Tables: 2

Figures: 1

Harm Reduction strategies and drug-related negative consequences in the dance music scene: the moderating role of polysubstance use

Running head title: Simultaneous polysubstance use, harm reduction strategies and drug-related negative consequences in the dance music scene

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Harm Reduction strategies and drug-related negative consequences in the dance music scene: the moderating role of polysubstance use

Abstract

Introduction: Although simultaneous polysubstance use (SPU) is associated with greater harms than concurrent polysubstance use (CPU), no previous research has examined the effectiveness of harm reduction strategies in reducing drug-related harms in people who use drugs simultaneously and whether these strategies have a differential impact on drug-related negative consequences according to SPU patterns. **Objectives:** to examine the relationship between SPU patterns, harm reduction strategies and drug-related consequences experienced among people who attend dance music settings, and to examine the moderating role of SPU patterns in the relationship between harm reduction strategies and drug-related negative consequences **Methods:** a web-based survey was used to gather data from 649 substance-using attendees at dance music settings (mean age=26.2, 68% male). The survey collected data on: settings of last party attended, drug use, harm reduction strategies used and drug-related negative consequences experienced during last party attended. **Results:** Latent class analysis identified two SPU profiles: Moderate SPU and Severe SPU. Participants in the severe SPU class experienced more drug-related negative consequences at their last party in comparison with those in the moderate SPU class. Regardless of SPU pattern, avoiding binge drinking was related to fewer drug-related negative consequences, whilst avoiding mixing stimulants was related to fewer drug-related negative consequences only among those participants in the severe simultaneous polysubstance use class. **Conclusions:** These findings could help to inform the design of messages and tailored interventions aimed at minimizing drug-related negative consequences among people who use multiple substances in the dance music scene.

Keywords: simultaneous polysubstance use, polysubstance use patterns, dance music scene, harm reduction strategies, drug-related negative consequences.

Introduction

Polysubstance use is prevalent among attendees at dance music settings such as nightclubs, music festivals, and electronic dance music parties (Fernández-Calderón et al., 2011; Palamar & Keyes, 2020; Sañudo et al., 2015). Polysubstance use has been defined (Connor et al., 2014; Hakkarainen et al., 2019) both as the consumption of two or more substances in different sessions of substance use, including past month or past year (concurrent polysubstance use-CPU), and the use of multiple substances during a single consumption session (simultaneous polysubstance use-SPU).

Previous studies have consistently shown that polysubstance use is associated with greater negative consequences than single substance use (Baggio et al., 2014; Morley et al., 2015), and SPU is more harmful than CPU (Davis et al., 2019). Harm reduction strategies (HRS, i.e., individual practices aimed at reducing drug-related negative consequences) such as avoiding mixing stimulants and planning drug use sessions, are widely employed by people who use multiple drugs in the dance music scene (Fernández-Calderón et al., 2013; 2014). It has been demonstrated that HRS use is linked to a decrease in health-related negative consequences in CPU (Vera et al., 2020). However, in spite of the fact that SPU is associated with greater harms than CPU, to our knowledge, no previous research has examined the effectiveness of HRS in reducing drug-related harms among people who use multiple drugs simultaneously.

The effectiveness of a specific HRS in reducing drug-related negative consequences may be related to both the nature of the strategy and the pattern of substance use. Nonetheless, as far as we are aware, no previous studies have examined whether a specific HRS could have a differential impact on drug-related consequences according to SPU patterns.

Thus, we aimed to i) examine the relationship between SPU patterns, HRS and drug-related negative consequences experienced among people who attend dance music settings, and ii)

examine the moderating role of SPU patterns in the relationship between HRS and drug-related consequences.

Material and Methods

Participants and Procedure

We used an online survey to access 1345 participants who reported use of at least one substance during the past year. The survey was hosted by the Energy Control website (a harm reduction project), and promoted through its social network. Other harm reduction organizations in Spain, Mexico, Uruguay, Colombia, Costa Rica, Ecuador, US, Canada, and Australia used their social networks to promote the study. From the initial 1345 participants, we selected 649 who reported that the last party they attended was a rave, a nightclub, non-electronic music festival (e.g., pop, rock) or an electronic music festival. Thus, the sample of this study was conceptualized as attendees at dance music settings. Their mean age was 26.2 years (*SD*=6.9), 68.0% were male, 80.3% self-identified as heterosexual, 11.4% bisexual, and 8.0% homosexual. More than a half (56.9%) reported residing in Spain, 10.3% in Argentina, 6.6% in Australia and the remaining 26.2% in other countries (mainly European and South American countries). Around one out of four participants (23.1%) were studying at the time of completing the survey, 37.1% were employed and 26.5% were both studying and employed. More than a third (36.2%) had completed university studies and 59.8% had completed high school or equivalent studies.

Before completing the survey, the participants provided informed consent and were informed about the study aims and its confidentiality. The Ethics Committee of the University of Almería approved the research protocol of this study.

Instruments

The on-line questionnaire, available in Spanish and English, gathered information on socio-demographic characteristics, setting of last party attended, and the use (yes/no) of 14 drugs and

new psychoactive substances during the last party attended. Participants were asked about the use (yes/no) of five HRS during the last time they partied: avoiding binge drinking, planning the drug use sessions instead of using what someone offers, avoiding mixing stimulants, avoiding mixing depressants, and setting a limit on the quantity of drug to be consumed. Finally, participants were asked to indicate if they had experienced (yes/no) 14 physical/cognitive effects the last time they partied or during the subsequent hours: memory impairment, stomach pain, tachycardia, bad mood, headache, nausea/vomiting, insomnia, loss of consciousness, hangover, respiratory symptoms, chest pain, drop in blood pressure, sexual difficulties and injuries/fractures while under the influence of drugs. Affirmative answers were summed to reflect the total number of drug-related consequences experienced during the last party attended.

Data Analysis

Latent class analysis (LCA) was conducted to identify SPU profiles, using as indicators those drugs reportedly used by at least 10% of participants during the last party attended: alcohol, cannabis, ecstasy, powder cocaine, amphetamine, ketamine, LSD and poppers. Models with one to five class solutions were considered. The best model was determined using the Bayesian Information Criteria (Vermunt & Magidson, 2005). LCA was conducted with *Latent Gold 4.5*.

Negative binomial regression analyses were conducted to test the association between HRS and drug-related negative consequences. The COUNTFIT procedure (Long & Freese, 2014) was used to check the relative appropriateness of negative binomial regression in comparison with other count regression models. The regression model included the five dichotomous HRS predictors and was adjusted for age, gender, and SPU pattern. Five interaction terms were also tested to assess whether the relationship between HRS and drug-related negative consequences was moderated by SPU pattern. To deal with multicollinearity issues, the significance of interaction effects were tested in simple models that included only the variables involved in the

interaction. The final model only included those interactions that were found to be significant in the simplest models.

Results

The LCA revealed that the five explored solutions showed a good fit (p>.05). The 2-class model was identified as the model with best fit and the most parsimonious (*BIC*=5132.51, Classification error=.106). Participants were assigned to the classes with the highest posterior probability. The average probabilities of classification were .905 (Class 1) and .823 (Class 2).

Most of the participants (86.9%) were assigned to Class 1 (Table 1). No significant associations were observed between SPU pattern and alcohol use during the last party attended. For the remaining substances, Class 2 exhibited higher occurrence than Class 1. The mean number of substances reportedly used by participants at the last party attended was significantly higher in Class 2 than Class 1. Thus, Class 1 was labelled Moderate SPU (MSPU) and Class 2, Severe SPU (SSPU). Participants in the SSPU class experienced more drug-related negative consequences than those in the MSPU class. Further, no significant associations were found between SPU patterns and HRS use, whilst no significant differences were observed in the mean number of HRS used.

[Table 1 near here]

Females, younger participants and members of the SSPU class reported more consequences than males, older participants, and members of the MSPU class, respectively (Table 2). Those who avoided binge drinking were less likely to experience drug-related negative consequences than those who did not (*IRR*=.82, *CI*=.72-.93). A significant interaction was found between SPU pattern and the avoidance of mixing stimulants (Figure 1). The effect of the avoid mixing stimulants strategy was only significant among those in the SSPU class (*IRR*=.71, *CI*=.52-.97). The members of the SSPU class who avoided mixing stimulants at their last party attended

experienced fewer drug-related consequences than those in the SSPU who did not use this strategy.

[Table 2 about here].

[Figure 1 about here].

Discussion

To our knowledge, this is the first study to explore the relationship between HRS use and drug-related negative consequences in people who use multiple drugs simultaneously and who attend dance music settings, and is also the first to examine the moderating role of SPU patterns in this relationship. Our results revealed that the avoidance of binge drinking, regardless of SPU pattern, was related to fewer harms, whilst the avoidance of mixing stimulants was related to fewer drug-related negative consequences, but only among those participants identified as SSPU.

Although alcohol is regarded as the ever-present drug in polysubstance use repertories (particularly in recreational settings) its role in polysubstance use has been overlooked (EMCDDA, 2009). Combining alcohol with other substances (e.g., marijuana or cocaine) produces more negative effects than the consumption of each drug separately (Cummings et al., 2019; Lee et al., 2017). Moreover, intensive alcohol use reduces the control over the intake of other drugs, both in terms of use and quantity consumed (EMCDDA, 2009). Our results showed that the avoidance of binge drinking was related to fewer drug-related negative consequences. Whilst this could be attributed to the fact that binge drinkers experience more negative consequences than non-binge drinkers (Kuntsche et al., 2017), it could also be explained by the fact that those polysubstance users that are less intoxicated with alcohol have a higher degree of control over their use of other substances. These results highlight the importance of promoting the avoidance of binge drinking among people who use multiple drugs in the dance music scene.

The need for medical attention due to stimulant-induced agitation is prevalent among partygoers visiting emergency medical services (Chhabra et al., 2018; Friedman et al., 2020). Similar to previous studies (Fernández-Calderón et al., 2019), we found that the avoidance of mixing stimulants was related to fewer harms. However, an interesting result to emerge from our study was that this protective effect was only found for those participants with a severe pattern of SPU, which highlights the importance of promoting this strategy among attendees at dance music events who combine several substances.

Limitations in this study include its non-probabilistic sampling and cross-sectional design employed, which limits both the generalizability of our results and the ability to interpret the findings in terms of predictability. Moreover, we did not ask our participants about their motives for combining substances. Previous research in the field of alcohol use (e.g., Bravo et al., 2015) has shown that the motives for alcohol use are associated with the HRS employed and the negative consequences experienced. Thus, future research should consider motives for combining drugs to determine whether these have an impact on HRS use and the negative consequences experienced.

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Disclosure of interest

The authors report no conflict of interest

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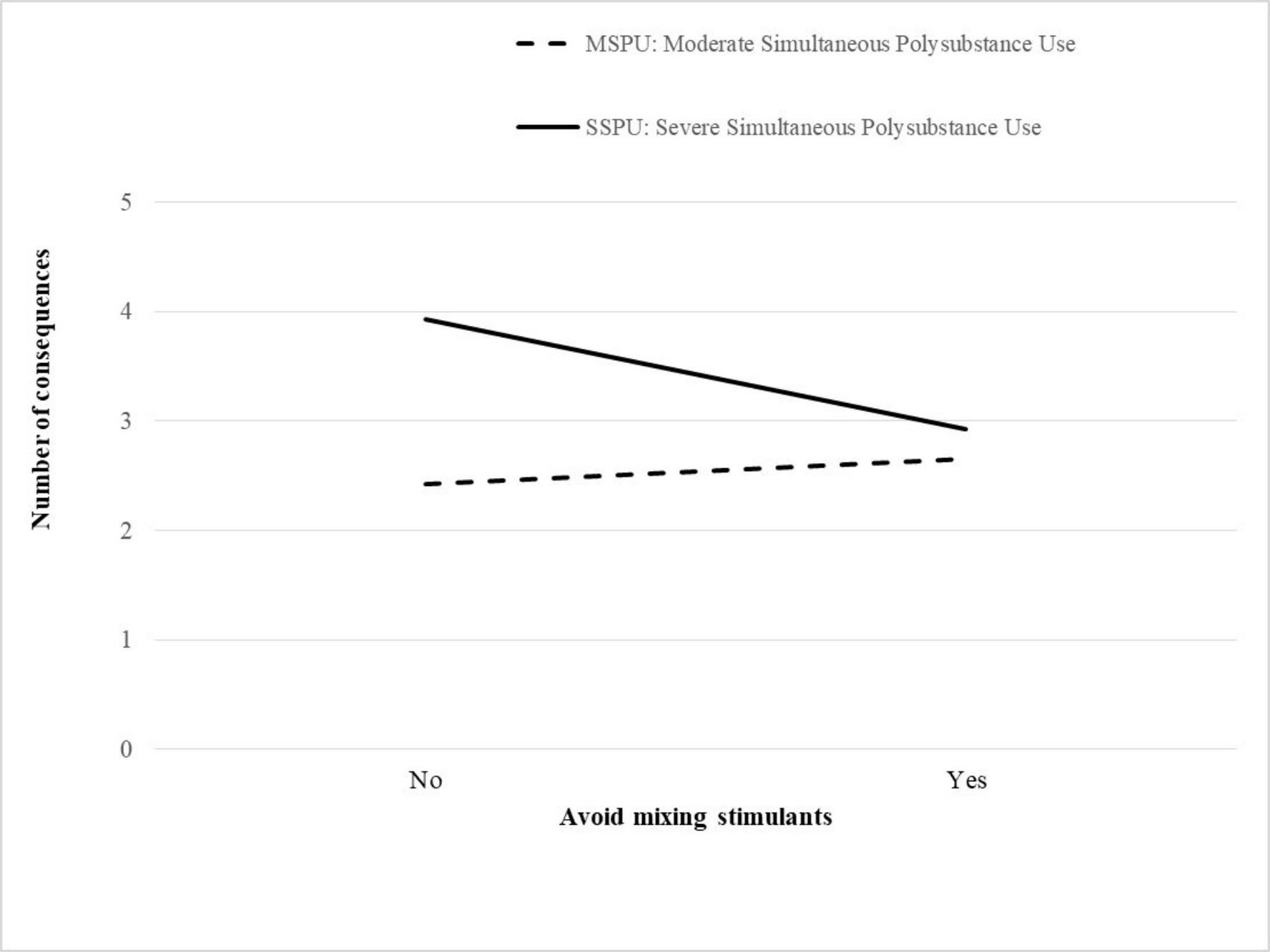

MSPU: Moderate Simultaneous Polysubstance Use
SSPU: Severe Simultaneous Polysubstance Use
Number of consequences
5
4
3
2
1
0
No
Yes
Avoid mixing stimulants

Table 1. Drug use, harm reduction strategies used and drug-related negative consequences experienced during the last party attended

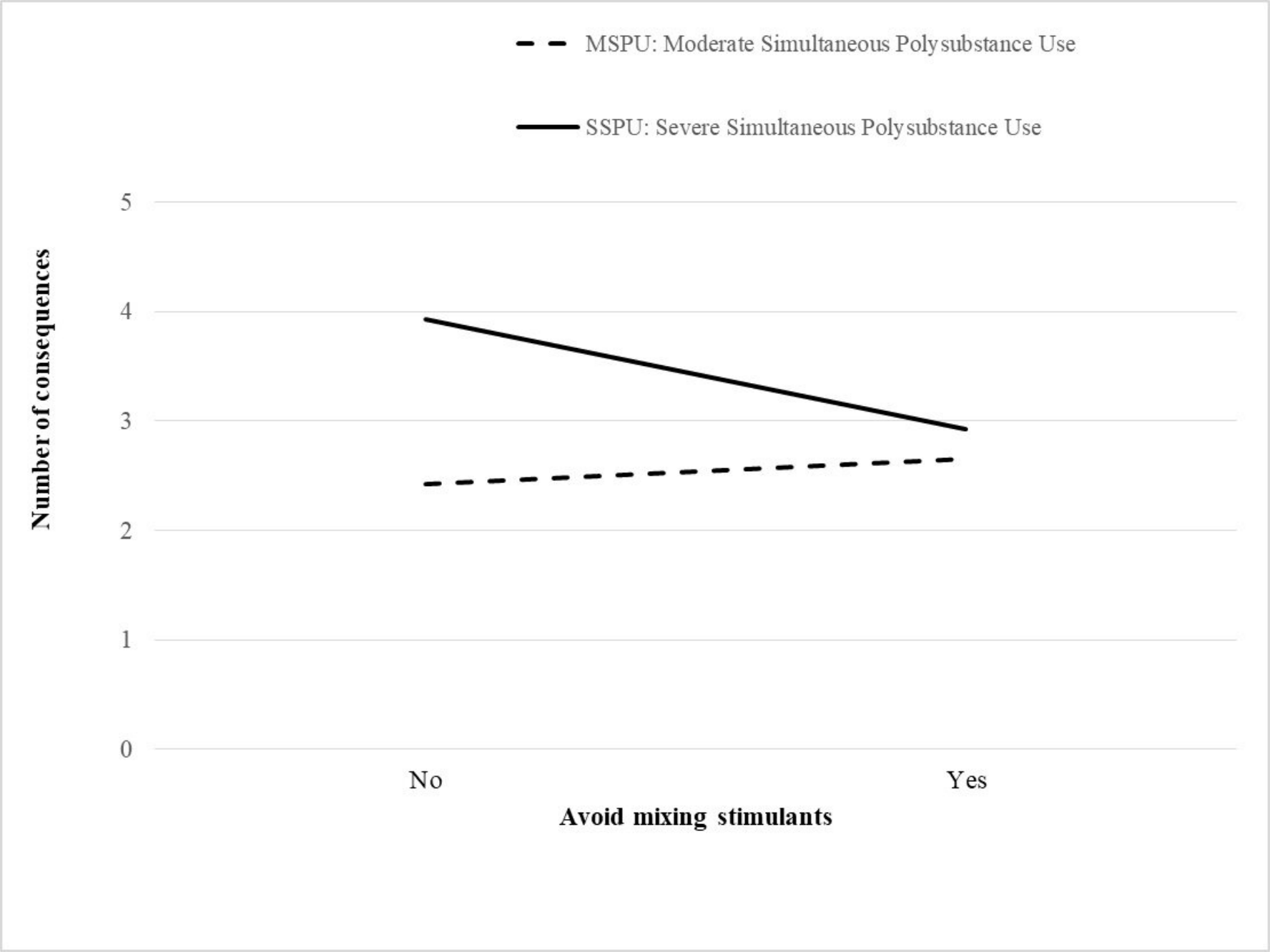
	Total sample (n=649)	**MSPU (n=564, 86.9%)**	**SSPU (n=85, 13.1%)**	χ^2/t
Drugs used (%)				
Alcohol	86.1	86.2	85.9	ns
Ecstasy	69.3	65.4	95.3	<.001
Cannabis	67.5	66	77.6	.032
Amphetamines	33.9	28.9	67.1	<.001
Powder cocaine	25.6	21.5	52.9	<.001
LSD	14	10.3	38.8	<.001
Ketamine	10.9	3.4	61.2	<.001
Poppers	10.3	3	58.8	<.001
Harm reduction strategies (%)				
Plan the drug use session	67.5	68.6	60	ns
Limit the quantity consumed	65.6	67	56.5	ns
Avoid binge drinking	54.5	55.1	50.6	ns
Avoid mixing stimulants	45.6	44.1	51.8	ns
Avoid mixing depressants	45.1	46.1	42.4	ns
Mean number (*SD*) of harm Reduction Strategies used at last party	6.39 (2.95)	6.42 (2.96)	6.19±2.93	ns
Mean number (*SD*) of drug-related negative consequences experienced at last party	2.67 (2.17)	2.55 (2.12)	3.52 (2.28)	<.001
Mean number (*SD*) of drugs used at last party	3.35 (1.49)	2.98 (1.09)	5.82 (1.46)	<.001

MSPU: Moderate Simultaneous Polysubstance Use; SSPU: Severe Simultaneous Polysubstance Use; LSD: Lysergic acid diethylamide

Table 2. Negative binomial regression model for drug-related negative consequences and harm reduction strategies

Predictor	*b* (*SE*)	*IRR* (95% *CI*)	*p*
Intercept	**1.63 (0.13)**	**5.13 (3.96, 6.65)**	**<.001**
Sex (Male = 1)	**-0.36 (0.06)**	**0.70 (0.62, 0.79)**	**<.001**
Age	**-0.01 (0.00)**	**0.99 (0.98, 0.99)**	**.001**
SPU pattern (SSPU = 1)	**0.41 (0.10)**	**1.50 (1.24, 1.82)**	**<.001**
Avoid binge drinking (yes = 1)	**-0.20 (0.07)**	**0.82 (0.72, 0.93)**	**.002**
Plan sessions (yes = 1)	-0.06 (0.07)	0.94 (0.82, 1.08)	.363
Limit use (yes = 1)	-0.02 (0.07)	0.98 (0.85, 1.13)	.761
Avoid mixing depressants (yes = 1)	0.12 (0.07)	1.13 (0.99, 1.29)	.064
Avoid mixing stimulants (yes = 1)	0.06 (0.07)	1.06 (0.92, 1.23)	.339
SPU pattern x Avoiding mixing stimulants	**-0.34 (0.16)**	**0.71 (0.52, 0.97)**	**.031**

SSPU: Severe Simultaneous Polysubstance Use; IRR: incidence rate ratios.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