highlighting similarities and differences in light of the results found with the different indicators. The implementation of a simple inference hypothesis testing provide an informative example of cooperation of science and politics.

THE NEW INDICATORS TO MEASURE FREQUENCY OF USE AND HEALTH CONSEQUENCES OF DRUG USE

It is important to understand whether the degree of rigor of a law and a policy may, in some way, affect the following aspects:
- prevalence of consumers (standard indicator);
- frequency of consumption (new indicator);
- type of consumption, substances, and poly-use (new indicator).

In three recent papers, new indicators have been introduced and applied to different populations (Fabi et al., 2011 and 2014; Mammone et al., 2014) to better measure the behaviors of consumers with respect to frequency of use and poly-drug use.

These indicators consider both the frequency of use and the harm of each substance used, providing tools to evaluate concurrent drug policies and, in particular, guiding primary prevention interventions. Based on comparable data on substance use from 38 European countries among 15 to 16 year old adolescents in the year 2011, the analysis specifically aimed at: 1) defining a global "frequency of use" (FUS) and estimating harm associated with poly-drug use (PDS), 2) comparing the aggregated scores by country. Poly-drug use was defined as concurrent use of more than one substance in a specific time period (Earleywine & Newcomb, 1997).

Sample. For this study, international data from the 2011 European School Survey Project on Alcohol and other Drugs (ESPAD) were used. A full description of sampling and data collection procedures has been reported elsewhere (Hibell et al., 2012). ESPAD collects comparable data on substance use among 15- to 16-year old European students to monitor trends within as well as between countries. In the 2011 ESPAD study, students in 38 European countries were surveyed in a class room setting by completing self-administered questionnaires (total N = 111,583). Countries participating were Albania, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Malta, Moldova, Montenegro, the Netherlands, Belgium-Flanders, Norway, Poland, Portugal, Romania, Russian Federation, Serbia, Federation of Bosnia and Herzegovina, Bosnia and Herzegovina-Srpska, Slovak Republic, Slovenia, Sweden, Ukraine, United Kingdom, Kosovo.

Sample sizes varied between 366 and 6084, in Liechtenstein and Serbia, respectively.

Data on lifetime use are collected for tranquillizers and sedatives without a prescription, cannabis, inhalants, cocaine, crack, heroin, hallucinogens (LSD and mushroom) and stimulants (GHB, ecstasy and amphetamines). Data about the use in the last year and last month were collected for cannabis, ecstasy and inhalants.

Analyses. The indicators "frequency of use" score (FUS) and "poly-drug use" score (PDS) have been previously used in the analyses of the 2011 Italian School Population Survey (Fabi et al., 2011) and the 2012 PDU survey in Italy, the Czech Republic, Portugal and Catalonia (Ricci & Rossi, 2013; Fabi et al., 2013). Based on prevalence data on substance use in the last 30 days, the frequency of use score (FUS) was computed, in these previous publications, by summing for each individual the median values of the frequency interval of each substance used. In the present paper, the FUS indicator is modified for the data available and is based on lifetime period instead of last thirty days. The "overall" or global harm weight for each substance was derived from the three indicators proposed by van Amsterdam et al. (2010) measuring different aspects of a substance's negative health consequences: acute toxicity (X), chronic toxicity (Y) and dependence (Z). Principal component analysis (Everitt and Dunn 1991, pages 45-57 for a general introduction) was applied to provide weights (a,b,c) leading to the global harm score $W=aX+bY+cZ$ (Table 1) as first principal component. Principal components analysis of the (X,Y, Z) scores for the different substances results in three new variables (W, W', W") which

	TABLE 1			
INDICATORS USED FOR THE PRINCIPAL COMPONENT ANALYSIS: X, Y AND Z (VAN AMSTERDAM ET AL., 2010) AND AVERAGE PHYSICAL HARM SCORE (W) OF THE DIFFERENT SUBSTANCES OBTAINED BY THE FIRST PRINCIPAL COMPONENT.				
SUBSTANCE	**OVERALL PHYSICAL HARM SCORE (W)**	**ACUTE TOXICITY (X)**	**CHRONIC TOXICITY (Y)**	**DEPENDENCE (Z)**
CRACK COCAINE	2.67	2.39	2.63	2.82
HEROIN	2.51	2.37	2.03	2.89
ALCOHOL	2.18	1.89	2.47	2.13
METHAMPHETAMINE	2.18	2.03	2.18	2.24
METHADONE	2.12	1.95	1.42	2.68
COCAINE	2.07	1.95	2.05	2.13
AMPHETAMINE	1.88	1.71	1.89	1.95
GHB	1.47	1.84	0.79	1.71
BENZODIAZEPNES	1.31	0.97	0.76	1.89
BUPRENORPHINE	1.30	1.21	0.76	1.71
CANNABIS	1.18	0.84	1.53	1.13
KETAMINE	1.05	1.55	0.92	0.84
ECSTASY	1.03	1.34	1.34	0.61
METHYLPHENIDATE	0.87	0.92	0.83	0.86
ANABOLIC STEROIDS	0.81	0.45	1.24	0.71
KHAT	0.73	0.39	0.95	0.76
LSD	0.61	1.47	0.68	0.03
MAGIC MUSHROOMS	0.28	0.89	0.13	0.03

are stochastically independent and provide, globally, the same information as the previous ones X, Y and Z. The first component W, which we used as the main summary (best weighted average) of the three indicators X, Y and Z, is the most informative one, the information value being measured by the associated variance. The variances explained by the three principal components (W, W', W'') are 77%, 14% and 9%, respectively.

The poly-drug score (PDS) for the *i-th* user was computed using the following formula:

$$PDS_i = \sum_{j=1}^{n} w_j FUS_{ij}$$

where *n* represents the number of substances used in the time period considered, w_j is the W score of the *j-th* substance and FUS_{ij} is the frequency of use of the *j-th* substance for the *i-th* user in the same time period.

The indicators FUS and PDS were calculated using lifetime consumption of 11 substances: cannabis, ecstasy, tranquilizers or sedatives (without doctor's prescription), amphetamines, LSD or other hallucinogens, crack, cocaine, heroin, "magic mushrooms", GHB, and anabolic steroids. Since respondents were aged 15 to 16 years at the time of the survey, "ever used" was considered representing recent consumption. Any lifetime drug use was defined as the positive response to at least one of the drugs listed above.

The seven response categories of lifetime frequency were assigned the values 0, 1.5, 4, 7.5, 14.5, and 29.5 representing the mean point of each interval. For the category "40 or more" an arbitrarily frequency of 50 was chosen. Only a small number of respondents selected the last category (3% of males and 9% of females).

It is important to note that the PDS had no maximum and exhibits a very high variability. Therefore, normalization is useful by dividing the score by the maximum theoretical value obtained in case of use of just one substance,

that in this case was computed considering a consumption equal to 40 (that is the upper bound of the last class interval of consumption) of the most harmful substance according to the harm score W (crack cocaine, having W=2.67). The normalization of PDS by using its maximum theoretical value (106.8), facilitates comparisons among the 38 countries. The complete comparison is based on the empirical distribution curves and synthetic indicators such as mean and median.

The quartiles of the FUS and PDS distributions can be reported for comparison of the countries in a special radar graph, instead of box plots placed side by side in a big figure, where the radar graph is a circular representation where a segment starts from the centre of the circle for each country, the various indicators of the country are reported in the segment and can be easily compared with all the other countries I a rather compact figure.

Inference on the effect of particular aspects of law and policy on the indicators in different countries can be easily performed and helps to understand how to improve the efficacy of interventions as it is shown below n a simple example.

RESULTS

Lifetime use of any drug

Figure 1 depicts the lifetime prevalence of any drug use by country. Countries are ordered by male prevalence from high to low.

If the analyses of law consequences are based on the prevalence, then Czech Republic, France, Netherlands and Poland show the most serious situations (prevalence higher than 35%). Italy and Portugal have a similar prevalence (higher than 25% but lower than 30%), Ireland and Cyprus (higher than 20% and lower than 25%), Albania and Sweden (lower than 20% and higher than 10%) and Norway and Kosovo show the lowest values (less than 10%). If the impact of the law is evaluated only on this indicator, which is the standard adopted, it can be biased, as is shown by the application of the new indicators.

Frequency of use score and poly-drug use score

In order to better analysis a country's situation, it's important to consider the PDS. The empirical cumulative distributions, where the maximum

LIFETIME PREVALENCE (%) OF DRUG USERS BY GENDER (SOURCE ESPAD SAMPLE 2011)
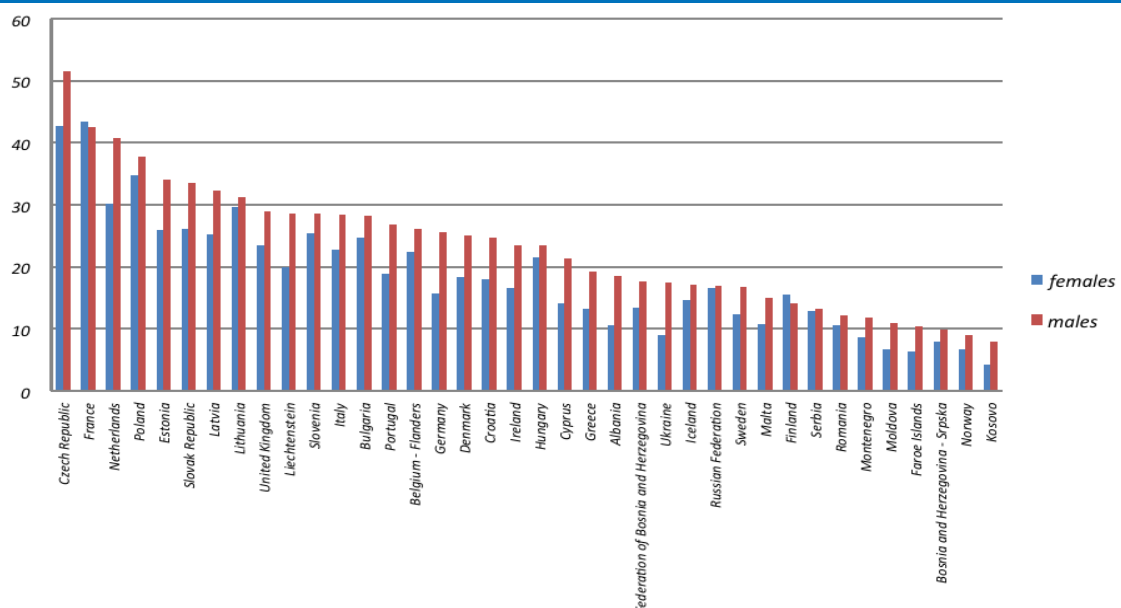
value reached by any curve is equal to one, can be used for this purpose. Analysing that kind of distribution curves, it is possible to determine the value of PDS such that a given percentage of user population has lower or equal PDS values, as shown in Figure 2. It is possibly to make inference and verify if the values are significantly different in some specific countries etc..

Further insight into the distribution of FUS and PDS by country can be gained by looking at the radar graphs, for example in Figures 3-5 reporting the quartiles for males. Looking at the three figures it is easy to distinguish between the countries where the high or low PDS values regard uniformly the whole population, the three quartiles have the same behaviours (high or low) and those where some quartiles are low

and the other is high or the inverse situation. Just for example, the first group comprises France and Netherlands, the second one Kosovo, Czech Republic and Albania. The other two groups comprise: the first Montenegro and Malta and the second one Italy and Cyprus. Although there is a high correspondence of FUS and PDS within countries, patterns of harm evolve in some countries (e.g. Federation of Bosnia and Herzegovina, Serbia) where the frequency of use score is low. The overall rank order of countries by FUS and PDS is reported in Table 2 and Table 3 respectively.

Some countries, with high median PDS, show low median FUS (e.g. Federation of Bosnia and Herzegovina, Moldova) indicating that, although few drugs are used at medium

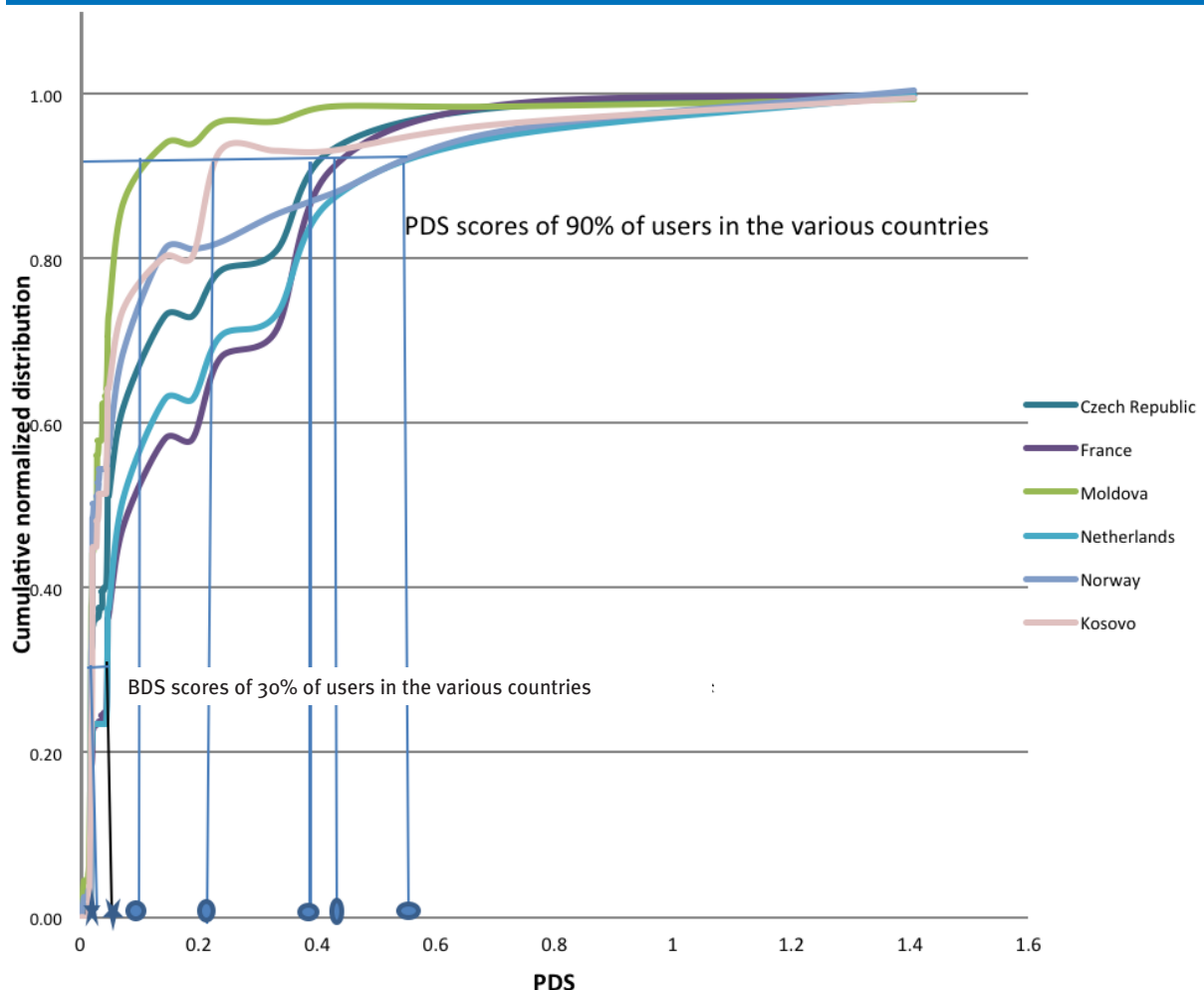**FIGURE 2**

CONDITIONAL EMPIRICAL DISTRIBUTIONS OF PDS

FIGURE 3

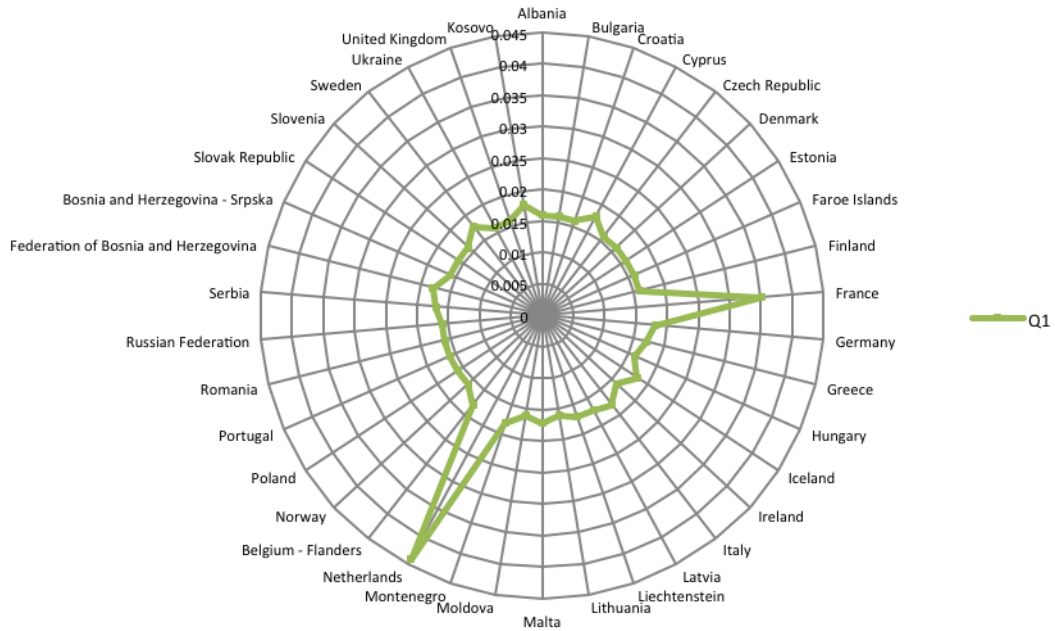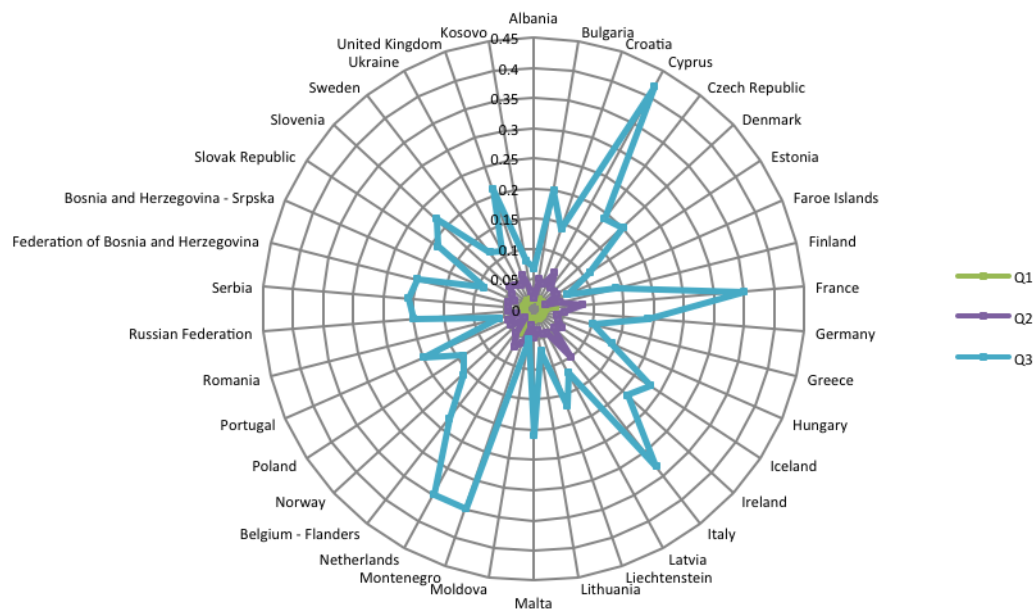**QUARTILES OF THE DISTRIBUTIONS OF THE POLY-DRUG SCORE (MALES)**

FIGURE 4

QUARTILES OF THE DISTRIBUTIONS OF THE POLY-DRUG SCORE (MALES)

FIGURE 5

QUARTILES OF THE DISTRIBUTIONS OF THE POLY-DRUG SCORE (MALES)

frequency, those drugs are associated with severe harm for the part of the population that consists of poly-users. It can be observed in Figure 6 that, although the median values are not so high and similar, the values such that 90% of users consume less are quite different for these two countries high for Federation of Bosnia and Herzegovina and low for Moldavia. On the other hand in some countries with medium frequency score, median harm scores are rather low (e.g. Faroe Islands, Estonia). In this case in Figure 6 the values such that 90% of users consume less are again quite different for these two countries with Estonia having a rather high value, but less than Federation of Bosnia and Herzegovina, and the Faroe Islands having a very low value (same as Moldova). It can be observed that, if the comparison is only based on classical prevalence, Moldova and Faroe Islands have very low prevalence (about 10%), whereas Estonia shows a very high prevalence (more than 30%), and Federation of Bosnia and Herzegovina some value between 15% and 20%.

To better understand the implications, graphically represented by the curves in Figure 7, related to some countries with different laws and policies, it can be easily observed that the curves describing lowest harm consequences for the whole population are those representing the Czech Republic and Portugal where the drug laws and policies are less restrictive. The curve of Italy shows less harm for less than 75% of the population with respect to Netherlands and France before overlapping with Netherlands. France's curve shows higher harm compared to all the other countries for about 65% of the population but for the other part of the population shows lower harm than Italy and the Netherlands. This shows how the new indicators provide quite interesting information about aspects linked to the behaviours of consumers.

If the comparison of indicator values in specific countries has to be related to drug laws and policies it is necessary to report synthetically the main aspects of the interesting country laws and policies to implement hypothesis testing on indicator values and, in particular, on PDS country values.

Extended analysis of drug laws is reported in Ventura & Rossi (2013).

Synthesis of some drug laws and policy approaches

The main aspects of the country laws and policies are synthesised and also reported classified in specific issues in Table 4.

ORIGINAL ARTICLES

TABLE 2

COUNTRY	FUS	
	MEDIAN	**MEAN**
FRANCE	7.5	19.94
NETHERLANDS	7.5	19.55
ITALY	7	21.89
CYPRUS	5.5	26.2
UNITED KINGDOM	5.5	18.65
BELGIUM - FLANDERS	5.5	17.74
MONTENEGRO	4	23.94
ICELAND	4	20.42
MALTA	4	18.25
BULGARIA	4	17.18
SLOVENIA	4	16.98
GERMANY	4	15.77
PORTUGAL	4	15.01
LIECHTENSTEIN	4	20.74
IRELAND	4	18.98
RUSSIAN FEDERATION	4	17.2
HUNGARY	4	15.76
CROATIA	4	15.04
DENMARK	4	13.98
LATVIA	4	13.95
SLOVAK REPUBLIC	4	14.67
POLAND	4	14.12
CZECH REPUBLIC	4	15.59
SWEDEN	4	13.66
FINLAND	4	12.09
ESTONIA	4	10.49
UKRAINE	3.5	13.24
FAROE ISLANDS	3.5	5.89
NORWAY	3	13.69
ROMANIA	3	10.42
SERBIA	3	15.16
GREECE	3	13.78
LITHUANIA	3	10.16
FEDERATION OF BOSNIA AND HERZEGOVINA	3	14.95
MOLDOVA	1.5	6.57
BOSNIA AND HERZEGOVINA - SRPSKA	1.5	11.9
ALBANIA	1.5	9.58
KOSOVO	1.5	11.63

Table title: FREQUENCY OF USE SCORE (MEDIAN, MEAN), IN ORDER FROM THE HIGHEST TO THE LOWEST MEDIAN VALUE OF FUS

TABLE 3

NORMALIZED POLY-DRUG SCORE (MEDIAN, MEAN), IN ORDER FROM THE HIGHEST TO THE LOWEST MEDIAN VALUE OF PDS		
COUNTRY	PDS	
	MEDIAN	MEAN
ITALY	0.27	0.44
FEDERATION OF BOSNIA AND HERZEGOVINA	0.19	0.44
ALBANIA	0.12	0.46
FRANCE	0.08	0.24
UNITED KINGDOM	0.08	0.23
NETHERLANDS	0.08	0.23
MOLDOVA	0.08	0.12
CYPRUS	0.07	0.34
BELGIUM - FLANDERS	0.07	0.21
MONTENEGRO	0.05	0.3
ICELAND	0.05	0.26
MALTA	0.05	0.24
BULGARIA	0.05	0.21
SLOVENIA	0.05	0.2
GERMANY	0.05	0.19
PORTUGAL	0.05	0.18
LIECHTENSTEIN	0.04	0.27
IRELAND	0.04	0.24
RUSSIAN FEDERATION	0.04	0.2
HUNGARY	0.04	0.2
CROATIA	0.04	0.18
DENMARK	0.04	0.17
LATVIA	0.04	0.17
SLOVAK REPUBLIC	0.04	0.17
POLAND	0.04	0.17
CZECH REPUBLIC	0.04	0.17
NORWAY	0.04	0.16
SWEDEN	0.04	0.16
UKRAINE	0.04	0.15
FINLAND	0.04	0.14
ROMANIA	0.04	0.13
ESTONIA	0.04	0.12
FAROE ISLANDS	0.04	0.07
SERBIA	0.03	0.19
GREECE	0.03	0.17
KOSOVO	0.03	0.15
LITHUANIA	0.03	0.13
BOSNIA AND HERZEGOVINA - SRPSKA	0.02	0.15

FIGURE 6

DIFFERENT BEHAVIOURS OF EMPIRICAL DISTRIBUTIONS OF PDS
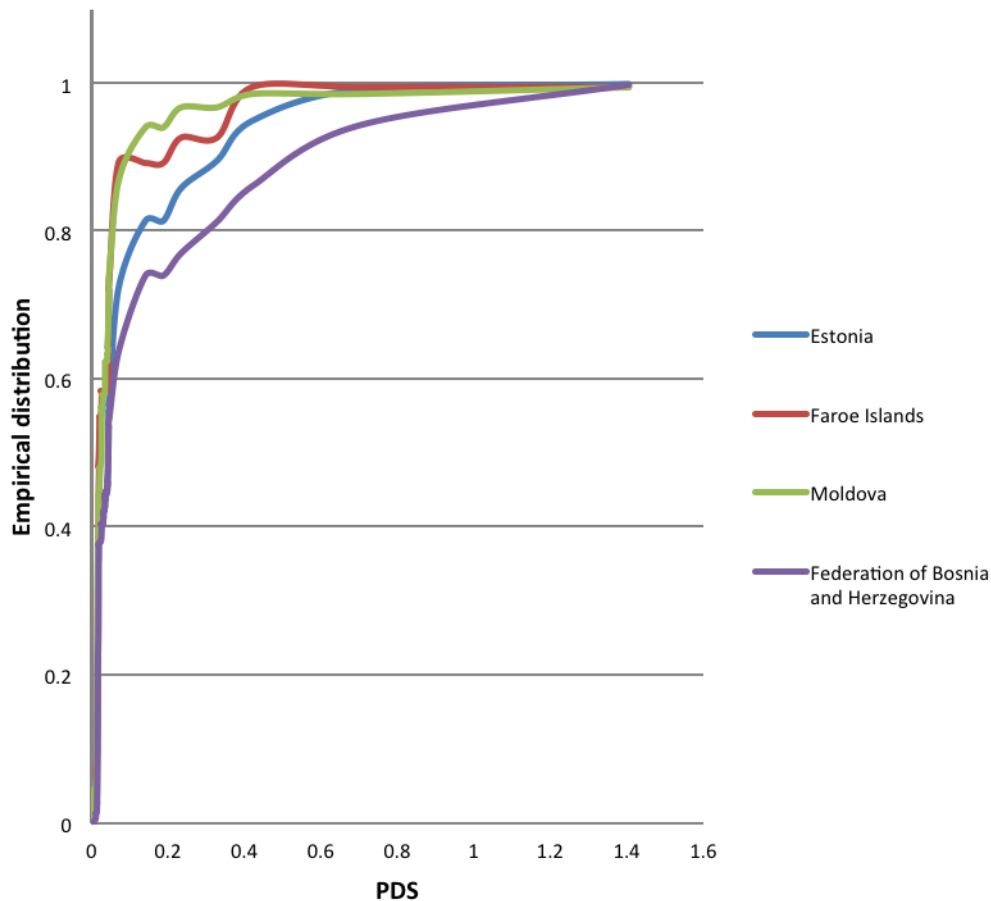
ITALY

Law 49 of 21 February 2006, known as the Fini-Giovanardi Law, amended the previous legislation by increasing sanctions and restrictions for drug use. The passing of the law was controversial in itself due to its insertion in the legislative Act preparing for the Winter Olympic Games in Turin. The legislation itself is criticized as a policy that cannot achieve its objectives or expectations due to its "zero tolerance" approach. Foremost was the abolition of any distinction between soft drugs and hard ones. The legislation represents a view of the drug user as a criminal rather than a patient, although personal possession is not criminalized. Restriction through the threat of penalization is emphasized over harm reduction and rehabilitation. There exists a contradiction between this restrictive legislation and its enforcement. Drug law enforcement units in Italy are roughly a fifth of those in Germany, and less than half of Spain and France. Implicit in the problem of incarcerating Italian drug users is the issue of overcrowded prisons in the country (EMCDDA, 2013).

FRANCE

Law No. 70-1320 of 31 December 1970 set the goals of
1. strict repression of trafficking,
2. prohibition of drug use and an alternative proposal for the repression of drug use, and
3. free medical care to needy consumers and anonymity in treatment.
France does not distinguish between the

ORIGINAL ARTICLES

FIGURE 7

DIFFERENT BEHAVIOURS OF EMPIRICAL DISTRIBUTIONS OF PDS
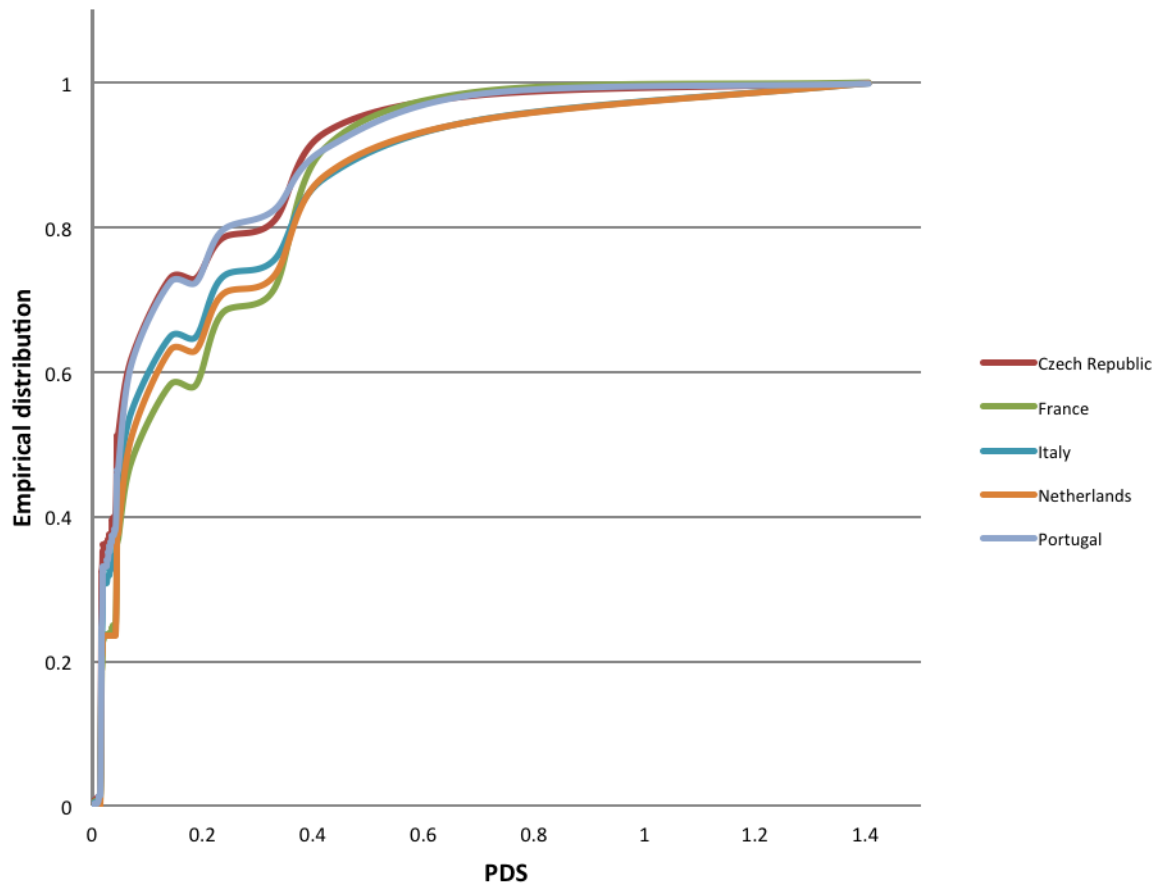
"use" and "possession" of illegal drugs nor the type of substance, yet judicial authorities are able to take the quantity and type of drug as well as prior criminal record into consideration when deliberating prosecution or reduction of charges. The Circular of 17 June 1999 built upon the 1970 Act by requesting prosecutors to prioritize treatment of incarceration for small-time offenders and problematic drug users. Shortly thereafter, the Law 99-515 installed a process for diverting criminal proceedings through a so-called "settlement" for small-time offenders. Following a scandal with the drug Mediator (a diabetes drug) being marketed as a diet aid and potentially causing 2000 deaths, a new law in 2011-2012 aims to reconcile patient safety with access to therapeutic innovation. As a cost-controlling measure for health insurance expenses, Law no. 2012-1404 includes the possibility to adopt an RTU for an off-label drug.

CZECH REPUBLIC

The Czech Republic has the most liberal legislation in Europe in terms of variety and quantity of substances allowed. On 1 January 2010, substances from marijuana to cocaine, ecstasy, and heroin were decriminalized in small quantities. Further reforms since then have empowered judges to consider addiction and other circumstances regarding the offender in order to impose sentences alternative to imprisonment such as treatment. Drug addiction is seen as a public health problem rather than a criminal.

The strategy employed is comprehensive and is based on four pillars: prevention, treatment and reintegration, risk reduction, and supply reduction. The harshest sanctions from the state are directed toward drug trafficking through organized crime. Membership of an organization is considered an aggravating

circumstance for trafficking convictions.

The Czech Republic is currently in the process of legalizing medical marijuana. Under the law currently, cultivation and importation is limited to the state, but amendments since then would allow for personal and corporate cultivation through a license. An electronic prescription system allows the prevention of a physician prescribing beyond the legal limit in a given month.

NETHERLANDS

The Dutch policy emphasizes compassion and treatment for those who develop drug use problems, because public health is the overriding concern. The Netherlands' 1995 white paper Drug policy states the basic principles of Dutch drug policy: a distinction between soft and hard drugs; a balanced and integrated approach; and four major objectives (to prevent drug use and to treat and rehabilitate drug users; to reduce harm to users; to diminish public nuisance by drug users, and to combat the production and trafficking of drugs).

Using this pragmatic approach, the government sets clear priorities based on the perceived risks of particular drugs. A key aspect of Dutch drug policy, in fact, is the notion of **market separation**. Beginning in May 2012, Dutch provinces began implementing national legislation that prohibits the sale of cannabis to foreign non-residents. However, on November 2012 the Justice Minister, Ivo Opstelten, informed the Parliament that the measure will be modified and that it is up to each local authority to decide whether to keep or not free access to soft drugs offered by the "coffee shop" inside their territories. While the intention of the legislation is to curb drug trafficking, drug tourism, and street crime; cities such as Amsterdam may delay implementation because, counter to the logic of the legislation, drug tourism by non-Dutch tourists is desirable.

PORTUGAL

Since 1 July 2001, the possession of any drug for personal use without authorization is an administrative issue rather than a criminal one. Emphasis is placed on education and treatment rather than restriction. **"Dissuasion Commissions"** are an institutionalized framework which facilitates the evaluation and treatment of users, instead of imprisoning them. When an individual is found in possession of no more than 10 daily doses of drugs and is not under suspicion of supply offences, his or her case will be transmitted to the **Commission for the Dissuasion of Drug Abuse (CDT)**, where it will be determined whether the person is an occasional or dependent user, or a dealer. Various sanctions may occur ranging from warnings to forfeiture of professional and firearms licenses. Possession of more than 10 daily doses or being charged with selling drugs means the individual will be sent to criminal court. The 2001 legislation was an outgrowth of the recommendation for decriminalization of both "hard" and "soft" drug possession and use by a government-appointed committee in 1998 – The Commission for the National Strategy to Fight against Drugs. Portugal has a history of viewing drug consumption as a health issue which has fostered a policy that focuses on treatment rather than restriction.

An Example of Pds Hypothesis Testing and Interpretation of Impacts of Drug Laws and Policies

The proposed indicators FUS and PDS can be easily used to compare country drug laws and policy consequences.

Just to show an example, let us consider the drug laws in Czech Republic, Italy and Portugal. All three laws decriminalize consumption. Supply reduction aspects of the laws are quite different, but are generally not taken into account when discussing and evaluating demand reduction interventions. However, demand is highly influenced by supply as it will be shown below. Let's just report the results of a comparison based on the new PDS indicator,

If we calculate the new PDS indicator in the three countries, we get, as mean values, PDS=0.44 for Italy, PDS=0.18 for Portugal and PDS=0.17 for Czech Republic. This means that the less harmful behaviour among sixteen years old students can be observed in the less restrictive countries (Portugal and Czech Republic). In Italy, indeed, the PDS indicator is the highest, as the median, of the 38 countries

TABLE 4

SYNTHETIC CHARACTERISTICS OF FIVE COUNTRY DRUG LAWS AND POLICIES			
COUNTRY	**MAINS LAWS**	**GENERAL NOTES**	**NEWS**
1. ITALY	- DPR of 9th of December 1990 n.309. - the Referendum to repeal Law of 18-19th of April 1993. -Law 49 of 21th of February 2006, that has emended the DPR of 9th of December 1990 n.309.	Since its approval, the law 49 of February 2006, known as the Fini-Giovanardi Law, from the promoters' surnames, has been much criticized, both because of the "method" of approval, since it was inserted in the Legislative Act about the Winter Olympic Games of Turin, and because of the "contents", since the "zero tolerance" approach, punishing with the same penalty any kind of drug infringement, without any distinction based on danger or harm to people, seems unable to obtain its initial objectives and expectations.	**Unconstitutionality of Fini-Giovanardi Law.** The Constitutional Court has ruled as unconstitutional - for violation of Article. 77, second paragraph, of the Constitution,which regulates the procedure for laws by decree - Articles. 4bis and 4vicies of d.l. December 30, 2005, n. 272, as converted by art. 1 of the Law of 21 February 2006, n. 49, thus removing the changes made to the rules declared unconstitutional in Articles 73, 13 and 14 of Presidential Decree of 9 October 1990, n. 309. Revival of the law Iervolino-Vassalli '90, as amended by referendum of the Radicals in '93 which abolished imprisonment for the personal use of drugs.
2. FRANCE	-Law No. 70-1320 of 31 December 1970. -Circular of 17 June 1999, -Law 99-515 of 23 June 1999 - Law No. 2011-2012.	At the time of the adoption of **Law No. 70-1320 of 31 December 1970, the three goals** that the legislature had set itself were: 1) strict repression of trafficking, 2) prohibition of drug use and an alternative proposal for the repression of drug use, 3) free medical care to needy consumers and anonymity in treatment. **Main point: "use" or "possession" of illegal drugs is a criminal offence.** The law itself does not distinguish between possession for personal use or for trafficking, nor by type of substance. However, **judicial authorities** may take into consideration the nature of the substance, the quantity and any prior criminal records in their decision to prosecute, reduce the charges or not prosecute an offender.	**On December 29, 2011, the French Parliament adopted Law No. 2011-2012,** on reinforcing drug safety, aimed at restoring public trust in the drug regu-latory system following the scandal that erupted in France in connection with the drug Mediator (Loi n° 2011-2012 du 29 décembre 2011 relative au renforce-ment de la sécurité sanitaire du médicament et des produits de santé). **The new law related to reinforcing the health safe-ty of medicine and health products** aims to reorganize the safety monitoring health products in order to recon-cile patient safety with ac-cess to therapeutic innova-tion. The new Law moreover strengthens the rules governing disclosure of conflicts of interest with pharmaceutical companies by directors and experts involved in the drug approval process at the competent regulatory agencies. The main changes in this law impact the Public Health Code and Social Security Code.
3.CZECH REPUBLIC	**-Reform of 2010**	The legislation of the Czech Republic **was changed on 1 January 2010**, when an amendment to the Criminal Code decriminalized the possession of a number of drugs, heavy and light, in small quantities. The substances vary greatly, from marijuana to cocaine, heroin, ecstasy, and it is the inclusion of hard drugs in the list of decriminalized drugs that has aroused the most controversy. Prior to this change (and, in particular, until the end of 1999) the Criminal Code stated that possession of narcotic drugs and psychotropic substances in **greater than small quantities was a criminal offence.** In cases of the **possession of small quantities without intention to supply**, the Act on Misdemeanours imposed **administrative sanctions.**	**-The National Drug Policy Strategy for the Period 2010 to 2018** was adopted by virtue of Government Resolution No. 340 on 10 May 2010 It updates the previous strategies, in accordance with the latest scientific knowledge on the phenomenon of drug use and defines the basic starting points for and directions of the measures aimed at dealing with the drug problem and the principles and approaches which the drug policy is based on. **The strategy is comprehensive and is based on four pillars:** **1.prevention,** **2.treatment and resocialisation,** **3.risk reduction** **4.supply reduction.** The focus is mainly on illegal drugs, but with some scope to address other drugs (alcohol, prescription drug misuse), if necessary. The action plan covers seven policy fields (primary prevention, treatment and aftercare, harm reduction, drug supply reduction and law enforcement, information / research / evaluation, coordination and funding, international collaboration). **-Act No. 50/2013 Coll. dated 30 January 2013, amending Act No. 378/2007 Coll., on pharmaceuticals, Act No. 167/1998 Coll., on addictive substances, and Act. No. 634/2004 Sb., on administrative fees, was promulgated in the Collection of Laws on 4 March 2013. The Act introduces the option of using cannabis for therapeutic purposes in the Czech Republic**

TABLE 4

SYNTHETIC CHARACTERISTICS OF FIVE COUNTRY DRUG LAWS AND POLICIES			
COUNTRY	MAINS LAWS	GENERAL NOTES	NEWS
4.NETHERLANDS	- **Netherlands' 1995 white paper Drug policy.**	Regarding the Netherlands' 1995 white paper Drug policy, it states the **basic principles of Dutch drug policy:** a distinction between soft and hard drugs; a balanced and integrated approach; and four major objectives (to prevent drug use and to treat and rehabilitate drug users; to reduce harm to users; to diminish public nuisance by drug users, and to combat the production and trafficking of drugs). The Netherlands' 1995 white paper Drug policy had formulated the basic principles of Dutch drug policy: a distinction between "soft" and "hard" drugs; a balanced and integrated approach; and four major objectives, that are: 1.to prevent drug use and to treat and rehabilitate drug users; 2.to reduce harm to users; 3.to diminish public nuisance caused by drug users; 4.and to combat the production and trafficking of drugs. So, the Dutch policy emphasizes compassion and treatment for those who develop drug use problems, because public health is the overriding concern. Using this pragmatic approach, the government sets clear priorities based on the perceived risks of particular drugs. A key aspect of Dutch drug policy, in fact, is the notion of **market separation.**	**From 1 May 2012,** three Dutch provinces in the south, Zealand, North Brabant and Limburg (on the border with Belgium and Germany) have applied the ban, with the expectation that it would be extended by the end of 2012 to all the provinces of the country. The new law, among other things, provides that customers of the seven hundred Dutch coffee shop should prove to be resident in the Netherlands showing a specific card issued only to Dutch and foreign residents in order to prevent access to coffee shops to foreigners. However, **on November 2012** the Justice Minister, Ivo Opstelten, informed the Parliament that the measure will be modified and that it is up to each local authority to decide whether to keep or not free access to soft drugs offered by the "coffee shop" inside their territories. Indeed the new rule that came into effect **on the first day of 2013**. In the Netherlands' coffee shops, from that period in fact only Dutch residents are from now on allowed to buy cannabis ("wiet"), like marijuana and hashish. Before buying a joint, customers need to show a passport or official proof of residency in the Netherlands. The authorities hope that this will help to curb drug trafficking, drug tourism and street crime. But the situation now is not clear: -on the one hand new laws being introduced in the Netherlands mean people who visit so-called coffee shops that sell cannabis will have to provide ID and an official document confirming they live in the country and each local council will enforce the new rules, -on the other hand several cities - including Amsterdam - may try to delay their full implementation because they do not want to miss out on income from non-Dutch tourists. -The rule follows a 2012 experiment in a long, controversial history of policy-making in regard to drugs: the *wietpas* ("weed pass").
5.PORTUGAL	-Law 30/2000, which entered into force on 1 July 2001. -Decree-law 183/2001, on 21 June 2001.	The new law of 2000 maintained the status of illegality for using or possessing any drug for personal use without authorisation. However, the offence changed from a criminal one, with prison being a possible punishment, to an administrative one. Moreover, Portugal's reforms have not been limited to treating drug possession as an administrative offence; they also include a wide range of measures such as prevention and social education, discouraging people from further use of controlled substances, harm reduction, treatment for drug dependent people, and assistance in reintegrating them into society. This law established a system of **"Dissuasion Commissions"** that is unique in Europe and managed by the Ministry of Health, rather than the Ministries of Justice or the Interior, and this was an important symbolic step that reflected a new approach to drug policy. The commissions seek to inform people and dissuade them from drug use and also have the power to impose civil sanctions for non compliance and to refer consenting persons to treatment. The CDT is composed of three members appointed by the Ministries of Justice and Health (the member appointed by the Ministry of Justice has to be a legal expert, the other two usually being a health professional and a social worker). These Commissions evaluate each case with the help of a technical team to assess whether the person is an occasional or a dependent user, or a dealer.	**New legislation framework:** -**Law 13/2012 of 26 March 2012:** Amends for the nineteenth time the Decree Law No. 15/93 of 22th January which approves the legal regime applicable to trafficking and consumption of narcotic drugs and psychotropic substances. -**Law 11/2012 of 8 March 2012:** Establishes the new rules for prescribing and dispensing medicines. -**Order n.8816/2012 of 3 March 2012:** Defines the Departments of the General Directorate on Addictions and Behaviours -Health Ministry. -**Administrative Rule 46/2012 of 13 February 2012:** First amendment to the Administrative Rule N. 198/2011 of 18 May, which establishes the legal framework that obeys the rules of electronic prescription of medicines. -**Decree Law 17/2012 of 26 January 2012:** Approves the structure of the General Directorate for Intervention on Addictive Behaviours and Dependencies -**Decree Law 124/2011 of 29 December 2011:** Approves the new structures within the Health Ministry and creates the General Directorate for Intervention on Addictive Behaviours and Dependencies, extinguishing the IDT, I.P.

as reported in Table 3 (where Portugal is 16th and Czech Republic 26th) .

Comparing the three means, by variance analysis, the result is significant showing that the three means are not the same, but this kind of test is not very useful to understand the real situation in depth and try to analyse specific aspects of laws and policies more in depth. It is better to compare each couple of means. The interesting results are more evident. Italy shows drug user population in a significant (p<0.05) less healthy situation, the mean of PDS is higher than in the other two countries, due to quite more extensive poly-drug use and consumption of more toxic substances.

In the EMCDDA European Drug Report 2014 it can be found the following graph (Figure 8), showing the kind of preventive intervention for students and young people. It is clear that Italy has less interventions than the other two countries, in particular than Czech Republic.

Similar results are obtained comparing the proportions of users in the three countries with PDS lower than 0.19 all together (Table 5). The value of chi-squared is 13.1 and p<0.005 then the null hypothesis can be rejected and the three proportion are not considered equal.

But, if only Czech Republic and Portugal, are compared the value of chi-squared is 0.029 and p>0.75. Also this comparison shows that there are not significant different results between Czech Republic and Portugal but the country with quite negative consequences of drug law and policy interventions among young users is Italy.

Similar comparisons based on other data provide similar conclusions regarding the evaluation of the drug laws and policies in the three countries (Fabi et al.. 2014) as can be seen, for example, in Table 6, where the mean age of problem drug users (PDUs), assisted by services, are reported for Italy and the Czech Republic.

It is clear that the approach of the Czech Republic, where Harm Reduction is a priority, while in Italy it is not and furthermore poorly implemented, is more efficient in reducing negative consequences, by emphasizing

FIGURE 8

AVAILABILITY OF SPECIFIC DRUG PREVENTION INTERVENTIONS
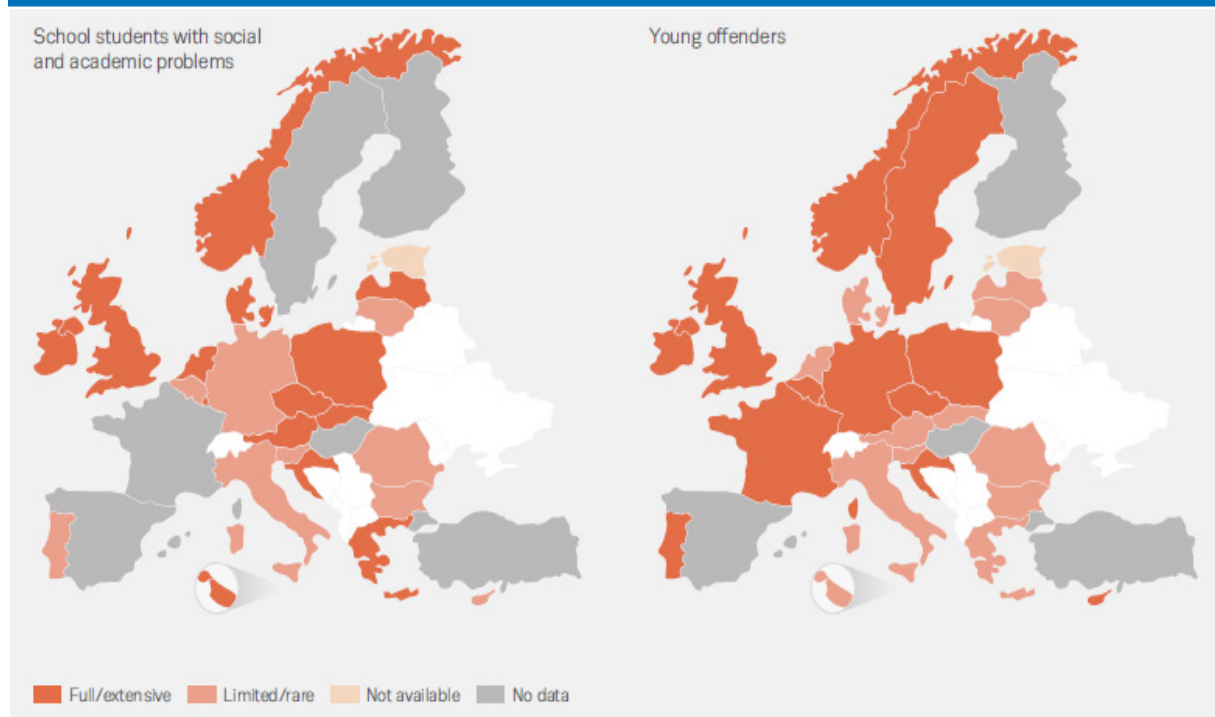FOR SELECTED VULNERABLE GROUPS (EXPERT RATINGS, 2012)

School students with social and academic problems

Young offenders

Full/extensive   Limited/rare   Not available   No data

TABLE 5

PDS SPECIFIC PREVALENCE HYPOTHESIS TESTING				
PDS	CZECH REPUBLIC	ITALY	PORTUGAL	TOTAL
‹0.19	707	437	153	1297
›0.19	261	236	58	555
TOTAL	968	673	211	1852

TABLE 6

MEAN AGE OF PDUS ASSISTED IN THE SERVICES IN ITALY AND CZECH REPUBLIC IN 2012				
MEAN AGE	ITALY		CZECH REPUBLIC	
	MALE	FEMALE	MALE	FEMALE
MEAN	36.18	35.36	30.47	27.21

therapy and rehabilitation. It would be quite interesting and useful to further analyse the impact of prevention and harm reduction interventions in countries that show good outcomes, such as the Czech Republic, on e.g. healthier behaviour of users.

But the crucial point, differentiating Italy from most other countries and, in particular, from Portugal and the Czech Republic, was, in 2006, the abolition of any distinction between soft drugs and hard ones for dealers and for consumers. This had the "unintended", but expected, consequence of increasing poly-drug dealing, which extended poly-drug use, in particular among young people.

The Italian data about poly-drug dealing are reported more in detail in Mascioli & Rossi (2014). Here, the difference between Italy and other countries is illustrated by Figure 9, obtained from a survey aiming at estimating the drug market, on behalf of the European Commission (Trautman et al., 2013).

In Italy, poly-drug dealing started to increase as soon as the Fini-Giovanardi law was launched, as shown in Figure 10. Also the number of dealers increased by 10% from 2005 to 2009 (Mascioli & Rossi, 2014).

CONCLUSIONS

According to the analysis carried out above, we can observe a close connection between the legislation and the kind of consumption.

In particular, Portugal and the Czech Republic have less restrictive regulations and more organized policy that influence the consumption of substances that appear high but not so dangerous.

Moreover, it is clear that attention to health services is high in those countries as reported in Ricci and Rossi (2013) and Ventura & Rossi (2013). This makes it possible to intervene in a preventive and early phase with very positive results. This is also reported in the EMCDDA report 2014.

Therefore, there is an additional element to be considered in addition to the regulations: the drug policy's implementation, which inevitably influences the consumption and the consequences thereof.

In Italy, the basis of existing legislation in 2011 was very restrictive, yet the implementation has not been coherently emphasized., the consequences of this disparity are very negative. In particular policy did not provide suitable prevention interventions and was not organize with procedure similar to other countries: prevention, treatment, rehabilitation and harm reduction for users and law enforcement for traffickers and dealers. In particular prevention, rehabilitation and harm reduction were rather causal and law enforcement very poor. With respect to Czech Republic and Portugal the number of drug policy staff for each million of inhabitants is just 0.008 , in Czech Republic is 0.02 and in Portugal 0.05 (EMCDDA, 2013).
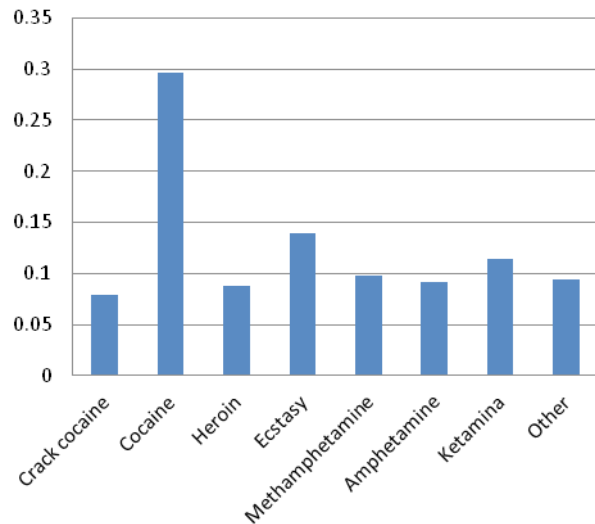
FIGURE 9

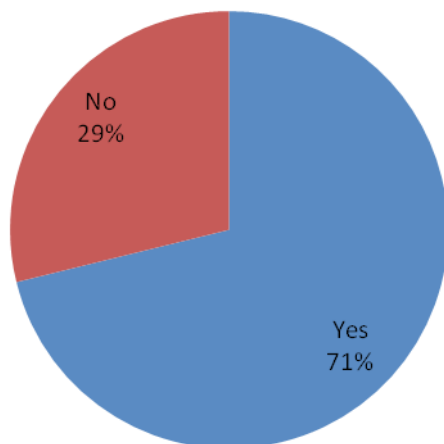POLY DRUG DEALING ACCORDING TO DECLARATION OF CANNABIS AND COCAINE ITALIAN USERS

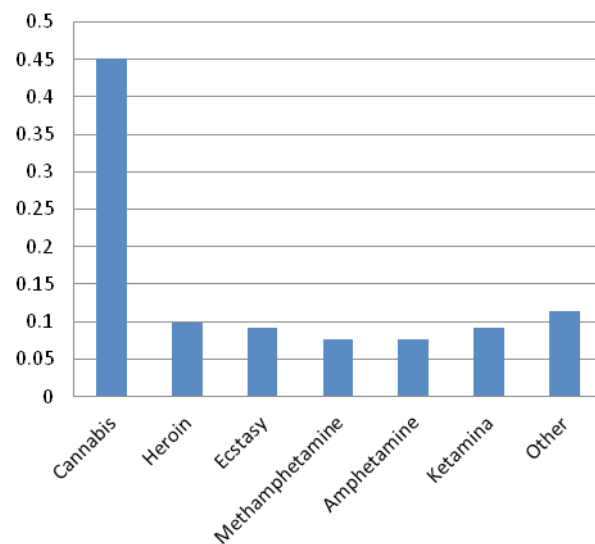Percentage of the cannabis users who declare that their dealers sell also other substances
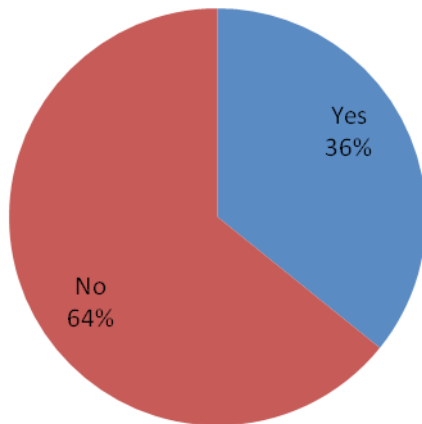
Frequency of dealing the other substances together with cannabis.

Percentage of the cocaine users who declare that their dealers sell also other substances

Frequency of dealing the other substances together with cocaine.

Therefore, we can conclude that it is the correct balance between a drug policy aimed at prevention and rehabilitation and a less restrictive legislation, which, on the basis of what we have analyzed and measured, and just as example, shown in this paper, has a positive effect on drug consumption. The outcome measurement is obtained by the simple indicator PDS to better classify country drug user populations It is less important the indicator FUS, but also it can provide satisfactory classification of countries and it allows to calculate PDS of singular individuals and of the country as quite interesting measure.

FIGURE 10

POLY-DRUG DEALERS IN POLICE DATA BASE FOR ITALIAN PROVINCES BEFORE AND AFTER THE FINI-GIOVANARDI DRUG LAW
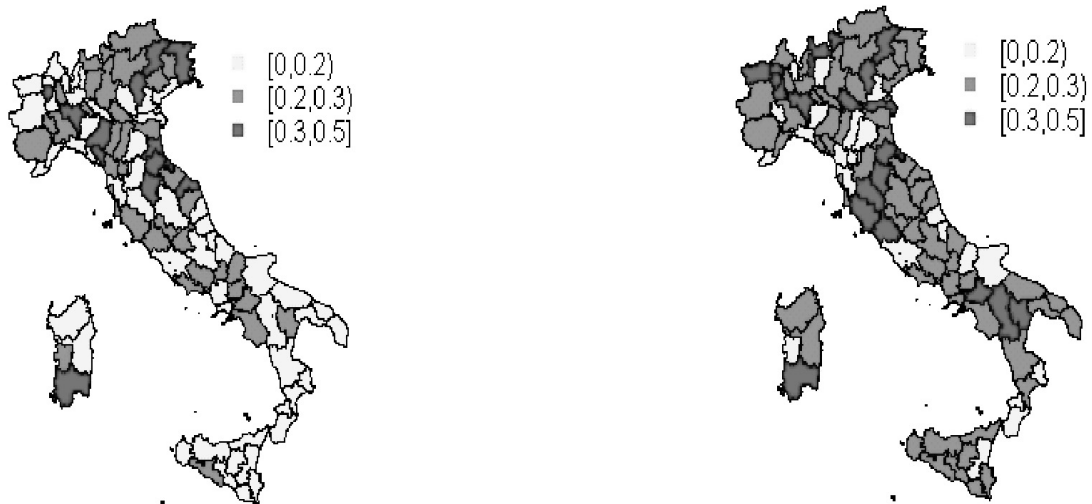
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