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Consumption of new psychoactive substances in a Spanish sample of research chemical users

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Objective To know the pattern of use of new psychoactive substances (NPSs) in a Spanish sample of research chemical (RC) users and to deepen the RC user profile and risk reduction strategies employed.
Methods This study is a cross-sectional survey by means of a specific questionnaire. Recruitment was carried out at music festivals, at non-governmental organizations (NGOs), and through announcements on an online forum. Two RC user profiles were defined, according to whether they search information through online forums.
Results A total of 230 users participated. The most frequent RCs were hallucinogenic phenethylamines (2C-B 80.0%, 2C-I 39.6%) and cathinones (methylone 40.1%, mephedrone 35.2%). The most frequent combination of RC with other illegal drugs was with cannabis (68.6%) and 2C-B with MDMA (28.3%). Subjects who are consulting drug forums (group 1) use more RC, obtain RC by Internet, and use more frequently risk prevention strategies. Regarding the risk-reduction strategies in this group, users sought information concerning RC before consuming them (100%), used precision scales to calculate dosage (72.3%), and analyzed the contents before consumption (68.8%).
Conclusions There is a specific RC user profile with extensive knowledge and consumption of substances, using different strategies to reduce risks associated to its consumption. Copyright © 2013 John Wiley & Sons, Ltd.

KEY WORDS—research chemicals; 2C-B; consumption patterns; new psychoactive substances

INTRODUCTION

Until recently the appearance of new psychoactive substances (NPSs) on the market was sporadic. However, in the last years this tendency changed with the appearance of new products sold in an unregulated market and the possibility to obtain these substances from websites (Archer *et al*., 2011). Some projects such as Psychonaut-ReDNet (DeLuca *et al*., 2012) or the Early-Warning System of the European Monitoring Centre for Drug and Drug Addiction (EWS-EMCDDA) have alerted about the presence of hundreds of NPSs. During 2010, a total of 41 NPSs were officially notified for the first time in the European Union via the EWS and 49 in 2011 (EMCDDA, 2012).

Although the use of NPS is still limited in most countries, there is an uncertain possibility that the use of these substances could become as widespread as that of other illegal drugs. A good example is mephedrone, a cathinone derivative that was widely used among young people in the UK during 2009 and 2010. Many reasons have been suggested to explain the expansion of its use. These include dissatisfaction of the purity drugs such as MDMA, marketing strategies of the providers, online availability, low cost, versatility in administration, lack of legislation, the perception that it is less risky than other drugs, and the developments of the manufacturing, distribution, and communication of these substances (Winstock *et al*., 2011; Measham *et al*., 2010; Vardakou et al., 2010; Van Hout and Brenan, 2012; Butler *et al*., 2007; Cone, 2006; Schifano *et al*., 2005, 2009). Moreover, according to the Advisory Council of Misuse of Drugs (ACMD), the highest peaks in searches on Google and in purchases of these substances on the Internet coincide chronologically with reports from the mass media about their abuse.

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Thus, paradoxically, the media unintentionally provides free publicity for the suppliers (ACMD, 2010).

Actually, the term used to define these drugs is NPS, which includes other terms such as "Legal Highs," "Spice drugs," "Party Pills," or "Research Chemicals" (Corazza *et al.*, 2012), but there is a relevant difference among them: the kind of information that is offered to the consumer about the product. The EMCDDA defines "Legal Highs" as an umbrella term for unregulated psychoactive substances or products claiming to contain them, which are specifically intended to mimic the effects of controlled drugs (EMCDDA, 2010). "Spice drugs" are sold in attractive packages as a mixture of herbs or plants whose precise composition and concentration are of unreliable nature (Fattore and Fratta, 2011; Logan *et al.*, 2012). The "Party pills" are sold as tablets or powders that are a mixture of substances of which the composition and concentration have been confirmed to be unreliable after subsequent analyses (Davies *et al.*, 2010; Baron *et al.*, 2011; Russell and Bogun, 2011; Ayres and Bond, 2012). In all cases, the information on the packages usually reports only the legal ingredients of the composition and not the unregulated psychoactive compounds it contains, such as synthetic cannabinoids in the case of Spice, or piperazines and cathinones in the case of party pills. Only what is called "Research Chemicals" is sold as powders containing a single active compound, which is identified on its label by its common pharmacological name and/or chemical name. It is important for RC users to know the drug that they are going to use, the dose, route of administration, or desirable and adverse effects.

Recently, the Psychonaut Web Mapping Project assessed a selection of drug-related Internet forums and virtual communities who share personal experiences, as well as documents, news, blogs, and all kinds of information about these new drugs through chats and private messages. The principal characteristics of these communities are the extensive knowledge they have about these drugs that is barely described in the scientific literature and the harm reduction strategies they employ to minimize the risk associated with the use of these substances (Davey *et al.*, 2012).

The main objective of this study was to know the patterns of use of NPS in a sample of RC users, to deepen the RC user profile and risk reduction strategies they employ.

METHODS

A preliminary interview was carried out with 12 users who had extensive experience with RC consumption, in order to drill: pattern of illegal drugs, RC use, combination with other drugs, problems associated to RC use, and risk reduction strategies. The information that we obtained was used to design the response options of the final questionnaire. They had been previously contacted through the Eleusis Association (http://asociacioneleusis.es), a NGO dedicated to the study of altered states of consciousness. The 12 expert users received a financial compensation for their participation.

A definitive questionnaire, based on interview results, consisted of 16 questions with two to seven response options reflecting the variability in the results of the preliminary inquiry and 1 measuring scale to estimate the risk of experiencing any harm associated with RC use scored from 0 to 10. Also 13 boxes were arranged to allow participants to name the most consumed RC throughout their life and a blank space to fill in with the most used combinations with illegal drugs and among RCs. The final questionnaire was self-administered, so all participants completed it by themselves. It lasted about 20 min. Inclusion criteria were adult subjects (minimum 18 years old), legally residing in Spain, speaking Spanish as first language, and having used an RC at least once in their lives. None of these participants received any compensation for answering. This final questionnaire was used in printed format, contacting participants who attended music festivals during summer 2010 and 2011 (Boom Festival and Sol Festival). In this setting, we settled a base camp at Energy Control's drug checking stand. Energy Control is an NGO dedicated to risk reduction in the context of entertainment and leisure activities (http://energycontrol.org). One of the authors (D. G. M.) contacted the Spanish people who visited the stand by curiosity or requiring some service. Participants were encouraged to talk to their friends about the study in order to increase participation. The Energy Control stand comprised an area where participants could complete the survey quietly. We also received printed questionnaires from RC users visiting the site that Energy Control has in Barcelona, where they could fill out paper versions.

We also used an electronic version of the survey to contact online forum users from Cannabiscafe (http://cannabiscafe.net), which is a specific drug forum in Spanish language. There, we set an advertisement explaining the study and inviting the users to contact the first author via e-mail to participate in the study. We sent an electronic version of the survey to the participant's mail, and they returned the filled survey at the same mail.

This is a convenience sample that has been used in other similar studies to identify the frequency and patterns of use of new drugs of abuse (McCambridge *et al.*, 2005; González *et al.*, 2006; Winstock *et al.*,

2011). Given the knowledge provided by the Psychonaut Web Mapping Group in a recent paper (Davey *et al.*, 2012), which discusses that forum users form a solid and unique community, having technical and pharmacological knowledge, and using methods to reduce harm, we decided to divide our sample according to the use of Internet forums to search information about RC (group 1) or not using (group 2). The data were analyzed using the SPSS 12.0 statistics package. Results are presented as means, differences between means, and percentages. Differences between groups 1 and 2 were analyzed using a *t*-test in case of continuous variables and using a chi-square test for categorical variables (in some cases Fisher's test). A value of $p < 0.05$ was considered statistically significant. The study was approved by the Local Research Ethics Committee (CEIC-PSMAR).

RESULTS

Between August 2010 and June 2011, a total of 230 surveys were completed. They were recruited at trance music festivals (43.47%, Boom Festival and Sol Festival 2010), the NGO Energy Control (14.8%), and the specific online drug forum Cannabiscafe (41.73%).

Demographic profile of research chemical users

Demographic data are shown in Table 1. A 98.3% of the sample was Spanish.

Pattern of illegal drugs use

The sample was experienced polydrug users. Table 2 shows "lifetime prevalence" and "last year use" of the most reported drugs of abuse (except RC).

Research chemical use

The beginning of the use of RC ranged from 1995 to 2011, with a progressive increase in 2006 (5.7%), 2007 (8.3%), 2008 (12.6%), 2009 (17.0%), and 2010 (22.2%). The main reasons for the use of RC were experimental or psychonautic (80.9%; group 1 = 86.6% *vs* group 2 = 75.4%; $p < 0.05$), recreational (78.3%; group 1 = 75.9% *vs* group 2 = 80.5%; $p = 0.39$), spiritual (28.3%; group 1 = 32.1 % *vs* group 2 = 24.6%; $p = 0.2$), and therapeutic (22.2%; group 1 = 28.6% *vs* group 2 = 16.1%; $p < 0.05$). The consumption of RC is presented in Table 3. The average age at first use of RCs is 27 years (SD = 7.34; min 17, max 51). There is not a significant difference between groups regarding age at first use. The average of different RC use by complete sample is 3.6 (SD = 2.85, range 1–13). There are statistical differences regarding the number of different RC used by each group (group 1 mean = 4.6 *vs* group 2 mean = 2.6; $p < 0.001$). Only for 9.6% of the sample the use of RC is higher or equal to illegal drugs. Correlations between number of illegal drug uses and number of RC uses is low ($r = 0.34$). None of them mentioned having used "Spices" or "Party pills".

With respect to the settings of use, they were chosen according to the pharmacological profile of the substance. Cathinones, having stimulant and empathogenic effects (mephedrone and methylone; $n = 134$), were generally consumed in clubs and bars (34%), followed by private settings such as the intimacy of one's home (29.9%), and outdoor natural surroundings such as festivals, the countryside, or the beach (25.4%). On the other hand, hallucinogenic phenethylamines (2C-B, 2C-E, and 2C-I; $n = 203$) were usually taken at home (42%), followed by open-air settings (35.1%) and, to a lesser extent, closed spaces such as clubs and bars (20.13%). A small number of unusual settings included seminars for personal growth, museums, and theatres (2.6%). Of the subjects, 30.7% declared to have used hallucinogenic phenethylamines alone (2C-B, 2C-E, and 2C-I), and 21.3% used cathinones by themselves (methylone and mephedrone). Of the sample, 82.6% considered that in the future the use of RC could increase to a similar level as that of other illegal drugs, such as MDMA and cocaine. The reasons they reported were that RC provide a new and wider range of effects (48.7%) and have greater purity and quality than other illegal drugs (38.3%) and that there is a lack of legislation

Table 1. Demographic data and also shown are the *p*-values of the group comparison

	Sample (n = 230) %	Group 1 (n = 112) %	Group 2 (n = 118) %	p
Male	74.4	83.0	66.1	0.003
Age (years, range 18–57)	31.5	30.8	32.2	0.168
University studies	62.2	65.2	60.2	0.433
Single	85.2	48.7	51.3	0.869
White collars	69.1	53.6	62.7	0.160

Table 2. Drug use in the total sample and in groups 1 and 2 (excluding RC) and also shown are the *p*-values of the group comparison

Substance	Global sample (n = 230) %	Group 1 (n = 112) %	Group 2 (n = 118) %	p
Cannabis				
Lifetime prevalence	99.1	99.1	99.2	0.970
Last year use	90.0	89.3	90.7	0.725
MDMA				
Lifetime prevalence	96.1	95.5	96.6	0.674
Last year use	89.1	86.6	91.5	0.231
Cocaine				
Lifetime prevalence	90.9	91.1	90.7	0.918
Last year use	63.5	61.6	65.3	0.566
Psilocybin				
Lifetime prevalence	88.3	84.8	91.5	0.114
Last year use	47.4	44.6	50.0	0.416
LSD				
Lifetime prevalence	85.7	83.0	88.1	0.270
Last year use	49.6	45.3	53.4	0.234
Amphetamine				
Lifetime prevalence	85.2	84.7	85.6	0.742
Last year use	60.9	59.8	61.9	0.751
Ketamine				
Lifetime prevalence	66.5	64.3	68.6	0.484
Last year use	38.3	39.3	37.3	0.755
Opium				
Lifetime prevalence	57.4	58.9	55.9	0.646
Last year use	32.6	36.6	28.8	0.263
Salvia divinorum				
Lifetime prevalence	45.2	48.2	42.4	0.374
Last year use	9.1	10.7	7.6	0.417
Mescaline				
Lifetime prevalence	37.0	37.5	36.4	0.868
Last year use	13.5	13.4	13.6	0.971
Ayahuasca				
Lifetime prevalence	36.5	36.6	36.4	0.979
Last year use	20.9	23.2	18.6	0.394
GHB				
Lifetime prevalence	31.7	33.0	30.5	0.681
Last year use	10.4	13.4	7.6	0.153
Heroin				
Lifetime prevalence	30.9	48.7	51.3	0.462
Last year use	14.3	16.1	12.7	0.468

MDMA, methylenedioxymetnamphetamine; LSD, lysergic acid diethylamide; GHB, gamma-hydroxybutyric acid.
Other drugs consumed by the total sample were DMT (28.2%), 5-MeO-DMT (19%), kratom (3.9%), popper (3.5%), *Argyreia nervosa* (2.6%), *Peganum harmala* (2.2%), ibogaine (1.3%), ephedrine (0.9%), methamphetamine (0.9%), morphine (0.9%), nitrous oxide (0.9%), codeine (0.9%), *Datura stramonium* (0.4%), *Amanita muscaria* (0.4%), kanna (0.4%), methadone (0.4%), yopo (0.4%), methylphenidate (0.4%), and methylergometrine (0.4%).

related to their use (23.9%). In addition, they indicated that RC are cheap (20.4%) and easily available in contrast to other illegal substances (13%).

Combined use with other drugs

Regarding the combinations of RC with other drugs, we found that 66.5% of the sample tended to mix RC with alcohol (23% always), 68.6% with cannabis (38.7% always), and 48.3% had combined RC with other kinds of illegal drugs. We did not find differences regarding combinations with other illegal drugs in whole sample; we only found significant differences between groups in the use of RC in combination with alcohol (group 1 = 58.9% *vs* group 2 = 73.7%; $p < 0.05$). The most frequent combinations with other drugs can be seen in Table 4. Only 14.8% of the sample had simultaneously consumed various RC in the same session. Table 4 also shows the combinations between two or more RC. We found significant differences between groups in use of RC combinations, too (group 1 = 24.1 % *vs* group 2 = 8.5%; $p < 0.001$).

Problems associated to RC use and risk reduction strategies

It was observed that the participants' perception of risk of suffering any kind of harm derived from the use of

Table 3.   Lifetime prevalence of RC use in the total sample ($n = 230$) and in groups 1 and 2 and also shown are the *p*-values of the group comparison

RC	Total sample ($n = 230$) %	Group 1 ($n = 112$) %	Group 2 ($n = 118$) %	*p*
2C-B	80.0	84.8	75.4	0.075
Methylone	40.1	52.7	29.7	<0.001
2C-I	39.6	55.4	24.6	<0.001
Mephedrone	35.2	39.3	31.4	0.208
2C-E	25.7	37.5	14.4	<0.001
AMT	16.1	25.0	7.6	<0.001
4-AcO-DMT	13.5	16.1	9.3	0.123
2C-T-2	13.0	18.8	7.6	0.012
2C-D	10.9	15.2	6.8	0.041
DOC	10.9	11.6	10.2	0.726
4-HO-DIPT	7.0	11.6	0.8	0.001
5-MeO-DIPT	6.5	9.8	3.4	0.048
2C-T-7	5.2	8.9	0.8	0.004

2C-B, 4-bromo-2,5-dimethoxyphenethylamine; 2C-I, 2,5-dimethoxy-4-iodophenethylamine; 2C-E, 2,5-dimethoxy-4-ethylphenethylamine; AMT, alpha-Methyltryptamine; 4-AcO-DMT, *O*-acetylpsilocin, psilacetin; 2C-T-2, 2,5-dimethoxy-4-ethylthiophenethylamine; 2C-D, 2,5-dimethoxy-4-methylphenethylamine; DOC, 2,5-dimethoxy-4-chloroamphetamine; 4-HO-DIPT, 4-hydroxy-di-isopropyl-tryptamine; 5-MeO-DIPT, 5-methoxy-diisopropyltryptamine; 2C-T-7, 2,5-dimethoxy-4-*n*-propylthiophenethylamine.
Other RCs consumed by the global sample are MDPV (3.9%), 2C-C (3.5%), butylone (3.5%), MXE (3.5%), 4-FA (3.5%), MDAI (3%), desoxypipradrol (3%), 4-AcO-DIPT (2.6%), 4-HO-MET (2.6%), JWH-018 (2.2%), DOI (2.2%),4-MEC (2.2%), DPT (1.7%), 5-MeO-MIPT (1.7%), 5-MeO-DALT (1.7%), Proscaline (1.7%), 6-APB (1.7%), 4-AcO-MIPT (1.3%), 5-APB (1.3%), 2C-B-Fly (1.3%), 4-HO-MIPT (0.9%), DOM (0.9%), 4-MTA (0.9%), JWH-073 (0.9%), HOT-7 (0.9%), JWH-122 (0.4%), mCPP(0.4%), MBDB (0.4%), 2-DPMP (0.4%), DIPT (0.4%), 25NOMBe (0.4%), MET (0.4%), and 4-EMC (0.4%).

RC was medium (mean = 4.54; SD = 2.18; range scale from 0–10). Table 5 shows the risk reduction strategies employed by users. There were considerable differences regarding the risk reduction strategies employed between both groups depending on the user profile; however, we can say that the overall sample (88.7%) seeks information on the RC before consuming it. Subjects in group 1 obtain RC more frequently from internet, use more information resources, analyses the substance, and use more precise methods of dosing.

Despite these measures, 2.6% of the sample had experienced a health-related problem such as overdose, prolonged undesired effects, or psychotic breakdown; 2.1% had a legal problem; and 3% had experienced issues related to personal relationships. The uncontrollable desire to consume an RC had been experienced by 6.5% of the sample despite the fact that they had planned not to do so (methylone 4% and mephedrone 2.2%). Of the sample, 14.8% would never take an RC again, 2C-I being the least desired substance (3.5%), followed by DOC and mephedrone (both 1.7%). However, 93.3% had not experienced any kind of health issue.

DISCUSSION

This is the first study evaluating the exclusive characteristics of RC user profile and their risk reduction strategies employed in a large sample.

Results show that our sample is socially integrated, with an unemployment rate below the one described in Spain for people aged between 25 and 54 years old (Instituto Nacional de Estadística, 2011). They also have a higher educational level, almost double the level of the general population in 2009 (Instituto Nacional de Estadística, 2010).

Consumption of illegal drugs is similar to the one of a study on drug use patterns in populations attending underground raves in Spain (Fernández-Calderón et al., 2011). In our sample, it was particularly high, probably due to including older subjects (mean age 30 years old) and with more experience in drugs. Nevertheless, although in our sample heroin consumption had occurred at some point in the population's lifetime (30.9%) or last year (14.3%), it should be pointed out that none of the participants were undergoing substance abuse treatment at the time of the survey.

Regarding RC use, most of the substances that had been described in other studies (Schifano et al., 2006; Sanders et al., 2008; Bruno et al., 2012) were present in our sample, in addition to other new compounds. Hallucinogenic phenylethylamines and cathinones were the most commonly used RC. The proportion of 2C-B users (80%) is twice that of the methylone users (40.1%), with methylone being the second most used RC in the sample. This result could reflect the wide expansion of 2C-B in Spain. The average age to begin RC use is 27 years, which could indicate a later use of

Table 4. Proportion of the global sample that combines RCs with other illegal drugs or various RCs in the same session and in groups 1 and 2 and also shown are the *p*-values of the comparison

RC and illegal drugs combinations	Global sample (n = 230) %	Group 1 (n = 112) %	Group 2 (n = 118) %	p
2C-B + MDMA	28.3	14.3	34.4	<0.001
2C-B + amphetamine	7.4	5.4	9.3	0.251
2C-B + LSD	5.7	2.7	8.5	0.057
2C-I + MDMA	4.8	6.3	3.4	0.310
2C-B + ketamine	3.9	1.8	5.9	0.660[a]
RC combinations				
Methylone + mephedrone	3.9	5.4	1.7	0.162[a]
Methylone + 2C-I	2.6	5.4	0.0	0.012[a]
Methylone + 2C-B	2.6	4.5	0.8	0.085[a]

2C-B, 4-bromo-2,5-dimethoxyphenethylamine; MDMA, methylenedioxymetnamphetamine; 2C-I, 2,5-dimethoxy-4-iodophenethylamine; DOC, 2,5-dimethoxy-4-chloroamphetamine.

Other combinations of illegal drugs and RCs consumed by the sample are methylone + amphetamine (2.2%), 2C-E + MDMA (1.8%), 2C-D + MDMA (1.3%), methylone + MDMA (1.3%), mephedrone + amphetamine (1.3%), 2C-I + amphetamine (1.3%), 2-CI + LSD (1.3%), 2C-B + GHB (1.3%), 2C-B + psilocybin (0.9%), 4-MEC + MDMA (0.9%), methylone + ketamine (0.9%), 2C-E + LSD (0.9%), 2C-E + amphetamine (0.9%), AMT + amphetamine (0.9%), 4-AcO-DMT + MDMA (0.9%), 2-CT-7 + MDMA (0.9%), mephedrone + cocaine (0.9%), JWH-018 + N$_2$O (0.9%), 2C-B + popper (0.4%), 2C-I + ketamine (0.4%), 2C-I + cocaine (0.4%), 2C-E + cocaine (0.4%), butylone + MDMA (0.4%), 4-EMC + MDMA (0.4%), 4-FMA + MDMA (0.4%), 2C-T-2 + MDMA (0.4%), 5-MeO-DIPT + MDMA (0.4%), AMT + cocaine (0.4%), AMT + ketamine (0.4%), AMT + psilocybin (0.4%), AMT + opium (0.4%), 2C-B + opium (0.4%), 2C-E + psilocybin (0.4%), mephedrone + LSD (0.4%), MXE + ketamine (0.4%), MXE + amphetamine (0.4%), 4-AcO-DMT′ + amphetamine (0.4%), DOC + amphetamine (0.4%), 4-FA + GHB (0.4%), mephedrone + ketamine + cocaine (0.4%), and 2C-B + LSD + heroine (0.4%).

Other combinations of RCs consumed by the sample are methylone + 2C-E (1.3%), 2C-I + 2C-B (1.3%), 4-AcO-DMT + 4-AcO-DIPT (1.3%), 2C-B + DOC (1.3%), mephedrone + 2C-B (0.9%), mephedrone + 2C-E (0.9%), 2C-B + 2C-D (0.9%), mephedrone + methylone + 2C-I (0.9%), methylone + MDAI (0.4%), methylone + 5-MeO-DIPT (0.4%), methylone + AMT (0.4%), methylone + 4-FA (0.4%), methylone + butylone (0.4%), butylone + 2C-E (0.4%), 2C-E + 4-AcO-DMT(0.4%), 2C-I + 4-AcO-DMT (0.4%), 2C-I + 5-MeO-DIPT (0.4%), 2C-I + 4-AcO-DIPT (0.4%), 4-AcO-DIPT + AMT (0.4%), AMT + DPT (0.4%), 4-HO-MET + mephedrone (0.4%), 2-CT-2 + 2-CT-7(0.4%), 5-MeO-DALT + 2C-C (0.4%), MDAI + 5-APB (0.4%), methylone + 5-APB + 6-APB (0.4%), and methylone + 4-MEC + 4FMA (0.4%).

[a]Fisher's test.

these substances in relation to other legal or illegal drugs (mean age in Spain ranges from 16 to 22 years), except for hypnosedatives (mean age 34.5 years) (PNSD, 2011). There are significant differences regarding number of different RC used by each group (4.6 *vs* 2.6). These differences are also reflected in the percentage of users who have consumed each RC shown in Table 3.

The combination of new substances with other drugs has barely been described in the literature, and there is little data about mixing mephedrone or 2C-B with other substances (Lea *et al.*, 2011; Van Hout and Brenan, 2012; Caudevilla-Galligo et al., 2012). In our sample, however, the prevalence of these kinds of combinations was quite high, with alcohol (65.5%) and cannabis (68.6%) being the substances that were most used, followed by the combination of 2C-B and MDMA (28.3%). Regarding the mixture of two or more RC, methylone was the substance most often used. This could be due to the similarity of its subjective effects to those of MDMA, which has been reported as being the most consumed substance in combination with other drugs (Grov *et al.*, 2009).

Risk-reduction strategies employed by users have barely been described in the literature (Ramsey *et al.*, 2010; Winstock *et al.*, 2010b), and with the exception of our study, they have never been evaluated in RC users. We observed that the perception of experiencing any kind of harm was medium (mean = 4.5 (SD = 5.2); max = 10, min = 0), so it is probable that risk reduction strategies employed by the whole sample could directly influence the fact that most people (97.4%) had never suffered any kind of health problem related to RC use.

With respect to the RC user profiles, we did not observe the profile described by Bruno *et al.* (2012), who distinguished between users of stimulants and of hallucinogenic substances. In our sample we found a poly-consumption pattern for all types of substances. Looking at the groups profiles, we found that users in group 2 have less experience in RC use (2.6 *vs* 4.6); they usually acquire the RC through close friends, and those friends are an important information source for them. Also, they take doses that have been calibrated by others or dosage by sight. Group 1 has more psychonautic and therapeutic motivations to RC use and seeking information on specialist websites, books, and NGOs dedicated to risk reduction. They take an active role in buying RC through the Internet, analyzing drugs, and calibrating doses using safe methods

Table 5. Risk-reduction strategies used by subjects in the total sample and in groups 1 and 2 and also shown are the *p*-values of the comparison

Risk-reduction strategies	Global sample (n = 230) %	Group 1 (n = 112)) %	Group 2 (n = 118) %	p
Source of acquisition				
Close friends	79.6	45.4	54.6	0.046
Internet	42.6	74.5	25.5	<0.001
Drug dealers	10.4	7.1	13.6	0.112
Other[a]	2.2	1.1	2.9	0.051
Sources of information				
Forums	77.8	100.0	0.0	<0.001
Internet (specialized Web pages)	48.7	93.7	59.3	<0.001
Books	33.5	46.4	21.2	<0.001
NGOs	26.1	38.4	14.4	<0.001
Friends	22.6	11.6	33.1	<0.001
Health professionals	6.5	7.1	5.9	0.710
Scientific articles	2.2	3.6	0.0	0.055[b]
Communication media	0.9	0.0	1.7	0.492[b]
Substance analysis				
Usually analyzed substance	49.1	68.8	30.5	<0.001
Methods of dosing				
Precision scale	52.6	72.3	33.9	<0.001
Dosage by other people	36.5	22.3	50.0	<0.001
By sight	23.5	13.4	33.1	<0.001
Diluted in water	11.3	17.9	5.1	0.002
Other[c]	3.9	4.5	3.4	0.743[b]

[a]The category "Other" includes purchases from Head Shops (0.9%) and chemist or self-production (1.2%).
[b]Fisher's test.
[c]The category "Other" includes breaking up pills and increasing dosage according to effects (2.2%), prior testing of dosage thresholds according to erowid.org (0.9%), using the substances in powdered form (0.4%), and impregnation with drying agents (0.4%).

such as diluting drugs in water or calibrating with a precision scale. As Davey *et al.* (2012) have suggested, group 1 can be considered e-psychonauts who have extensive experience with these kinds of drugs and belong to an online users' community where all kinds of information related to the use of RC is shared. According to the EMCDDA's definition of the term "psychonaut", they have a particular interest in exploring altered states of consciousness through experimenting with hallucinogens and other psychoactive drugs (EMCDDA, 2004). Members from virtual communities, like some group 1 members, have an extensive education to avoid taking the risks that uneducated individuals take with drug use and have a raised concern about unknown and potentially harmful products being sold without warning (Davey *et al.*, 2012). The fact of knowing exactly what a product contains is what makes the users of RC not use other NPS products. Therefore, this profile differs considerably from that of users of other NPS products, such as "Party pills" or "Spice drugs," who are unaware of the exact composition of the products and, as a result, do not know the effects and dose–response that can be expected. However, we found that group 1 self-administered combinations of RC, a practice on which very little information is found on the Internet sites and forums. Consequently, they were fully aware that,

taking certain combinations, they were experimenting as "laboratory guinea pigs."

These different profiles are consistent respectively with users of group 1 described by Zukiewicz-Sobczak *et al.* (2012), where experimenters were interested in the effects of various psychoactive substances out of curiosity, and group 3 of this study was composed of recreational users who use drugs occasionally as just another attraction for the weekend. Group 1 in our study also is similar to the subgroup described by Sanders *et al.* (2008) in which the members had extensive experience in RC consumption; they knew exactly what they were taking, routes of administration, and expected effects.

Our results show that 77.8% of the sample consulted information prior to taking an RC, with principal motivations of use being experimental or psychonautic, and that the main reason to believe that the use of these substances could become more extensive was based on the diversity of new effects they produce. We should, therefore, take into account that information available on forums and Internet, such as trip reports, and the users' own preferences could play a key role in promoting the expansion and popularity of one particular substance, at least in the users that actively search for new substances (group 1). Only 10.4% of the sample accessed RC via unknown dealers.

However, analysis of pills bought as MDMA in the black market during 2011 in Spain revealed 2C-B, 2C-I, and mephedrone being their active components (Energy control, 2011). It is therefore possible that a considerable number of individuals have used RC without knowing. In Spain, 2C-B, 2C-I, and mephedrone are some of the few RC that are currently banned (MSC, 2002b; MSC, 2002a; MSC, 2011). Previous work has reported the presence of mephedrone in pills sold as MDMA in The Netherlands and Ireland. This is because when mephedrone was banned, the stock had to be introduced in the black market (Brunt et al., 2011; Van Hout and Brenan, 2012). This, along with the work of Winstock et al. (2010a, 2010b) after mephedrone was made illegal, questions whether the legislative control of these substances affects their availability and use and manifests potential collateral implications such as an increase of health risks, as users do not know what they are buying.

The principal limitations are the small sample size that could not reflect the general population and that the sample was self-determined. However, convenience samples have been used in other similar studies to identify the frequency and patterns of use of new drugs of abuse (McCambridge et al., 2005; González et al., 2006; Winstock et al., 2011). In addition, the questionnaire had a set number of boxes to indicate the RC they had consumed during the user's lifetime. As a consequence, by restricting the number of RC to a maximum of 13, there was a possible ceiling effect with respect to the quantity and variability of RC consumed by the sample. It is quite possible that more RC had been taken. Similarly, there might have been a lack of accuracy at the time of remembering all the combinations with other substances consumed throughout their lifetime, and there could be a tendency in more experienced users to remember only the most exceptional combinations.

In conclusion, there is an RC user profile that differs from other NPS user profiles. Specifically, those RC users who are forum members use more information sources, and they know where to buy and employ strategies to reduce the risks associated with consumption, reflecting the extensive knowledge about drugs they have.

This study provides insight into the characteristics of RC consumers and illustrates the relevance of forums when providing information on new substances and on strategies to reduce the risks associated with drug use. Future studies should confirm whether the characteristics of this sample can be generalized to other consumer groups. In addition, there is an urgent need for taking the use of these new substances to the laboratory in order to assess the real risks that they could present on consumers' health.

CONFLICT OF INTEREST

The authors have declared that there is no conflict of interest.

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