

# Understanding the dynamics and consequences of young adult substance use pathways, a longitudinal and momentary analysis in the European nightlife scene: ALAMA

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## Summary

The nightlife scene is synonymous with drug use and its economy has surged in the last decade. Meanwhile, an unprecedented number of New Psychoactive Substances has emerged. The potency of ecstasy pills has doubled, alongside a rise in health incidents. Previous studies have failed to capture the dynamic aspects of nightlife drug use, both in the short-term (before, during, and after the club) and the longer-term (changes over time). A pan-European understanding of these issues is necessary to implement optimal policy decisions for nightlife licensing, drug control, and harm reduction. The proposed study combines state of the art interdisciplinary techniques (momentary or 'real time', long-term, subjective, biological) and comparison across countries, to thoroughly characterise drug use pathways (short- and longer-term) and their consequences. <https://www.eranid.eu/projects/alama-nightlife/>

## Measuring the harms of substance use and poly-use in the nightlife scene: a pilot application of new poly-use indicators on Italian data collected within the ALAMA study

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**Summary** Poly-drug use is becoming increasingly common, in particular in young user groups. Classical single drug use indicators are not adequate to measure the combined possible harms of such patterns of use, while more complex indicators can summarize the total effects. We propose one set of such indicators, based on individual frequency of use data and expert evaluations of single substance harms of various types. It is shown that the use of these poly-drug use indicators can be useful for characterizing high-risk subgroups of users and studying associations between drug use and concomitant variables. In general, these indicators are also adequate for comparisons between different user groups and populations.

## Data and Methods

The ALAMA study, financed by the European Research Area Network on Illicit Drugs (ERANID) has investigated the drug use pathways in the nightlife scene and its consequences in five European countries (Belgium, Italy, Sweden, the Netherlands, United Kingdom) with the specific aim of identifying substance use profiles of young Europeans attending nightclubs, festivals and parties/raves via transversal and longitudinal online surveys. The transversal and longitudinal online data collection captures, in particular, detailed information on demographics, nightlife engagement and drug use. The transversal survey is designed to assess retrospective information (lifetime and last 12 months). Baseline data was collected in the period May 2017–November 2017. Young adults were recruited online (mainly via social media) and at festivals and clubs. The analyses presented here are based on the Italian part of the data, with focus on poly-use indicators. The other participating research groups will separately present country analyses. A more detailed treatment of our findings has been submitted for publication (Fabi et al. 2019).

The indicators used in this analysis are described in detail in Colasante et al. (2019). Their main characteristics are only briefly described here, together with some details about the NPS-extended harm scores used in the analyses.

All indicators are calculated on individual data. The Frequency of Use (FUS) indicator is defined using weights describing the frequency of use of each substance, for a suitable time range: lifetime, 12 months, 30 days or specific time range, and summing the weights over all substances consumed by each subject in the period. The indicator thus estimates the total number of drug intakes during the studied period. The indicator can then be normalized by dividing by the maximum value of a single drug use frequency, yielding the normalized FUS indicator, denoted by F.

In addition to the FUS indicator, two further indicators, PDSself and PDSothers, based respectively on the Harm to self and Harm to others scores, are obtained as the weighted means of these harm scores, using normalized frequency of use as weights. The two indicators are normalized by dividing the scores of the individual substances by the maximum score of the score table. As mentioned above, full details are available in Colasante et al (2019), but it is of interest to mention that the highest scoring illegal substance, thus deemed most dangerous in the present ranking, is fentanyl.

The complete set of scores, for classical substances as given in van Amsterdam et al. (2015) and extended to NPS, as evaluated by Italian EWS experts, is shown in Table 1.

**Table 1. Harm to self and Harm to others scores related to "classical" and new substances (NPS in purple).**

Substance	Harm to self (PDS <sup>self</sup> )	Harm to others (PDS <sup>others</sup> )
Fentanyl and fentanyl analogues - synthetic opioids	45	18
Heroin	33	18
Crack cocaine	33	14
Metamphetamine	28	1
Alcohol	24	51
PHNACA series- synthetic cannabinoids	24	8
4-FA	23	4
Synthetic cathinones	22	8
Synthetic cannabinoids (e.g. 'Spice')	20	1
Synthetic hallucinogens - e.g. 2-CB, 25I-NBOMe	18	4
Cocaine	18	11
Cannabis	17	1
Amphetamine (e.g. Speed)	16	4
Synthetic dissociatives (e.g. methoxetamine)	16	4
Ketamine	12	2
Benzodiazepines (e.g. Valium)	11	1
Mephedrone	10	1
GHB	10	7
Methadone	10	4
DMT	8	1
Tobacco / tobacco products	8	9
Ecstasy / MDMA	8	1
MDA	8	1
Anabolic steroids	7	1
Khat	7	1
LSD (acid)	6	1
Buprenorphine	4	0
Magic mushrooms	3	0
Amyl / alkyl nitrates ('poppers')	3	0
Nitrous oxide ('laughing gas')	2	0

## Results

### Data description: subjects and substances

Final size 1548 respondents, about 80% male, median age 22 (age range in study 18–34), about 54% single.

Almost all have a high school or higher education. About half of the respondents works and only 6% declare that they neither study nor work. Since an inclusion criterion was musical event attendance, all have attended at least 6 events during the past year and about half one event or more per month.

Figure 1 shows the distribution of types of musical events.

**Figure 1. Nightlife venues or events attended.**

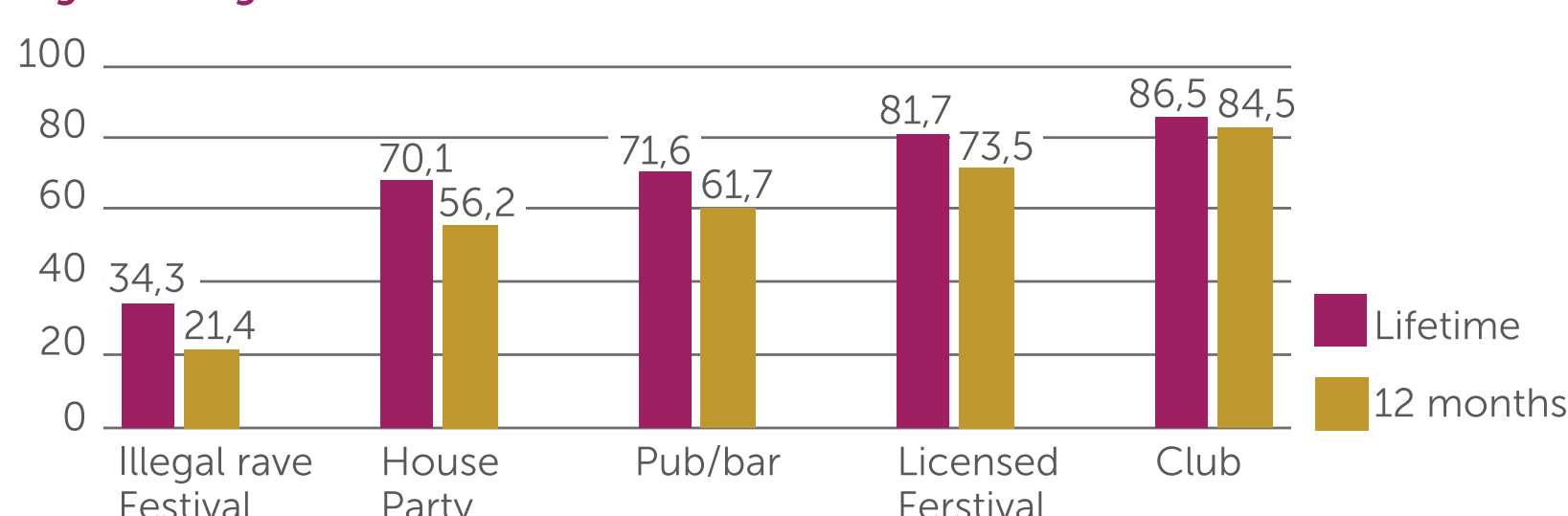


Table 2 shows the frequency of use of each investigated substance, lifetime and in the last 12 months. It should be added that the category "Other substance" was present in the survey, but very few subjects reported anything not in the main list. The most frequent answers were Opium (20 subjects), Salvia Divinorum (12 subjects), Crack (7 subjects) and Mescaline (5 subjects). It is clear that the most used substance is alcohol, followed by cannabis, tobacco, ecstasy and cocaine. NPS are shown in red. As a measure of persistence of use, Delta % has been calculated for each substance, being defined as the percentage of lifetime users who have not used the substance during the last 12 months (high values indicate non-persistence).

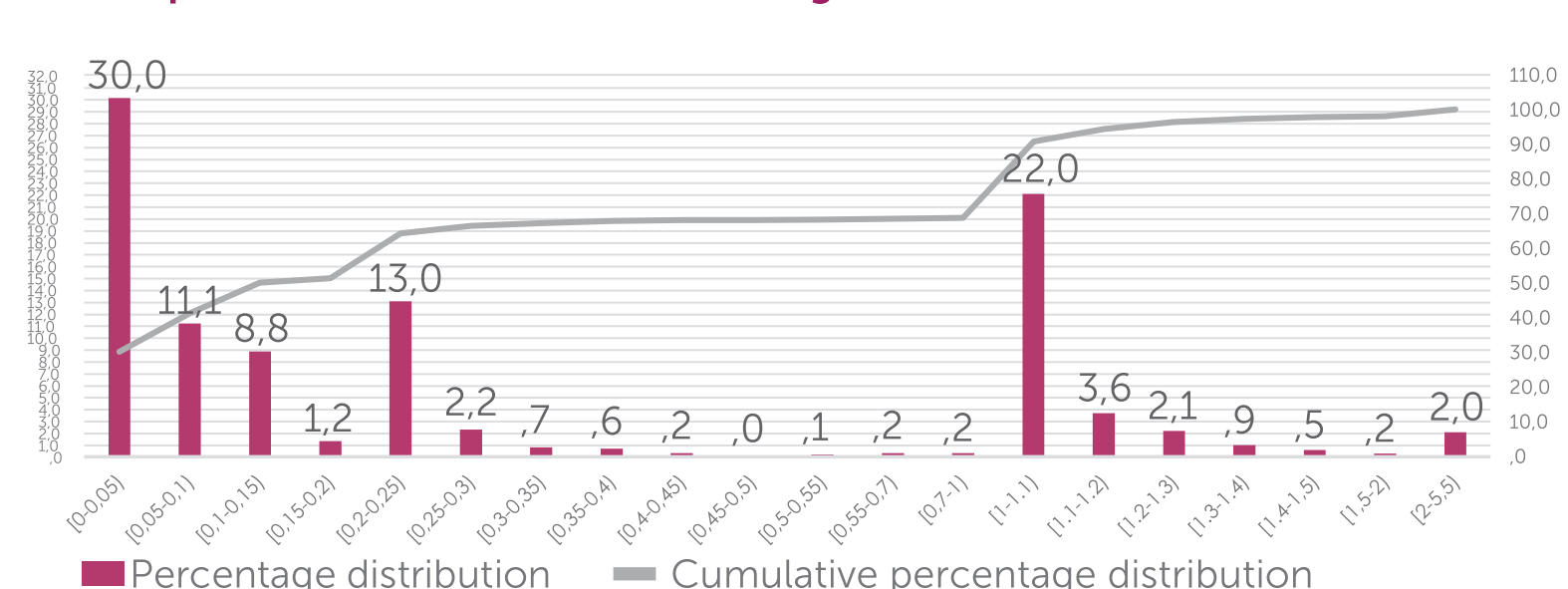
The sample size of users here and in the following analyses is 809, as some substance incomplete questionnaires have been excluded; as well as data relating to those who declare that they have not used any substance.

Taking into account a statement by EMCDDA "Surveys in nightlife settings tend to focus more broadly on 'substance use', rather than simply on (illicit) 'drug use', reflecting the complexity of contemporary patterns of non-medical use of psychoactive substances", it is useful to consider the illegal and legal substances separately.

The average number of substances used by users lifetime is 5.5 per person, including alcohol and tobacco in addition to illegal classical substances and NPS (NPS=0.7 per person). The average number of substances used in the last 12 months is 4 per person, including alcohol and tobacco in addition to illegal classical substances and NPS (NPS=0.26 per person).

If legal substances (alcohol and tobacco) are excluded, the average numbers of substances used lifetime per person are: 4.5 substances excluding Alcohol, 4.6 excluding Tobacco and 3.6 excluding both (2.93 classical substances and 0.67 NPS). If legal substances (alcohol and tobacco) are excluded, the average numbers of substances used in the last 12 months per person are: 3.1 substances excluding Alcohol, 3.2 excluding Tobacco and 2.2 excluding both (1.94 classical substances and 0.26 NPS).

**Figure 3. F indicator distribution (% left axis) and empirical cumulative distribution (right axis).**



### Possible relations between poly-use indicators and individual demographic/social variables.

Thus, in the studied population, the PDSself harm indicator seems the most indicative one in terms of harm prevention objectives. In particular, it becomes of interest to further characterize the "high" (PDSself ≥ 0.35) group.

One first interesting observation is that this group is characterized by a generally high frequency of use of one or, usually, more than one substance rather than use of particularly harmful substances as such.

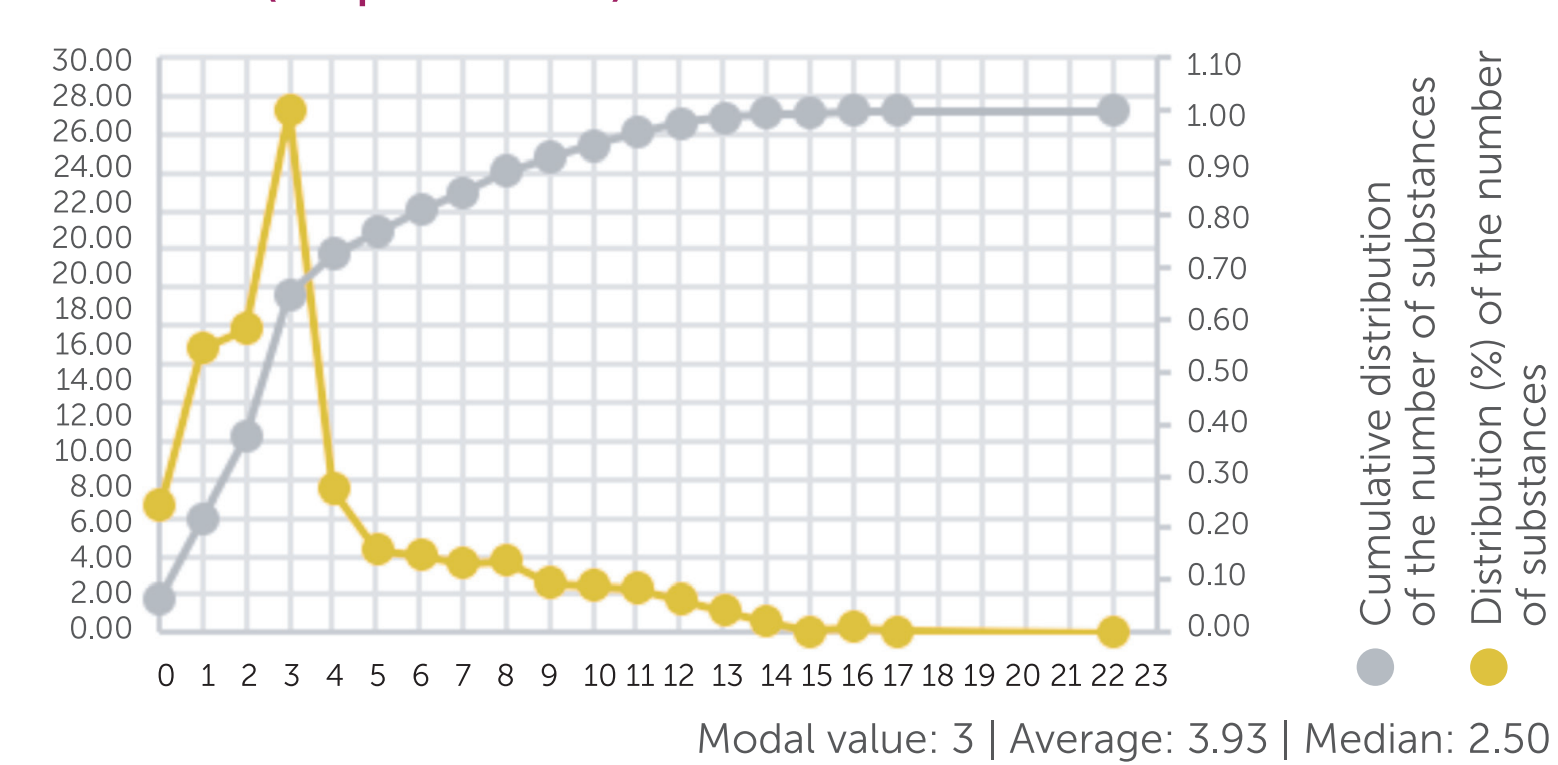
The critical value of the F indicator which divides the population into non-intensive users of substances, mostly users of a single substance, and intensive users, mostly users of more than one substance, is 1. Let us therefore consider the two groups of users with FUS values F < 1 and F ≥ 1. The two groups contain 68.7% and 32.3% of the sample, respectively.

If this classification is compared to the one representing "low" and "high" PDSself (PDSself < 0.35 and PDSself ≥ 0.35), it is seen that they are essentially equivalent, over 99% of subjects who have high or low F values have at the same time also

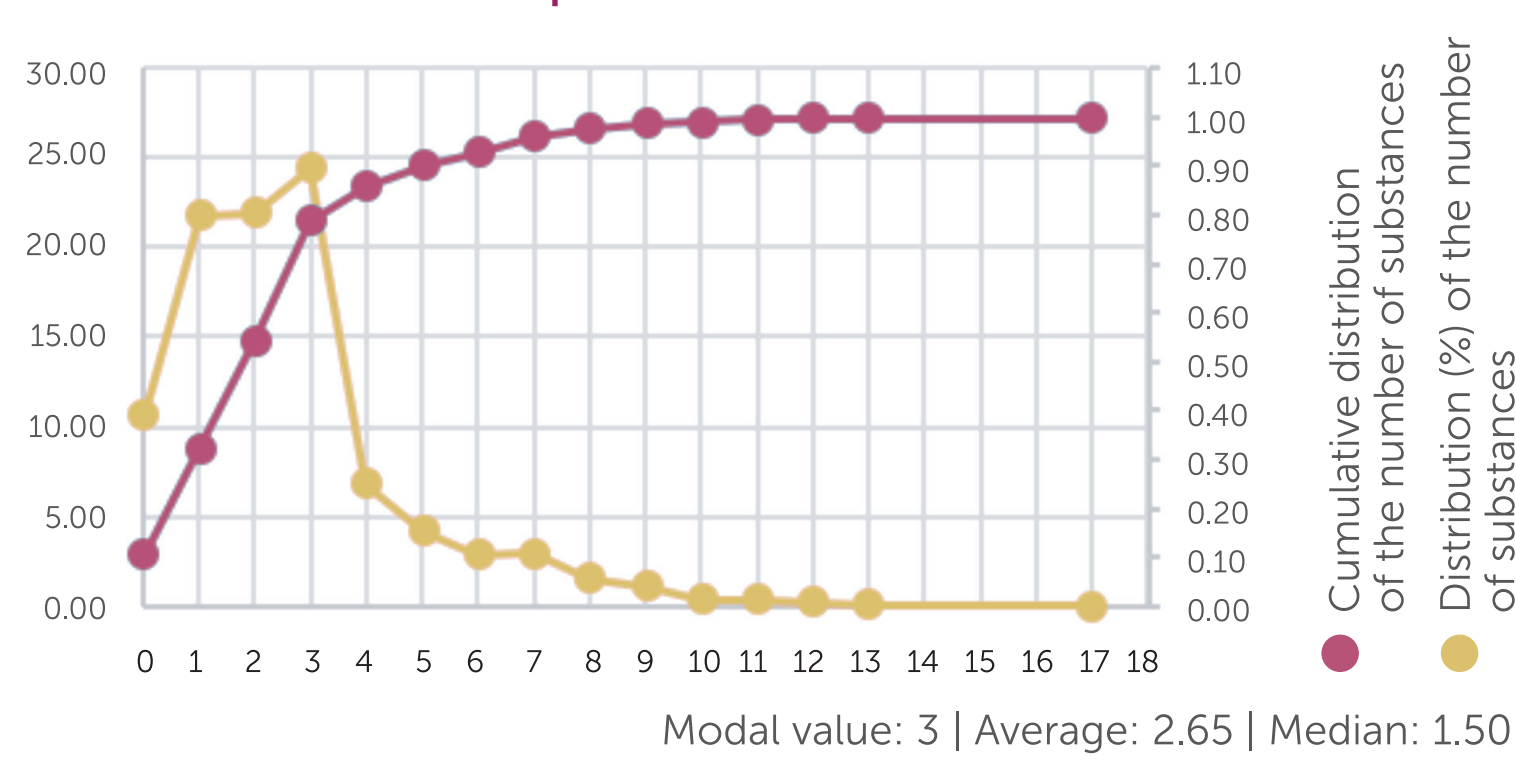
It is further seen that the sample is rather homogeneous regarding demographic and social variables and the distribution of "Occupation" and "Educational level" suggest a sample different from typical "problematic use" subjects.

Figures 2a and 2b show the distribution (% left axis) and the empirical cumulative distribution (right axis) of the (self-declared) number of substances used by the subjects (6% declare 0 substances lifetime and 10% in the last 12 months).

**Figure 2a. Distribution (%) of the number of substances used in lifetime as declared (sample size 1548).**



**Figure 2b. Distribution (%) of the number of substances used in the last 12 months as declared sample size 1548.**



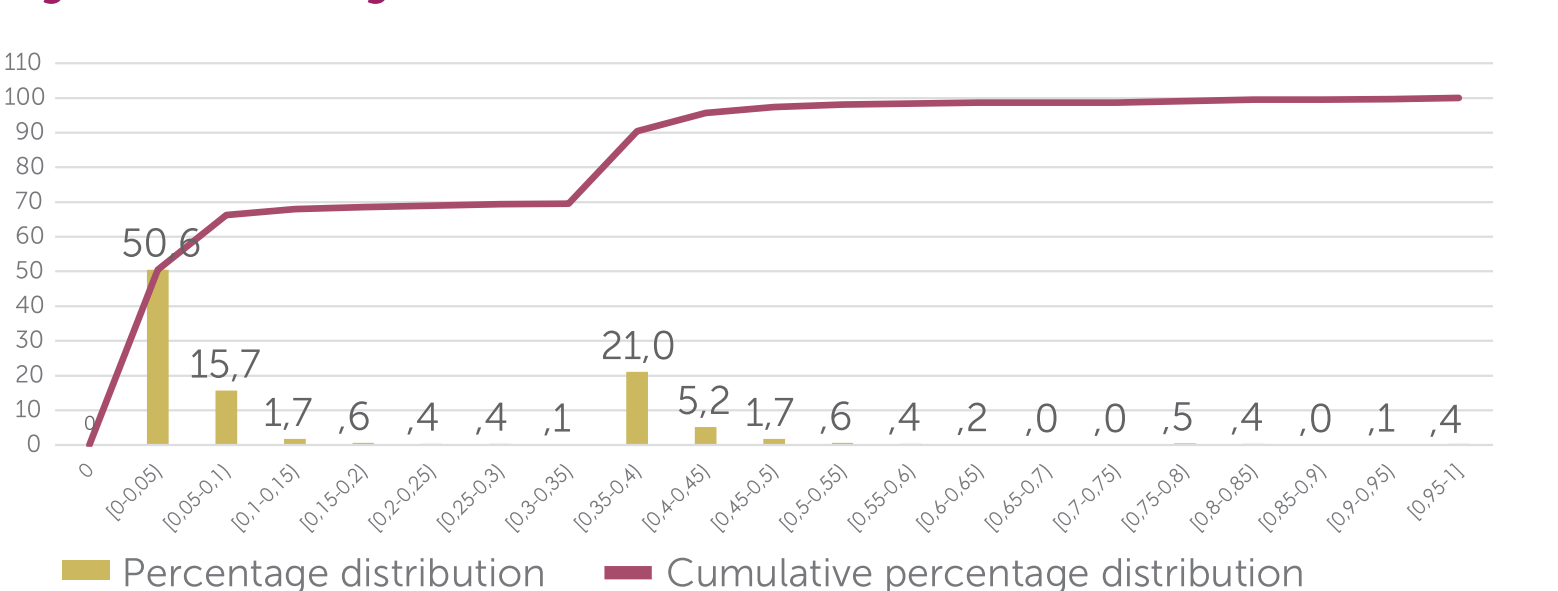
### Poly-drug use score results.

The F indicator ranges, in the ALAMA data excluding non-consumers, from 0.01 (minimum base value) to 5.34, obtained by a severe poly-use subject. Some F values can be obtained both for single use and for poly-use (see list of base values), but all non-base values can only be obtained from poly-use. Considering the percentage of non-base values, indicated by p, it can be concluded that at least p % of users is poly-user and that at most (100-p) % of users use only one illegal substance. In the ALAMA data at least 54% of subjects have used more than one illegal substance during the last 12 months.

Figure 3 shows the empirical distribution of the F indicator with values grouped into classes. Three local modal values can be observed, indicating the presence of three quite distinct groups of users in the sample: those with low frequency of use or poly-use, those with medium frequency and those with high frequency of poly-use.

Regarding the PDS indicators, Figures 4 and 5 show the presence of two characteristic groups in the ALAMA users according to the PDSself indicator, while the PDSothers shows a homogeneous grouping around very low scores as the empirical distribution shows a rather smooth behaviour.

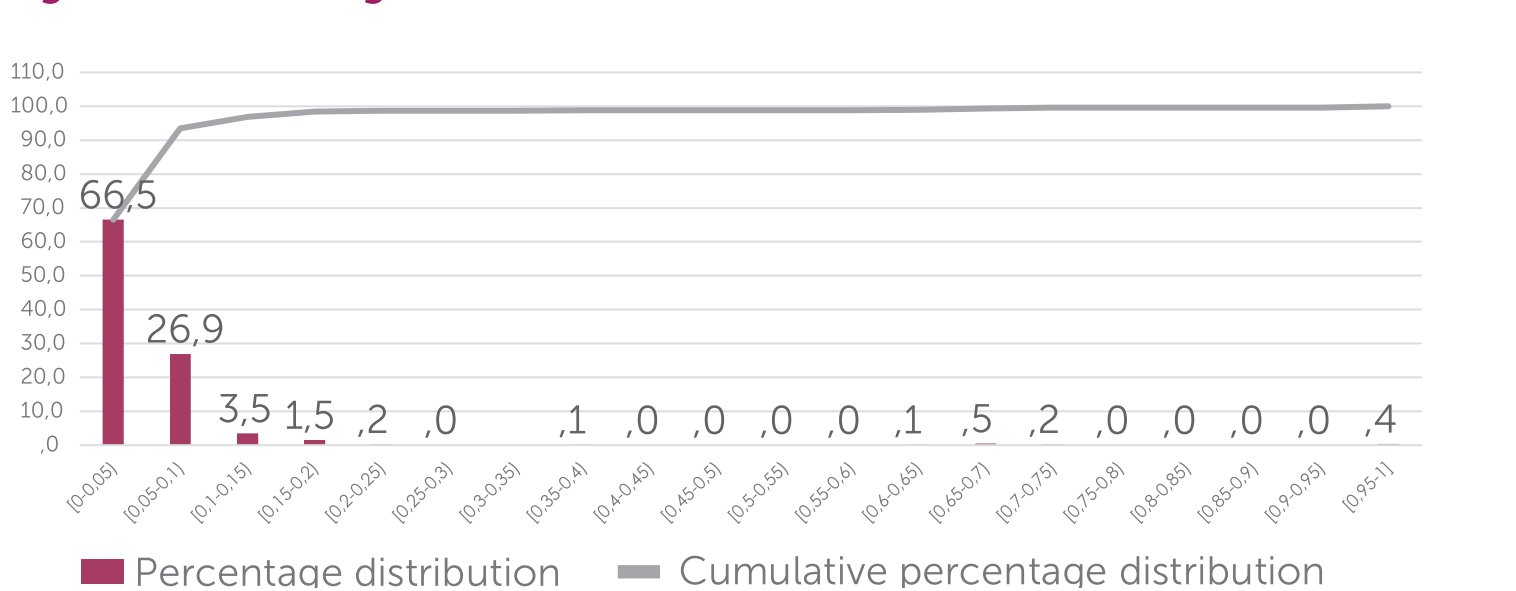
**Figure 4. Percentage and cumulative distributions of PDSself.**



**Table 2. Frequency (%) of use of each substance (number of "yes" for each substance) among users lifetime and in the last 12 months (NPS in purple).**

Substance	Percentage of use lifetime	Percentage of use in the last 12 months	Delta %
Alcohol	97.2	96.3	0.9
Cannabis	98.8	95.7	3.1
Tobacco	88.6	83.7	5.5
Ecstasy	41.7	28.8	30.9
Cocaine	36.5	24.4	33.1
Ketamine	24.4	12.7	47.9
Amphetamine	24.4	12.6	48.3
Amyl / alkyl nitrates ('poppers')	23.5	8.3	64.7
LSD	20.8	8.0	61.5
MDA	17.7	8.0	54.8
Mushrooms	22.1	6.8	69.2
Synthetic Cannabinoids	9.6	4.3	55.2
Benzodiazepines	9.0	4.1	54.4
Prescription opiates	7.4	3.3	55.4
DMT	4.7	2.0	57.4
Nitrous oxide	6.1	1.6	73.8
Heroin	4.2	1.6	61.9
Synthetic Hallucinogens	3.9	0.9	76.9
GHB	2.0	0.5	75
Synthetic Dissociatives	1.4	0.5	64.3
Mephedrone	1.4	0.4	71.4
4-FA/4-FMP	0.2	0.1	50

**Figure 5. Percentage and cumulative distributions of PDSothers.**



## Conclusions and Suggestions

In the present study, we have both illustrated the new data on substance use, in particular NPS, among nightlife attendants, according to the ALAMA study results, and the use of poly-use indicators to summarize these data. It is interesting to note that, at least in the Italian data, the use of NPS is not widespread, if ecstasy is considered as "classical", and that the main substances used are alcohol, tobacco, cannabis and ecstasy. All other substances seem to be "experimental", in the sense that they may have been occasionally used, but their recent use is not frequent.

Another important observation is that the patterns of use do not seem to correlate to a large extent with classical demographic/social variables. Previous work (Colasante et al., 2019) rather point towards relational/psychological variables such as relations with parents (at least for young subjects), school results (again for young people) that, more in general, could be thought of as extending to measurement of satisfaction with current situation, maybe relations with others, etc... Variables of this kind that correlate more with substance use/abuse would be of value for information, prevention measures and to be collected in future surveys.

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Fabi F., Graziano S., Waldron J., Benedetti E., Grabski M., Molinaro S., Rossi C., Scalia Tomba G. (2019). *Measuring the harms of substance use and poly-use in the nightlife scene: a pilot application of new poly-use indicators on Italian data collected within the ALAMA study*. Submitted.

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