European Monitoring Centre
for Drugs and Drug Addiction

INSIGHTS

MONITORING DRUG USE IN THE DIGITAL AGE: STUDIES IN WEB SURVEYS

Combining web surveys and general population surveys to improve data on people who use drugs in France: reflections on recruitment strategies and the generalisability of results

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Abstract: This paper looks at the implementation and recruitment strategies of the 2016 European Web Survey on Drugs (EWSD) in France. It also explores the possibility of generalising the EWSD results by using a matching procedure that links EWSD respondents with respondents of the 2017 general population survey (GPS) in France. Two non-probabilistic recruitment strategies for the EWSD were tested. The first strategy sought to reach drug users through specialised websites related to drugs, while the second strategy targeted a sample of French Facebook users through a paid advert that was posted on around 177 000 Facebook pages. As the paper shows, different recruitment strategies yielded different samples of respondents, in terms of their drug use patterns and demographic characteristics. Further, the paper uses a matching procedure, namely propensity score matching, to explore if inferences could be made to the general population based on responses to questions in the EWSD. In this way, the paper shows how it was possible to estimate the prevalence of use of several drugs in the general population, even though these questions were not asked in the GPS. This example contributes to the ongoing work on generalising web survey results to larger populations.

Introduction

In 2016, the French Monitoring Centre for Drugs and Drug Addiction (OFDT) conducted the first wave of the European Web Survey on Drugs (EWSD) in order to collect new information on drug use in France. For the OFDT, this represented an opportunity to continue the methodological work on web surveys that was initiated in a previous exercise carried out in 2014 (Cadet-Tairou, 2016).

This study has two broad aims. First, to assess the implications of different EWSD recruitment methods to reach people who use drugs, drawing on experiences of recruiting the sample through advertisements on key French drug-related websites and through targeted ads on Facebook. The second aim is to explore whether the generalisability of results can be enhanced through the application of a matching procedure that links EWSD respondents with the respondents to the 2017 general population survey (GPS) in France.

Recruitment strategy and sample

European Web Survey on Drugs (EWSD)

As online surveys for drug data collection rely on convenience (or self-selecting) samples of respondents, a critical step involves the identification of a recruitment strategy with the potential to recruit a large number of individuals from the

target group, with the required characteristics for sample inclusion, and encourage them to complete the questionnaire.

For the EWSD in France, the OFDT tested two non-probabilistic recruitment strategies, which were applied at two separate points in time. The first strategy sought to reach drug users through specialised websites related to drugs (hereafter 'drug-related websites') by asking the organisations owning them to include an advertisement banner, with links to the survey questionnaire, on their website. The second strategy targeted a sample of French Facebook users by paying for an advert that was subsequently posted on around Facebook 177 000 pages. Over the entire survey period for the EWSD, which covered 15 weeks from May to September 2016, 4 849 visits to the questionnaire webpage were recorded. Around 2 824 respondents agreed to participate and were eligible to do so according to the following criteria: they were living in France; had used at least one of four specific drugs (cannabis, MDMA, amphetamines or cocaine) at least once during the last year, that is, during the 12 months prior to the survey; and were at least 18 years old. After data cleaning and recoding, the final respondent sample consisted of 2 202 individuals.

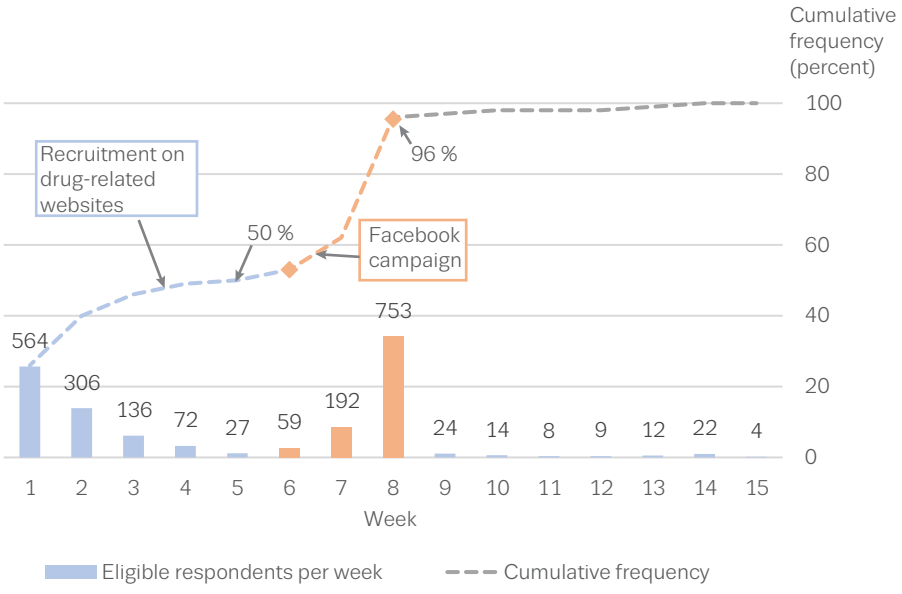
For the first strategy, the research team posted advertisement banners during the first five weeks of the survey on 12 of the most important French drug-related websites. Among these were the websites of support centres for drug-related harm reduction, centres for the prevention of drug use, drug information pages, mutual health insurance companies for students only, call centres on addictions, an AIDS information site, the federation of health institutions and an online discussion board on drugs. Using this strategy, 40 % of the final sample was recruited within the initial two weeks of the survey (see Figure 1). During the first week, an average of 155 unique visitors accessed the survey each day. By the end of the first week, 564 questionnaires had been validated (eligible respondents) for 1 088 clicks on the website banners. After this, the number of unique visitors who accessed the survey fell rapidly, reaching fewer than 10 per day in the fifth week of the survey, the week before the Facebook campaign started.

In response to this significant decrease, a second recruitment strategy was implemented in the sixth week of the survey. A Facebook advert was launched and posted on around 177 000 French people's home pages (targeted at those between the ages of 18 and 50 years) ([1]), which led to 3 765 clicks on the advertisement banner. In three weeks, 911 additional eligible complete questionnaires were collected. Assuming that all respondents during the sixth, seventh and eighth weeks of the survey (see Figure 1) were recruited by Facebook, even if a few could potentially have been recruited through

([1]) The upper age range was limited to 50 as French general population survey results have shown that past 12-month illicit substance use is very rare after the age of 50 in France. Furthermore, this enabled us to reduce the costs related to the advertisements by focusing on age ranges within which the majority of people who use drugs are located.

FIGURE 1

Number of respondents per week related to recruitment strategies



Source: 2016 French EWSD, processed by authors.

another strategy ([2]), this meant that 41 % of the final eligible sample of respondents was recruited from Facebook during these three weeks. It should be noted that for the Facebook recruitment strategy, the cost was determined by the number of clicks on the advertisement banner. This required us to set a maximum daily budget for this recruitment strategy (EUR 30), based on an average cost of EUR 0.25 for each click on the advertisement banner. When this budget was reached, the advertisement was no longer broadcast that day, which limited the number of potential respondents. From our experience, it would be recommended to increase this budget on weekends, which would have allowed us to reach people who do not log in to their Facebook account on weekdays. In the third week of the Facebook campaign, we increased the advertisement budget, which may explain the large increase in completed questionnaires (from 59 respondents in the first week of the Facebook campaign to 753 respondents in the third week).

French general population survey

In contrast to these non-probabilistic methods, France regularly conducts a general population survey (GPS), based on random sampling, called the Health Barometer survey. This survey also collects data on drug use in the general population, which makes it possible to estimate the prevalence of drug use in the French adult population and provides some information on patterns of use, at least for the most commonly used drugs such as cannabis.

The last French GPS was administered through a computer-assisted telephone interview led by Public Health France (Santé publique France). The survey took place from 5 January to 18 July 2017, on a sample of the French-speaking population between the ages of 18 to 75 years old (Richard et al., 2017). The GPS sample is based on two independent random samples, one consisting of household with a landline based on sample polling on two levels (household then individual), and the other consisting of individuals with mobile phones (polling only on the individual level). The questions relating to illicit substances were only asked of individuals between the ages of 18 and 64 years ([3]) (*n* = 20 665). Out of this sample, 2 042 respondents reported having used at least one of the four drugs covered in this study (amphetamines, cannabis, cocaine and MDMA) during the last year.

Results from the EWSD and the French GPS

The sociodemographic characteristics (see Table 1) of the EWSD respondents varied according to the recruitment strategy. The sample recruited through Facebook (*n* = 911) was generally younger, with a mean age of 23.3 years compared with 26.9 years for those recruited through drug-related websites (*n* = 1 291), and also had a larger proportion of students (46 % from Facebook compared with 37 % from the drug-related websites). The younger age of Facebook respondents may have been influenced by the advertisement being limited to those reporting their age as between 18 and 50 years in their profiles. However, a small number of Facebook respondents over the age of 50 were present in the final sample. Furthermore, the targeted recruitment and eligibility criteria meant that all EWSD respondents had used drugs in the past 12 months. As covered elsewhere, this may be expected to attract more frequent users (see, e.g. Matias, 2022).

Differences in sociodemographic characteristics were also found between the EWSD respondents and the GPS respondents who reported having used one of the four drugs covered in the questionnaires (see Table 1). Overall, EWSD respondents were much younger than their counterparts in the GPS (mean age of 25.4 years versus 31.5 years, respectively) and more often a student (41 % versus 21 %). Furthermore, the proportion of females in the EWSD was slightly higher than in the GPS (38 % versus 32 %, respectively). Of note, the EWSD respondents recruited through drug-related websites were more similar to the GPS respondents with regard to age and occupational status than those recruited through the Facebook ads.

Comparing subsamples of EWSD and GPS respondents

To improve the comparability of results from the EWSD and the GPS, subsamples from both surveys were selected. We limited the comparison to those using one of the four drugs in the last year and aged 18 to 44 years. This was done because outside this age range, the proportion of people among all who reported drug use is very low in both surveys: 85 % of the GPS respondents reporting the use of drugs are found among those aged 18–44, compared with 96 % of all EWSD respondents.

([2]) A question at the end of the survey asked 'How did you know about this survey?'. Some respondents did not answer this question, which at first made it unclear which recruitment strategy was involved. Moreover, it should be noted that 'Facebook' was included in a broader response modality ('Through social media'). The choice was made to include those who, during weeks 6 to 8 of the survey, did not answer the question related to the recruitment source (*N* = 150), as recruited via the Facebook advertising campaign, in addition to respondents for whom there might have been some doubt in relation to the recruitment source (*N* = 45). This decision was made as advertisement on the French drug-related websites had ceased at that stage (and recruitment from the French websites was already very low in the week prior to the launch of the Facebook recruitment campaign).

([3]) Questions on illicit substance use are restricted to 18- to 64-year-olds in the French GPS, given that current substance use is very rare beyond the age of 64, with data on substance use among those older than 64 years old mainly referring to past rather than current use.

TABLE 1

Sociodemographic characteristics by web survey subsamples and in the general population aged 18 to 64 years

		EWSD sample			General population as seen through GPS 2017 sample	
		Facebook recruitment (%)	Drug-related websites recruitment (%)	All (%)	People who use drugs (%)	All (%)
		N = 911	*N* = 1 291	*N* = 2 202	*N* = 2 042	*N* = 20 665
Gender	Male	59	64	62	68	49
	Female	41	36	38	32	51
Age	18–24 years	72	56	63	32	11
	25–34 years	22	25	24	34	17
	35–44 years	4	12	9	19	18
	45–54 years	1	5	3	12	19
	55–64 years	0.1	2	1	3	18
	65–75 years	0.1	0.4	0.3	0	16
	Mean (years)	23.3	26.9	25.4	31.5	45.9
Status	No response	14	10	12		
	Employed	31	38	35	57	56
	Student	46	37	41	21	7
	Unemployed	7	10	9	16	9
	Other (e.g., retired, looking after the family home)	2	4	3	6	28
Family status	No response	28	26	27	8	3
	One person living alone	44	42	43	24	17
	A couple without children living at home	21	20	21	16	28
	A couple with child(ren) living at home	6	10	8	37	41
	One adult with child(ren) living at home	1	2	1	15	10

Source: 2016 French web survey and 2017 Health Barometers, Santé publique France, processed by authors

After applying these selection criteria, there were 1 705 respondents aged 18–44 in the GPS subsample and 2 098 in the EWSD (see Table 2). The results and analyses presented below solely relate to these subsamples.

During the past 30 days (last month use), 82 % of EWSD respondents reported the use of cannabis (resin and/or weed), 29 % MDMA, 24 % cocaine and 21 % amphetamines (Table 2). Furthermore, 61 % of EWSD respondents used two or more of those substances during the past 12 months (last year use), compared with 17 % of GPS respondents. As with the sociodemographic characteristics, the level of drug use varied between the two EWSD subsamples: those recruited on drug-related websites were more likely to report more frequent drug use than those recruited through Facebook, with the exception of last month use of MDMA and amphetamines, which appeared closer in the two groups.

One of the difficulties with the GPS is that it lacks questions on last month and daily use for all drugs except cannabis. Furthermore, for most substances, except cannabis, last year use is very low compared with the EWSD (e.g. only 8 % of respondents in the GPS subsample are last year MDMA users and 3 % are last year amphetamines users versus 55 % and 38 % respectively for the EWSD). Overall, there are significant differences between the GPS and EWSD subsamples in terms of the proportions of respondents reporting the use of drugs, with the proportions of GPS respondents almost always considerably lower. The exception is last year use of cannabis, which was reported by 96 % of the respondents in the GPS subsample and 95 % of the EWSD respondents. Furthermore, 19 % of the GPS respondents stated that they used cannabis almost daily, compared with 39 % of the EWSD respondents.

TABLE 2

Lifetime, last year and last month prevalence rates of drug use among EWSD respondents and the general population (1)

	EWSD sample			GPS 2017 sample	
	Facebook recruitment (%)	Specialised drug websites (%)	All (%)	People who use drugs (%)	All (%)
	N = 902	*N* = 1 196	*N* = 2 098	*N* = 1 705	*N* = 10 391
Cannabis LY	96	94	95	96	17
Cannabis LM	82	82	82	58	10
Cannabis almost daily	35	43	39	19	3
Synthetic cannabinoid LY (GPS: lifetime use)	15	14	14	12	2
MDMA LY	52	58	55	8	1
MDMA LM	28	31	29	n.a.	n.a.
Cocaine LY	39	49	44	14	3
Cocaine LM	21	26	24	n.a.	n.a.
Amphetamines LY	36	40	38	3	0.5
Amphetamines LM	21	21	21	n.a.	n.a.
Ketamine LY	18	22	20	n.a.	n.a.
Cathinone LY	3	6	5	n.a.	n.a.
At least two of the following: cannabis, MDMA, amphetamines or cocaine LY (polydrug use)	57	65	61	17	3

Abbreviations: n.a., data not available; LY, last year use; LM, last month use.
(1) In order to improve comparability we limited the age range to 18–44.
Source: 2016 French web survey and 2017 Health Barometers, Santé publique France, processed by authors.

The data from the EWSD have several unique characteristics, one of which is the relatively high use of synthetic cannabinoids during the last year (14 %). In the GPS subsample, only 12 % of respondents reported ever having tried synthetic cannabinoids (lifetime use). While last year use of synthetic cannabinoids was not asked in the GPS, the relatively low lifetime prevalence of synthetic cannabinoid use suggests an even lower prevalence of last year use. The EWSD results may indicate that the use of synthetic cannabinoids is more prevalent in France than estimated through the last GPS results. Similarly, the EWSD reveals the relatively widespread use of ketamine (20 %) among people who use drugs. As there have been no questions related to this substance in the GPS, this finding suggests that ketamine use could be considered for inclusion in the next wave of the GPS. Finally, the EWSD subsample revealed a high level of polydrug use (respondents reporting use of more than one illicit drug in the last year), at 61 %, compared with 17 % in the GPS.

Using a matching procedure to generalise EWSD results

Because individuals from the EWSD are self-selected, it is impossible to make any statistical inference to the general population, despite the detailed information this survey might contain. The sample obtained depends on who sees the survey advertisement and the perceived salience and personal inclination or ability to respond. It is therefore difficult to know which groups of people who use drugs are represented in the EWSD, and it is not clear how this sample relates to the general population. Nevertheless, the strength of the EWSD stems from its richness of data related to specific and detailed questions on use, and its ability to recruit a larger number of people who use drugs compared with the GPS. It is also worth noting that under-reporting of drug use may be an issue in a GPS and less so in a self-recruited survey on drug use (see Belackova and Drapalova, 2022).

Using the data from the EWSD, a matching procedure (Imbens and Rubin, 2015) can help with the issue of generalisability. Through this statistical method, EWSD respondents can be matched to the GPS respondents using statistical methods such as propensity score matching or direct matching. In this case, the matching procedure seeks to identify EWSD respondents with a similar profile to GPS respondents — which can then be used in a number of different ways, as outlined below. However, this requires that the same questions were asked in both surveys to ensure effective comparability on variables such as identical sociodemographics (age, gender, educational level, type of household, occupational status), frequency of drug use (e.g. cannabis lifetime and last month frequency of use but also similar questions for

amphetamines and cocaine), and even respondent internet browsing behaviours or presence on social networks. Provided that the matching procedure is well-specified (i.e. accounts for any selection bias), we can be confident that the matched web respondents are similar to their GPS counterparts. The unmatched web respondents can help identify EWSD-specific respondent profiles: individuals that are not present in the GPS but present in the population of interest (i.e. among people who use drugs).

The matched EWSD respondents can be used in three ways: using the web specific questions that were not asked in the GPS to estimate additional behaviours that we can infer to the general population; to increase the size of the GPS sample (provided that a new weighting is computed); and for estimating measurement bias (if a difference in the level of some variables of interest that are present in the EWSD and GPS surveys appears between the respective respondents).

An example of matching: propensity score

Here we provide one example of a matching procedure to illustrate how this process may be used to estimate additional behaviours that we can infer to the general population, on the basis of the specific questions asked in the EWSD that were not asked in the French GPS. We applied a matching procedure based on a propensity score. This is the probability of belonging to the EWSD sample instead of the GPS sample, using gender, age (without age limit), family status, highest diploma level, cannabis use (in four categories) ([4]), last year MDMA use, last year cocaine use and last year amphetamines use. The procedure randomly selects a web respondent within a range of variation of 0.25 standard deviations of the propensity score for each GPS respondent, with the strict condition that gender, age and cannabis use are equal; it also allows the same EWSD respondent to be matched several times to many GPS respondents. Through this procedure, we matched 2 001 respondents from the GPS survey to 456 respondents from the EWSD.

The variables that are specific to the EWSD are attributed to the matched GPS respondents, allowing the computation of additional drug use prevalence that was not asked in the GPS survey. For example, 35 out of the 2 001 matched GPS respondents would be considered positive for ketamine use. The unmatched GPS respondents (n = 38) are considered non-users of the additional drugs only available in the web survey, such as ketamine or cathinones.

In this process, we must assume that: (1) the EWSD covers all the existing drug use profiles (which is debatable and likely not the case for particularly marginalised people who use drugs), although not in a representative way; (2) the propensity score removes selection bias associated with belonging to the web survey or the GPS survey as well as all additional drug use prevalence that are of interest (such as ketamine). Note that the predictive power of the propensity score model is high ([5]), but we cannot be sure that there is conditional independence between the survey (in this case the EWSD) sample and the additional variables of interest (Imbens and Rubin, 2015). The results from the propensity score matching can then be used to estimate the prevalence of last year ketamine use weighted in the general population. Among 18- to 44-year-olds, we estimate last year use of ketamine to be 0.3 %, as shown in Table 3, which gives the new correctly weighted estimate of ketamine use (initially unknown in GPS).

Our findings imply that overall (and assuming that the propensity score model is correct), the majority of the respondents could have been in either of the two surveys, or, to

([4]) Last year, last month and daily use of cannabis, in addition to last year use of synthetic cannabinoids.

([5]) Including area under the ROC curve = 0.89 (a measure of the accuracy of the model that predicts the mode – internet or telephone: 0.5 being the score of a perfect random guess); pseudo R^2 = 0.56.

TABLE 3

Original estimations of additional behaviours in general population and after matching (18- to 44-year-olds)

	Web survey (%)	GPS 2017 sample		Estimations weighted in GPS after matching	
	All	People who use drugs	All	People who use drugs (%)	All (%)
Synthetic cannabinoids LY	14	Unknown	Unknown	10.5	1.8
MDMA LM	29			2.7	0.5
Cocaine LM	24			6.0	1.0
Amphetamines LM	21			0.9	0.2
Ketamine LY	20			1.5	0.3
Cathinones LY	5			0.6	0.1

Abbreviations: LY, last year use; LM, last month use.

put it another way, that they were sufficiently similar. However, only a small subsample of the EWSD respondents can be matched with GPS respondents having exactly identical values for gender, age and cannabis use frequency. The unmatched web respondents represent real people who use drugs that are not present in the GPS. As such, they probably illustrate a coverage fault of the GPS: that the GPS does not cover specific groups of people who use drugs that are covered in the EWSD.

We emphasise that this is an illustrative example. A next step would be to make a detailed comparison of the profiles of matched and unmatched EWSD survey respondents and to consider the following robustness checks: (1) reflection on the quality of the surveys (e.g., coverage bias, response rate, under-reporting, non-response bias); (2) reflection on the variables used to calculate the propensity score; and (3) to test and replicate different matching models in order to test the accuracy of estimates.

Conclusion

This study has examined the French part of the 2016 European Web Survey on Drugs (EWSD). It has shown how the different online requirement strategies used for the EWSD resulted in different samples of respondents, in terms of their drug use patterns and demographic characteristics. One part of the sample was recruited through French drug-related websites and the other part through targeted Facebook advertising. In addition, the EWSD sample of respondents was compared with that of the 2017 French general population survey (GPS). Again, there were sometimes significant differences in the profile of respondents compared with the GPS sample, both in terms of socio-demographic characteristics and consumption levels. In our case, it was found that EWSD respondents recruited through drug-related websites were more similar to the GPS respondents with regard to age and occupational status, compared with EWSD respondents recruited through Facebook. However, it is difficult to generalise from this and further investigation should be carried out.

Furthermore, we used a propensity score matching technique to determine whether inferences could be made to the general population based on responses to EWSD questions that were not asked in the GPS. By doing so, we were able to estimate the prevalence of use of several drugs in the general population — even though these questions were not asked in the GPS. This included the last year use of synthetic cannabinoids, ketamine and cathinones, and the last month use of MDMA, cocaine and amphetamines.

While this is an important step towards making web survey results more generalisable, several limitations must be borne in mind, as outlined in this paper. Importantly, when designing an online survey with the aim of generalising the results to the general population, it is advisable to ask a set of similar questions to those asked in the GPS in order to better control the matching procedure: questions about drug use details but also about the likelihood to participate to a GPS or a web survey. In the future, it would be useful to test and replicate different matching techniques and to vary the sets of control variables in order to test the accuracy of the estimates that we have arrived at through the use of the propensity score procedure.

These results suggest that online survey data are highly dependent on recruitment strategies and methods. The use and analysis of this type of data, however interesting, must be done with great caution, especially in a comparative approach that would utilise data from different online surveys. Nevertheless, their interest is undeniable (such as limited cost, easy to carry out, access to users difficult to observe with GPS). Methodological studies must be continued in order to propose an even more rigorous statistical framework.

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EMCDDA Insights are topic-based reports that bring together current research and study findings on a particular issue in the drugs field. This paper is published as part of *Monitoring Drug Use in the Digital Age: Studies in Web Surveys*, an EMCDDA Insights that provides an overview of current knowledge and the latest developments in the field of web surveys on drug topics. The Insights contains in-depth reports on the methodology of web surveys, the available studies being carried out in different drug topics and analyses of the European Web Survey on Drugs. The Insights will be of interest to researchers and scientists, people who use drugs, policymakers and their advisors, specialists and practitioners, and all those concerned with the issue of drugs and innovative methods.

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