



Synthetic Cannabinoids (SCs) in Metaphors: a Metaphorical Analysis of User Experiences of Synthetic Cannabinoids in Two Countries

Zsuzsa Kaló¹ · Szilvia Kassai^{1,2} · József Rácz^{1,3} · Marie Claire Van Hout⁴ 

Published online: 06 August 2018

© The Author(s) 2018

Abstract

New psychoactive substances (NPS) remain a global public health and clinical challenge. Popular NPS include synthetic cannabinoids (SCs). A conceptual metaphorical analysis of user experiences of SCs was conducted in two European countries (Western and Central European). Metaphors are increasingly used to better understand drug user experiences and as medium to inform and guide clinical responses. Semi-structured interviews with 12 SC users were conducted in Hungary ($n = 6$) and Ireland ($n = 6$). Thematically segmented texts of SC usage (1) motivation, (2) effects, (3) consequences and (4) the setting were selected. A systematic analysis of conceptual metaphors was conducted on the selected texts. The conceptual target and source domains of the experiences of SC usage (motivation, effects, consequences) were analysed. Four conceptual source domains were found in all of the segmented and analysed narratives of psychological factors (motivations, effects, consequences): change in the vertical perception, perceiving that SC is everywhere, feeling disconnected, recognition of lack of control and identifying the SC as a destroying entity. The conceptual metaphors reflect how users perceive experiences of SC use, the discrepancy between the experience of embodiment and disembodiment. This study provides clinicians with an insight into the experiences of SC motivations, effects and consequences and can be used to inform and guide clinical and therapeutic responses in the support of those recovering from SC dependence.

Keywords New psychoactive substances (NPS) · Synthetic cannabinoids (SC) · Metaphor · Conceptual metaphor · Systematic metaphor analysis · User experiences

✉ Marie Claire Van Hout
m.c.vanhout@ljmu.ac.uk

Zsuzsa Kaló
kalo.zsuzsa@ppk.elte.hu

Szilvia Kassai
kassai.szilvia@ppk.elte.hu

József Rácz
racz.jozsef@ppk.elte.hu

Extended author information available on the last page of the article

New psychoactive substances (NPS) remain a global public health and clinical challenge (Gunderson et al. 2012; Spaderna et al. 2013; Corazza et al. 2013; EMCDDA 2015; Van Hout and Hearne 2017; Kassai et al. 2017a; Dolengevich-Segal et al. 2017; Barnard et al. 2017). The United Nations Office on Drugs and Crime (UNODC) defines NPS as ‘substances of abuse, either in a pure form or a preparation, that are not controlled by the 1961 Single Convention on Narcotic Drugs or the 1971 Convention on Psychotropic Substances, but which may pose a public health threat’ (UNODC 2013). This broad NPS concept encompasses not only new compounds but also emerging trends in available substances, new contexts and routes of use and diffusion (Dolengevich-Segal et al. 2017). The number and range of NPS continue to increase globally. The World Health Organisation (WHO) indicated a rise of 55% in newly identified NPS in 2015, with the Early Warning System (EU-EWS) in Europe detecting 100 newly identified NPS in 2015. By 2016, over 560 NPS were under surveillance by the European Monitoring Centre for Drugs and Drug Addiction (UNODC 2013; Dolengevich-Segal et al. 2017; Barnard et al. 2017; EMCDDA 2015).

Synthetic Cannabinoids (SC)

NPS are marketed as illicit drug replacements, but carry user risk and harm due to the lack of information on toxicology and content (EMCDDA 2015). One such NPS are the synthetic cannabinoids (SCs) known as *Spice*, *K2*, *Kronic* (Bright et al. 2013; Baumann et al. 2014; Fantegrossi et al. 2014; Zawilska and Wojcieszak 2014), intended to replace natural cannabis and generally sold as herbal smoking mixtures. SCs emerged in Europe as early as 2004 (Griffiths et al. 2010; Schifano et al. 2009). Most prevalent synthetic cannabinoids compounds are CP 47,497-C8, JWH-081, JWH-250, JWH-018 and JWH-073 (Gunderson et al. 2012; Zawilska and Wojcieszak 2014). New-generation SCs include the hexyl homolog JWH-019 (Dresen et al. 2011), the aminoalkylindoles JWH-073 (Lindigkeit et al. 2009), JWH-250 (Westphal et al. 2010) and JWH-398 (Hudson et al. 2010) and JWH-015, JWH-122, HU-210 and AM-694 (EMCDDA 2009; Ernst et al. 2011). More recently, 5F-AKB48 and 5F-PB-22 have been detected in both seizures and fatalities (Roussel et al. 2015; Van Hout and Hearne 2017). These synthetic psychoactive compounds are sprayed or added to the herbal mixtures (Uchiyama et al. 2010) generally sold in metal foil sachets containing 1–3 g of dried leaves, resin or flowers (Dresen et al. 2011; Zuba et al. 2011; Kikura-Hanajiri et al. 2011; Zawilska and Wojcieszak 2014). Labelling on these herbal products often denotes ‘not for human consumption’ or ‘for aromatherapy only’ (Zawilska and Wojcieszak 2014). SCs in contrast to natural cannabis or phytocannabinoids (delta-9-tetrahydrocannabinol or THC) which are partial agonists are potent high efficacy cannabinoid receptor full agonists (Lindigkeit et al. 2009; Vardakou et al. 2010; Tuv et al. 2012). Prevalence data reports on use of SCs in adolescents and young adults (primarily male) estimated to be around 10% (Hu et al. 2011; Forrester et al. 2011; Vandrey et al. 2012), with global data suggesting lifetime use is higher (16.8%) (Winstock and Barratt 2013).

Motivation to Use and Effects of SC

Motivations to experiment and use SCs centre on their availability, low pricing and inability to be detected in standard drug testing (Castellanos et al. 2011; Meshack et al. 2013; Arfken et al.

2014; Van Hout 2017). SC users report on euphoric pleasurable effects both similar to natural cannabis and distinct to SCs (drowsiness, time distortion, inability to think clearly, hallucinations) and general use for intoxication and relaxation purposes (Schneir et al. 2011; Fattore and Fratta 2011; Vandrey et al. 2012; Barratt et al. 2013; Soussan and Kjellgren 2014; Bonar et al. 2014; Van Hout and Hearne 2017; Kassai et al. 2017a). Decisions to use herbal mixtures are also grounded in a perception of safety (Fattore and Fratta 2011; Vandrey et al. 2012; Van Hout and Hearne 2017).

In comparison to natural cannabis, available literature indicates that more unpredictable and adverse symptomatology is reported by users (Bonar et al. 2014; Castaneto et al. 2014; Fantegrossi et al. 2014; Van Hout and Hearne 2017; Kassai et al. 2017a). Users describe intense and rapid trajectories of SC use from positive toward the negative and with dependent resulting in severe psychopathological and withdrawal symptoms (Zimmermann et al. 2009; Van Der Veer and Friday 2011; Nacca et al. 2013; Macfarlane and Christie 2015; Bilgri 2016) and solitary daily use (Van Hout and Hearne 2017; Kassai et al. 2017a). Continued and compulsive use characterized by craving and multiple re-dosing, despite fear around psychotic and other unpleasant effects (panic, paranoia, aggression, chest pain, palpitations, anxiety, insomnia) is common (Vandrey et al. 2012; Winstock and Barratt 2013; Barratt et al. 2013; Fattore 2016; Van Hout and Hearne 2017; Kassai et al. 2017a).

Emergency hospital presentations are characterised by patients presenting with panic attacks, agitation, paranoid ideation, tachycardia, nausea, psychotic reactions and hallucinations post SC use (Sobolevsky et al. 2010; Vearrier and Osterhoudt 2010; Forrester et al. 2011; Castellanos et al. 2011; Every-Palmer 2010, 2011; Schneir et al. 2011; Bebart et al. 2012; Spaderna et al. 2013). Winstock et al. (2015), in their study on patients seeking emergency medical treatment following SC use, with the relative risk of severity of side effects estimated to 30 times greater than natural cannabis. Clinical treatment of acute intoxication generally remains symptomatic and short (intravenous saline and benzodiazepines) and targeted to deal with agitation, tachycardia and nausea lasting up to 24 h (Castaneto et al. 2014; Fattore 2016). Adverse medical events caused by SC use include hyperemesis, kidney failure, seizures, cardiovascular events and psychiatric presentations (Tait et al. 2016). Anxiety and psychotic symptoms following acute intoxication reportedly last several days to weeks (Every-Palmer 2011; Bassir Nia et al. 2016), and in some studies, deteriorate and persist subsequent to the SC episode (Müller et al. 2010; Hurst et al. 2011; Van Der Veer and Friday 2011; Tung et al. 2012; Van Hout and Hearne 2017). Kassai et al. (2017b), in their identity work on SC users, illustrate how SC experiences are similar to traumatic experiences, representing additional difficulties in recovery. Reviews indicate that SCs can exacerbate psychotic symptoms in previously stable individuals or trigger new onset psychosis in those with no previous history of psychosis (Fattore 2016). In terms of treating dependence, patients with SC withdrawal symptoms often require intense medical support and admission to inpatient detoxification (Macfarlane and Christie 2015; Van Hout and Hearne 2017; Van Hout 2017).

Metaphors in Qualitative Drug Research

Metaphors are increasingly used to better understand drug user experiences and as medium to inform and guide clinical responses. Participants describe their drug-related experiences and a myriad of metaphors are recognizable in their depictions. Lakoff and Johnson (2008), in their conceptual metaphor theory, give a description of the metaphor as a common everyday

linguistic practice that is not only present in the literary language as a rhetorical instrument. Moreover, metaphorical expressions are part of the language we live by, which are detectable in the pronouns and the linguistic structures we are unconsciously using. This is especially applicable to drug users and drug-related language and nomenclature.

Johnson and Lakoff (2002) suggest that conceptual metaphors are rooted in bodily understanding of the world surrounding us and that embodied concepts are rooted in the experiences of the individual. Experiences can be explored by understanding the metaphorical mapping of the structure, the conceptual target and the source domains of metaphorical expressions the individual is using in describing specific experiences (Gibbs 2006; Kövecses 2003, 2010; Lakoff and Johnson 1980).

The conceptual metaphor theory provides a basis for systematic metaphor analysis as a method of qualitative research in social science (Schmitt 2005). Conceptual metaphors are analysed in the different fields of social science and the importance of metaphors in drug use have been long recognized in drug policy issues (Moore et al. 2015; Perlman and Jordan 2017), in drug treatment (Gryczynski et al. 2007), in progression and recovery of alcoholism (Jellinek 1946) and in revealing the experience of addiction (Shinebourne and Smith 2010; Gerçek 2017).

Metaphors of everyday alcohol consumption and their implications for counselling and prevention are inevitable (Schmitt 2005). Authors Rácz and Kaló (2009), in a preliminary study, have recognized the different conceptual metaphors of substance use by comparing Hungarian narratives of the personal experiences of the effects of heroin, amphetamine and marijuana.

Kaló and colleagues Kaló et al. (2013) also designed a study to compare the conceptual metaphors of the first known NPS, (4-MMC, mephedrone) from interviews conducted with Hungarian and Irish users. The study found that mephedrone had a complex effect on users which was expressed with metaphors from similar source domains in both languages. Differences were found if the setting of the mephedrone taking was different (injecting, snorting) (Kaló et al. 2013).

Rationale

Two qualitative studies with SC users were undertaken by authors in two European countries, namely Hungary (Kassai et al. 2017a, b) and the Republic of Ireland (Van Hout and Hearne 2017). NPS appeared in Hungary in 2010, with significant increases in popularity reported in 2014 (Rácz et al. 2016; Reitox National Focal Point 2016). User peer networks and online availability supported sourcing, despite generic regulation in Hungary (Reitox National Focal Point 2016). Similar patterns occurred in Ireland (Van Hout and Brennan 2011a, b, c; 2012; Van Hout and Bingham 2012; Van Hout 2017), and where SCs emerged as a significant community and clinical concern since 2015 (Van Hout and Hearne 2017; Van Hout 2017).

Metaphors are increasingly used to better understand drug user experiences and as medium to inform and guide clinical responses. The main concern of this paper is about understanding the meaning of SC usage in terms of latent and implicit contents of users' narratives; how the users of SC make sense of the world and how they experience SC usage across the trajectory of use, abuse and dependence. The theoretical background is defined by the conceptual metaphor analysis (Lakoff and Johnson 1980). Metaphors are culturally and socially defined, and yet they also represent a basic cognitive strategy of analogical problem solving. Metaphors are

context-sensitive, yet at the same time, they are abstract models of reality much in the same way as mental models and schemata in cognitive psychology (Moser 2000). We are applying metaphor analysis to these SC narratives, to provide insight into the analogical problem solving as it relates to the use of SCs as described by the lived experiences of users in Hungary and Ireland. This type of work contributes to the literature on NPS and indeed illicit drug use by virtue of its new approach, which goes beyond the simple descriptor level and attempts to yield insight into problem solving as experienced by users of this addictive and destructive synthetic drug.

Hence, the focus of our study of SC metaphors based on user experiences was to gain a richer insight into the experience of SC usage by identifying and systematically comparing the language use and their conceptual metaphorical background related to SC use in English and Hungarian reports. By the comparison of different languages, we aimed to identify more information about the universal internal mental images and perspectives of SC use. The research questions were as follows;

- What kind of conceptual metaphors are used by the SC users in describing their experiences with SC?
- What are the differences and commonalities between the Irish and the Hungarian reports regarding the metaphors of SC usage?
- What are the common conceptual source domains found in the metaphors of SC use?

Methods

We applied the conceptual metaphor theory as a method to understand universality of SC motivations, effects and consequences across to distinct cultural contexts, Hungary and Ireland. We used semi-structured interviews for data collection. We conducted interviews separately in the two countries, which were then transcribed verbatim. The data analysis was conducted by two independent researchers of the study.

Sample

In the Republic of Ireland, six dependent users (three males/three females) of herbal smoking mixtures known to contain the SC's 5f-AKB48 and 5F-PB-22 were interviewed. The study was undertaken in 2015 at a time where Ireland was experiencing significant community and clinical concerns for cross border tourism for NPS, increased crisis presentations at emergency health services and SC-related suicides. This sample had an average Severity of Dependence Score (SDS) of 13. The methodology is reported elsewhere (Van Hout and Hearne 2017). This sample differed from the Hungarian sample by virtue that none had attended treatment services and all reported attempts to self-detoxify at home.

In Hungary, six male self-identified SC users were recruited, who had problematic SC use and entered treatment. No female users were available. It was assumed that SCs were the dominant components of the substance that they smoked, the exact compounds of these substances are unknown. Before the analysis, they had been using SC for at least 2–6 years, and at the time of the study, they had been abstinent for at least 1 month. The methodology is reported elsewhere (Kassai et al. 2017a, b).

Ethics

The Irish study was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki, and the institutional ethical policies for conducting research. All participants received an information sheet and gave written informed consent prior to the interview. All were assured of confidentiality and anonymity and that they could withdraw from the study if requested. Audio recordings were destroyed post-transcription (Van Hout and Hearne 2017). The study protocols of Hungarian study were approved by the Institutional Review Board at Eötvös Loránd University. The participation in the study was voluntary; anonymity and confidentiality were assured to protect participants' identity. All the participants approved the condition of participation (Kassai et al. 2017a, b).

Analysis

In the analysis, we used the conceptual metaphor theory (Lakoff and Johnson 1980; Schmitt 2005) to identify the metaphors of SC usage. First, we identified the conceptual target area for metaphor analysis: in this study, the target area was SC use; we aimed to understand the metaphorical concepts related to SC use, how users describe it naturally and linguistically. In the conceptual metaphorical analysis, we focused on the narratives of personal experiences and pathways of SC use. Metaphors, their target and source domains associated with the effects and usage of SC were defined and systematic correspondences (mappings) between the Hungarian and Irish metaphorical expressions were stated. Metaphoric implications of mappings and different aspects of notions used in metaphors were examined and compared with conceptual metaphors used in the English and the Hungarian language. The entire interviews were close read and reports of personal experience with SC were selected and analysed.

Procedure

First, we selected extracts of the interview texts where the user described any aspect of SC usage. These reduced interview text sequences were analysed for the conceptual metaphors of SC usage. The data was analysed in the original language; later, the Hungarian analysis results were translated to English. The interview text segmentation was theory-driven, based on the synthesis of the addiction motivation theory (PRIME model Michie et al. 2011). Drug usage and addiction are viewed to consist of a number of distinct common components such as: the effects, the motivations and the consequences (Kaló et al. 2013).

Second, we analysed the conceptual metaphors of the segmented texts in both languages. We looked for the conceptual source domains of the effects, motivations and consequences in the narratives of Irish and Hungarian SC users. Results are shown in the above detailed system of motivations and the segmented components of SC experience.

Third, we made a synthesis of the common conceptual source domains regarding SC usage.

Segmentation of the Interview Texts

The experiences with SC were segmented into the following components: the effects, the motivations, the consequences and the setting. The *effects* included those narratives that described the result of using SC, and any of those phenomena (behaviours, feelings, etc.)

that were produced by SC. The *motivation* narratives included those sequences that described the user's reasons (motives) for taking SC; the inspiration that was arisen the person to take action; the purpose and direction to behave. The *consequences* as sub-theme consisted of the unwanted effects, and the after-effects, in terms of the phenomena observed after the desired effect. The *setting* as a general social factor was also added as a category in the analysis. It refers to the Irish or Hungarian setting.

Results

Summary of Results: Conceptual Source Domain of SC Metaphors

The embodied experience of SC usage was described by the SC users in the English and Hungarian narratives by specific conceptual source domain. Four conceptual source domains were found in all of the segmented and analysed narratives of psychological factors (motivations, effects, consequences): the change in the vertical perception, the feeling of perceiving that SC is everywhere, the feeling of disconnectedness, the recognition of lack of control and the identification of SC as a destroying entity (Table 1).

SC Enhances Changes in the Spatial Perceptions

The SC enhanced a change in the spatial perceptions that was reflected in the conceptual source domains. The first experience with SC was usually positive: if the user was up, the SC brought them down; if the user was down, the SC brought them up. The state was reached with the help of SC, whether it is up or down, it was regarded a positive change. The Hungarian metaphor reflected an autonomous power; the SC had the power to change the user's perception that was regarded on a vertical scale. In both languages, the power of the SC was also reflected in the spatial changes perceived horizontally. The SC had made the user feel emptied and indifferent; the SC locked the outside world forcing the user focus and zoom inside.

Table 1 SC metaphors and correspondences

Metaphors	Correspondences	
	Elements of source domain	Elements of target domain
SC is a magnetic field	<p>A magnetic field changes the powers when something gets closer</p> <p>The magnetic field once it is there, it cannot be moved</p> <p>The magnetic field/the destructive entity does something against the will of the person</p>	<p>It changes the spatial perceptions</p> <p>SC is everywhere</p> <p>Losing control</p> <p>Loss of control</p> <p>Disconnects from the world</p>
SC is a destructive entity	<p>The entity has autonomy</p> <p>The entity has a will</p> <p>The entity has a destructive will</p>	<p>Destruction of the body</p> <p>Death</p>

SC Is Identified as a Destroying Entity

This metaphor reflected that SC had held the autonomous power over the user. The conceptual metaphors of SC as a destroying entity reflected that the user had become more and more powerless and the SC was perceived as something that held the power and became progressively autonomous. It took the control over the user's life; moreover, it tricked with the mind, the forces, and the moves. The Hungarian users identified the SC as a destroying agent thus, themselves as entities losing control that were not capable of doing anything, and were not able to guide or control. In the Irish data, the control by the SC was so extreme, that they had described the SC as an entity that is gradually and deliberately killing them.

Metaphors of Motivations

The conceptual metaphors implicated that the users lack the agency or the responsibility in the motivations. Users described their experience on getting in touch with the SC where they were feeling that their approval was not needed. As if the substance would have been actively present everywhere and they had not been able to control the interaction between them and the substance.

SC is something that acted like a magnet. It was not everywhere but had a magnetic force that had pulled the users wherever they were.

It's a magnet altogether coz no matter where you go, its there. /Irish data/

'SC is everything and everywhere' was general in describing the SC experience. In this metaphor, the conceptual target domain was the motivations for SC use, and the conceptual target domain in both languages (English and Hungarian) was described with the 'every' determiner (Table 2).

Metaphors of Effects

The metaphors of effects of SC experience as conceptual target domains were described with a conceptual source domain of different prepositions (e.g. up, down, in, out) describing the directions of the movement. SC was something that changes in the movement perception vertically (high, up) in both the Irish and the Hungarian narratives (Table 3):

I feel happy, I feel relaxed, I feel calm, I feel the world is on my side. But if I haven't got it I feel the world is against me. I sweat, I can't eat, I can't think straight. Yet when I get that smoke everything changes. I'm up real high but if I haven't got it I'm down as low as you can get.

Table 2 Motivation: SC is everywhere

Irish data	Hungarian data
Herbal is a curse. It's a curse on everybody in this town, to be honest It works every way—money wise, condition wise, health wise, everything no matter where you go it's there It's everywhere	It is everywhere, it solved itself to be everywhere

Table 3 Motivation: SC disconnects from the world

Hungarian data

The world is disconnected, and it is just me, I am zoomed
 The world is narrowing down
 I feel a little disconnected
 It turns my brain off
 My brain goes stiff
 I was feeling scattered

The metaphors of effects of SC experience as conceptual target domains included expressions that were implicating losing control over their body and mind. The body and mind acted differently. The user lost their agency; their body was craving for the substance (Table 4).

Like, see the way you can feel like yourself now, I can't get that anymore, it's all herbal to me now. It's terrible, it's taken over my life and I don't want to do it, man. If I haven't got it I go mad, break the house up, put my hands through doors, walls, windows. I broke a window there last week. It's just ridiculous, I go mad, I cant even control myself, I go mad like ... /Irish data/

From the first moment, it was governing me, I couldn't handle it, I was just sitting for hours. /Hungarian data/

Thirdly, the metaphors of effects of SC experience as conceptual target domains were described by the Hungarian users inclusively with the conceptual source domains of disconnection. The SC disconnected the user from the world, their body, their 'brain' (Table 5).

Metaphors of Consequences

The metaphorical source domains of the consequences of SC were different prepositions (e.g. down) describing the direction of the movement. These movements were opposite to the ones describing the effects (up and down). The metaphors of consequences were formulated by linguistic expressions from the conceptual source domain describing it as something that had changed in the movement perception vertically in both the Irish and the Hungarian narratives (Table 6):

At the beginning it was very good, I felt good from it/SC, I was up, I was happy, like that, like these things that were inside me, I felt better like I started listening to the music

Table 4 Effects of SC use: brings up

Irish data	Hungarian data
I could not come up and talk to anybody, it was a quick high	I was all up
You'll get your high any time, your high the whole time	It strengthens up things
High as a kite	I was spinning up
I'm up real high	I went down stiff of it
You are all "up"	
I am up real high but if I have not got it I am down as low as you can get	

Table 5 Effects of SC use: losing control

Irish data	Hungarian data
Taking control	My brain took a turn
I wasn't me	The substance changes you
It's taken over my life and I do not want to do it	My body demanded it
Like herbal plays tricks with your mind too, It gives you bad thoughts	It leads me, it actually leads me, leads you to do things you would never do
Everything started spinning around me	It takes the power over you and then governs
Everything just went around me	I realized that I was not me anymore
If I could get it then it was got, I got it. I have often seen myself starving and buying it	I was not conscious
But when I smoke the herbal it seems to keep that voice down a bit, dies the voice down a bit, it seems to kill the voice	I was teased (by the substance) like I was not controlling myself It was reigning on me

and that gave me a high feeling. And it gave me high spirits when I was down, I smoked a cig. Or when I quarrelled with someone it made me down completely. /Hungarian data/ I don't wanna hurt myself, but it's gonna come that far. It's gonna happen. I don't wanna die, I'm only 25, I'm too young to die. But the way it's all coming in around me, it just takes a lot out of ya. Some mornings I just wake up feeling so down, you just wouldn't care if you walked out in front of a lorry, it'd make you feel good. If a lorry came and hit me this morning it wouldn't bother me one bit, I wouldn't care like. It's just your down and out and that's it. /Irish data/

The metaphorical source domains of the conceptual target domain of consequences of SC were also detected in the deterioration. The SC had also contributed to severe physical and mental deterioration (Table 7).

And eventually, SC consequences were described as something lethal (Tables 8 and 9).

It's killing us all bit by bit, day by day ... It's serious stuff, I just don't want it, don't need it, just don't want it near me, don't need it" /Irish data/

Discussion

We present here the first known attempt to analyse the conceptual metaphors (Lakoff and Johnson 1980) in user experiences of synthetic cannabinoids (SCs) in two countries, Ireland

Table 6 Consequences of SC use: change in vertical perception

Irish data	Hungarian data
If you do not have it you feel down, angry	You slip down to the ground
I never came off it since, I cannot get away from it, feeling so down	I was all down, all deteriorated
It's just your down and out and that's it	My whole self-regard was down
if I have not got it I'm down as low as you can get	
I got very fed up	

Table 7 Consequence of SC use: loss of control

Irish data	Hungarian data
To get away from it I need to be put into a clinic I never came off it since, I cannot get away from it I can't seem to get away from it	It totally controlled me I wasn't me, it was governing me

and Hungary. Users in our study were primarily young male adults, with reviews estimating that males appear more than twice as likely to use SCs (Castellanos et al. 2011; Forrester et al. 2011; Hu et al. 2011; Vandrey et al. 2012). We know that poly substance use is common among users of SCs (Castellanos et al. 2011; Hu et al. 2011; Vandrey et al. 2012). The selected narratives encompassed the motivations, the effects and the consequences which users encountered when using SCs in two distinct countries. We recognize that these SC narratives originate from both dependent users and users in recovery who are reflecting on their motivations, the effects and consequences of their SC usage.

According to the identified metaphors in the study, we consider the drug usage phenomenon as an embodied experience, that is indescribable by rigid, theoretical categories. Wallace (2004) argues that 'addiction should be seen as a fluid, embodied process in which an organism moves towards and away from homeostasis (rather than a discrete mental state, "caused" by a drug)' (Wallace 2004, p. 195). Thus, we demonstrate that the description of the drug usage experience can be understood by the conceptual metaphor analysis of language use of the drug users. Conceptual metaphor theory captures the embodied experience in language use by analysing the conceptual source domains.

The metaphorical analysis of these user narratives revealed that users perceive the SC to be everywhere they are and one which is especially overwhelming and all encompassing. This concept, as a metaphorical understanding, depicts SC as a magnetic force around the user, an inescapable trigger, always available, and one which renders the SC user powerless to decline, reduce or cease use. Extant literature underscores how SC is an NPS primarily 'smoked for euphoria' (Bebarta et al. 2012; Castellanos et al. 2011), initially regarded by users to incur positive personal experiences (Arfken et al. 2014) and with reasons for the first time use centring on curiosity, legality, availability and recreational effects (Barratt et al. 2013; Bonar et al. 2014). Desired effects for SC users are underpinned by the sense of elation and altered perception of reality (Fattore and Fratta 2011; Kjellgren and Jonsson 2013) and vary in the onset of effect and duration of action (Schneir et al. 2011).

Our analysis revealed that the general SC body experiences are dynamic and characterized by up-down orientation and are expressed consistently. Typical acute psychoactive effects as reported by our users include an energizing, disinhibiting, euphoric, relaxing experience with

Table 8 Consequence of SC use: destruction of the body

Irish data	Hungarian data
It ruins your skin It is damaging your health It infects your skin and everything	It totally ruins (you) It ruins like I don't know what It crushes you It ruins ... the ... whole inner world, it ruins it, like I would be a piece of wood, only a body

Table 9 Consequence of SC use: SC is lethal

Irish data	Hungarian data
It's killing me bit by bit (?)	My personality got weakened
It's killing me bit by bit	It distorted my personality completely
It's killing us all bit by bit, day by day	
it's killing us all	
It's killing me like	

mild perceptual alterations, increased creativity and mild memory and attentional impairments (Spaderna et al. 2013; Van Hout and Hearne 2017). The SC as an embodied experience causes changes in the users' perception and this change is reflected in the language used. These can range to the negative in altering cognitive and visual abilities, stimulating anxiety, hallucinations, extreme fear and motor impairment (Müller et al. 2010; Castellanos et al. 2011; Forrester et al. 2011; Gunderson et al. 2012). Perceptual changes on use of SCs reported in the literature include peripheral numbness, tingling, migratory flushing or cooling and altered depth perception (Schifano et al. 2009).

Metaphorical analysis across both countries revealed the inner experience of such symptoms. With both metaphors of SC as a *magnetic field* and SC as a *destructive entity*, users express and describe symptoms of anxiety (and de-realisation), unusual behaviours and thoughts, loss of reality or psychosis and fears around mental health conditions. Generally, SCs exhibit similar side effects to high-dose natural cannabis, but are more harmful (Hermanns-Clausen et al. 2013). Given the variability in content and potency of SC products, duration of effect (and residual effects) can last for hours (Schneir et al. 2011; Spaderna et al. 2013), and can contribute to a range of unpleasant experiences and risk of overdose (Tuv et al. 2012; Van Hout and Hearne 2017). Serious side effects include anxiety, decreased motor coordination, fast or irregular heartbeat, psychotic presentations and agitation (Every-Palmer 2011; Müller et al. 2010; Nacca et al. 2013; Barratt et al. 2013; Bassir Nia et al. 2016; Baumann et al. 2014; Fattore 2016; Hurst et al. 2011; Tuv et al. 2012). Emergency presentations describing such acute intoxication report on patient panic attacks, loss of consciousness, nausea, tachycardia, paranoid ideation, agitation, suicidal ideation, confused states and hallucinations, with symptoms emerging in the hours post consumption (Vearrier and Osterhoudt 2010; Sobolevsky et al. 2010; Van Der Veer and Friday 2011; Bebart et al. 2012). Agitated delirium lasting for days has been observed (Berry-Cabán et al. 2013).

The conceptual metaphors of SC as a destroying entity reflect that the user becomes more and more powerless and the SC is perceived as something that holds the power and becomes progressively autonomous. Users described the intention to stop using, but an inherent sense of fear and panic around psychotic episodes and self-harming when abstinent. Kassai et al. (2017a, b) showed that SC users experience that their personality is 'hijacked' and they compared SC use to a type of trauma that 'totally destroys their soul'. Across both countries, we found similar metaphorical concepts. This coupled with the sense that it (SC) is all around the users, contributes to the loss of power, and the objectification of SC (MacLachlan 2004). The protection of the self occurs whereby the user is distanced from the issue of SC and the distress it causes to the individual because it disconnects the 'self' from the thing (the SC) that is damaging him/her (MacLachlan 2004). The complexities around how to stop using SC across both countries were confounded by these discrepancies and conflicts. Disembodiment such as what is characterized within the SC experiences is that the body cannot organize or

summon different feelings up and down at the same time or consecutively but very quickly (Merleau-Ponty 2002). Dependence and loss of control are well observed in the literature on SC abuse, and characterized by rapid tolerance development, SC craving, clear withdrawal symptomatology and continuous urge to consume (Zimmermann et al. 2009; Vardakou et al. 2010; Fattore and Fratta 2011; Van Hout and Hearne 2017). Hence, it is intended that these metaphors can be used to provide clinicians with an insight into the experiences of SC motivations, effects and consequences, and better inform and guide clinical and therapeutic responses in supporting SC recovering addicts. Limitations centre on small sample and that samples differed by virtue of situation within the addiction recovery pathway (Shinebourne and Smith 2010).

Conclusion

We present here a unique metaphorical insight into SC users' experiences of motivation, effects and consequences. It is intended that these key insights underpinned by loss of control, fear and psychiatric illness can better inform and guide appropriate clinical and addiction responses to support recovery. 'Standard diagnostic assessment' relies on the description of symptom clusters often devoid of personal meaning and experiences, which is fundamental to the language of recovery (Mould et al. 2010). Effective communication with former SC users will become easier and better understood, as professionals can talk in 'their language' in therapy, in prevention and in harm reduction messages. This can be especially challenging in the case of NPS when the users themselves are not aware of what they have actually taken.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no competing interests.

Open Access This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made.

References

- Arfken, C. L., Owens, D., Madeja, C., & DeAngelis, C. (2014). Exploratory comparative study on the diffusion of synthetic cannabinoids and synthetic cathinones. *Journal of Psychoactive Drugs*, *46*(5), 362–368.
- Barnard, M., Russell, C., McKeganey, N., & Hamilton-Barclay, T. (2017). The highs and lows of NPS/"legal high" use: qualitative views from a UK online survey. *Drugs: Education, Prevention and Policy*, *24*(1), 96–102.
- Barratt, M. J., Cacic, V., & Lenton, S. (2013). Patterns of synthetic cannabinoid use in Australia. *Drug and Alcohol Review*, *32*(2), 141–146.
- Bassir Nia, A., Medrano, B., Perkel, C., Galynker, I., & Hurd, Y. L. (2016). Psychiatric comorbidity associated with synthetic cannabinoid use compared to cannabis. *Journal of Psychopharmacology*, *30*(12), 1321–1330.
- Baumann, M. H., Solis, E., Watterson, L. R., Marusich, J. A., Fantegrossi, W. E., & Wiley, J. L. (2014). Baths salts, spice, and related designer drugs: the science behind the headlines. *Journal of Neuroscience*, *34*(46), 15150–15158.
- Bebarta, V. S., Ramirez, S., & Varney, S. M. (2012). Spice: a new "legal" herbal mixture abused by young active duty military personnel. *Substance Abuse*, *33*(2), 191–194.

- Berry-Cabán, C. S., Ee, J., Ingram, V., Berry, C. E., & Kim, E. H. (2013). Synthetic cannabinoid overdose in a 20-year-old male US soldier. *Substance Abuse, 34*(1), 70–72.
- Bilgri, O. R. (2016). From “herbal highs” to the “heroin of cannabis”: exploring the evolving discourse on synthetic cannabinoid use in a Norwegian Internet drug forum. *International Journal of Drug Policy, 29*, 1–8.
- Bonar, E. E., Ashrafioun, L., & Ilgen, M. A. (2014). Synthetic cannabinoid use among patients in residential substance use disorder treatment: prevalence, motives, and correlates. *Drug and Alcohol Dependence, 143*, 268–271.
- Bright, S. J., Bishop, B., Kane, R., Marsh, A., & Barratt, M. J. (2013). Kronic hysteria: exploring the intersection between Australian synthetic cannabis legislation, the media, and drug-related harm. *International Journal of Drug Policy, 24*(3), 231–237.
- Castaneto, M. S., Gorelick, D. A., Desrosiers, N. A., Hartman, R. L., Pirard, S., & Huestis, M. A. (2014). Synthetic cannabinoids: epidemiology, pharmacodynamics, and clinical implications. *Drug and Alcohol Dependence, 144*, 12–41.
- Castellanos, D., Singh, S., Thornton, G., Avila, M., & Moreno, A. (2011). Synthetic cannabinoid use: a case series of adolescents. *Journal of Adolescent Health, 49*(4), 347–349.
- Corazza, O., Assi, S., Simonato, P., Corkery, J., Bersani, F. S., Demetrovics, Z., et al. (2013). Promoting innovation and excellence to face the rapid diffusion of novel psychoactive substances in the EU: the outcomes of the ReDNet project. *Human Psychopharmacology: Clinical and Experimental, 28*(4), 317–323.
- Dolengevich-Segal, H., Rodríguez-Salgado, B., Gómez-Arnau, J., & Sánchez-Mateos, D. (2017). An approach to the new psychoactive drugs phenomenon. *Salud Mental, 40*(2), 71–82.
- Dresen, S., Kneisel, S., Weinmann, W., Zimmermann, R., & Auwärter, V. (2011). Development and validation of a liquid chromatography–tandem mass spectrometry method for the quantitation of synthetic cannabinoids of the aminoalkylindole type and methanandamide in serum and its application to forensic samples. *Journal of Mass Spectrometry, 46*(2), 163–171.
- EMCDDA. (2015). New psychoactive substances in Europe. An update from the EU Early Warning System, <http://www.emcdda.europa.eu/system/files/publications/65/TD0415135ENN.pdf>. Accessed 05 July 2016.
- Ernst, L., Schiebel, H. M., Theuring, C., Lindigkeit, R., & Beuerle, T. (2011). Identification and characterization of JWH-122 used as new ingredient in “spice-like” herbal incenses. *Forensic Science International, 208*(1–3), e31–e35.
- European Monitoring Centre for Drugs and Drug Addiction – EMCDDA. (2009). Thematic paper—understanding the ‘spice’ phenomenon. Office for Official Publications of the European Communities, Luxembourg. Available via DIALOG. http://www.emcdda.europa.eu/attachements.cfm/att_80086_EN EMCDDA_Understanding%20the%20'Spice'%20phenomenon_4Update%2020090813.pdf. Accessed 30 May 2017.
- Every-Palmer, S. (2010). Warning: legal synthetic cannabinoid-receptor agonists such as JWH-018 may precipitate psychosis in vulnerable individuals. *Addiction, 105*(10), 1859–1860.
- Every-Palmer, S. (2011). Synthetic cannabinoid JWH-018 and psychosis: an explorative study. *Drug and Alcohol Dependence, 117*(2–3), 152–157.
- Fantegrossi, W. E., Moran, J. H., Radomska-Pandya, A., & Prather, P. L. (2014). Distinct pharmacology and metabolism of K2 synthetic cannabinoids compared to Δ^9 -THC: mechanism underlying greater toxicity? *Life Sciences, 97*(1), 45–54.
- Fattore, L. (2016). Synthetic cannabinoids—further evidence supporting the relationship between cannabinoids and psychosis. *Biological Psychiatry, 79*(7), 539–548.
- Fattore, L., & Fratta, W. (2011). Beyond THC: the new generation of cannabinoid designer drugs. *Frontiers in Behavioral Neuroscience, 5*, 60.
- Forrester, M. B., Kleinschmidt, K., Schwarz, E., & Young, A. (2011). Synthetic cannabinoid exposures reported to Texas poison centers. *Journal of Addictive Diseases, 30*(4), 351–358.
- Gerçek, C. (2017). The evaluation of students’ mental images of cigarette through metaphor analysis. *Eurasia Journal of Mathematics, Science & Technology Education, 13*(1), 105–111.
- Gibbs Jr., R. W. (2006). Metaphor interpretation as embodied simulation. *Mind & Language, 21*(3), 434–458.
- Griffiths, P., Sedefov, R., Gallegos, A. N. A., & Lopez, D. (2010). How globalization and market innovation challenge how we think about and respond to drug use: ‘Spice’ a case study. *Addiction, 105*(6), 951–953.
- Gryczynski, J., Johnson, J., & Coyhis, D. (2007). The healing forest metaphor revisited: the seen and “unseen world” of drug use. *Substance Use & Misuse, 42*(2–3), 475–484.
- Gunderson, E. W., Haughey, H. M., Ait-Daoud, N., Joshi, A. S., & Hart, C. L. (2012). “Spice” and “K2” herbal highs: a case series and systematic review of the clinical effects and biopsychosocial implications of synthetic cannabinoid use in humans. *The American Journal on Addictions, 21*(4), 320–326.
- Hermans-Clausen, M., Kneisel, S., Szabo, B., & Auwärter, V. (2013). Acute toxicity due to the confirmed consumption of synthetic cannabinoids: clinical and laboratory findings. *Addiction, 108*(3), 534–544.
- Hu, X., Primack, B. A., Barnett, T. E., & Cook, R. L. (2011). College students and use of K2: an emerging drug of abuse in young persons. *Substance Abuse Treatment, Prevention, and Policy, 6*(1), 16.

- Hudson, S., Ramsey, J., King, L., Timbers, S., Maynard, S., Dargan, P. I., & Wood, D. M. (2010). Use of high-resolution accurate mass spectrometry to detect reported and previously unreported cannabinomimetics in “herbal high” products. *Journal of Analytical Toxicology*, *34*(5), 252–260.
- Hurst, D., Loeffler, G., & McLay, R. (2011). Psychosis associated with synthetic cannabinoid agonists: a case series. *American Journal of Psychiatry*, *168*(10), 1119–1119.
- Jellinek, E. M. (1946). Phases in the drinking history of alcoholics. Analysis of a survey conducted by the official organ of alcoholics anonymous (memoirs of the section of studies on alcohol). *Quarterly Journal of Studies on Alcohol*, *7*(1), 1–88.
- Johnson, M., & Lakoff, G. (2002). Why cognitive linguistics requires embodied realism. *Cognitive Linguistics*, *13*(3), 245–264.
- Kaló, Z. S., Vida, K., Gogibedavili, A., Van Hout, M. C., & Rácz, J. (2013). English-Hungarian comparative study on metaphors of intravenous mephedrone use. European Society for Social Drug Research Annual Conference, Stockholm.
- Kassai, S., Pintér, J. N., Rácz, J., Böröndi, B., Tóth-Karikó, T., Kerekes, K., & Gyarmathy, V. A. (2017a). Assessing the experience of using synthetic cannabinoids by means of interpretative phenomenological analysis. *Harm Reduction Journal*, *14*(1), 9.
- Kassai, S., Pintér, J. N., Rácz, J., Erdösi, D., Milibák, R., & Gyarmathy, V. A. (2017b). Using interpretative phenomenological analysis to assess identity formation among users of synthetic cannabinoids. *International Journal of Mental Health and Addiction*, *15*(5), 1047–1054.
- Kjellgren, A., & Jonsson, K. (2013). Methoxetamine (MXE) – A phenomenological study of experiences induced by a “Legal High” from the internet. *Journal of Psychoactive Drugs*, *45*(3), 276–286. <https://doi.org/10.1080/02791072.2013.803647>.
- Kikura-Hanjiri, R., Uchiyama, N., & Goda, Y. (2011). Survey of current trends in the abuse of psychotropic substances and plants in Japan. *Legal Medicine*, *13*(3), 109–115.
- Kövecses, Z. (2003). *Metaphor and emotion: language, culture, and body in human feeling*. Cambridge: Cambridge University Press.
- Kovecses, Z. (2010). *Metaphor: a practical introduction*. New York: Oxford University Press.
- Lakoff, G., & Johnson, M. (1980). *Metaphors we live by*. University of Chicago press.
- Lindigkeit, R., Boehme, A., Eiserloh, I., Luebbecke, M., Wiggermann, M., Ernst, L., & Beuerle, T. (2009). Spice: a never ending story? *Forensic Science International*, *191*(1–3), 58–63.
- Macfarlane, V., & Christie, G. (2015). Synthetic cannabinoid withdrawal: a new demand on detoxification services. *Drug and Alcohol Review*, *34*(2), 147–153.
- MacLachlan, M. (2004). Disembodied language. In M. MacLachlan (Ed.), *Embodiment. Clinical, critical and cultural perspectives on health and illness* (26–27). Open University Press.
- Merleau-Ponty, M. (2002). *Phenomenology of perception*. London: Routledge.
- Meshack, A., Peters Jr., R. J., Lin, M. T., Hill, M., Abughosh, S., Essien, E. J., & Savage, C. (2013). The beliefs of teenage male cannabinoid users: a qualitative study. *American Journal of Health Studies*, *28*(3).
- Michie, S., Van Stralen, M. M., & West, R. (2011). The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implementation Science*, *6*(1), 42.
- Moore, D., Fraser, S., Törrönen, J., & Tinghög, M. E. (2015). Sameness and difference: metaphor and politics in the constitution of addiction, social exclusion and gender in Australian and Swedish drug policy. *International Journal of Drug Policy*, *26*(4), 420–428.
- Moser, K. S. (2000). Metaphor analysis in psychology—method, theory, and fields of application. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 1, no. 2).
- Mould, T. J., Oades, L. G., & Crowe, T. P. (2010). The use of metaphor for understanding and managing psychotic experiences: a systematic review. *Journal of Mental Health*, *19*(3), 282–293.
- Müller, H., Sperling, W., Köhrmann, M., Huttner, H. B., Kornhuber, J., & Maler, J. M. (2010). The synthetic cannabinoid spice as a trigger for an acute exacerbation of cannabis induced recurrent psychotic episodes. *Schizophrenia Research*, *118*(1), 309–310.
- Nacca, N., Vatti, D., Sullivan, R., Sud, P., Su, M., & Marraffa, J. (2013). The synthetic cannabinoid withdrawal syndrome. *Journal of Addiction Medicine*, *7*(4), 296–298.
- Perlman, D. C., & Jordan, A. E. (2017). To neither target, capture, surveillance, nor wage war: on-going need for attention to metaphor theory in care and prevention for people who use drugs. *Journal of Addictive Diseases*, *36*(1), 1–4.
- Rácz J., & Kaló, Z. S. (2009). Metaforák és pszichoaktív anyaghasználat. [Metaphors and psychoactive substance use] *Korunk*. Retrieved from: <http://www.korunk.org/?q=node/8&ev=2009&honap=7&cikk=10870>. Access date: 2017–07–09.
- Rácz, J., Csák, R., Tóth, K. T., Tóth, E., Rozmán, K., & Gyarmathy, V. A. (2016). Veni, vidi, vici: the appearance and dominance of new psychoactive substances among new participants at the largest needle exchange program in Hungary between 2006 and 2014. *Drug and Alcohol Dependence*, *158*, 154–158.

- Reitox National Focal Point. (2016). National Report to the EMCDDA, R.N.F. Point, 2016. http://drogfokuszpont.hu/wp-content/uploads/HU_National_Report_2016.pdf. Accessed 18 Jan 2017.
- Roussel, O., Carlin, M. G., Bouvot, X., & Tensorer, L. (2015). The emergence of synthetic cannabinoids in Mayotte. *Toxicologie Analytique et Clinique*, 27(1), 18–22.
- Schifano, F., Corazza, O., Deluca, P., Davey, Z., Di Furia, L., Farre', M., et al. (2009). Psychoactive drug or mystical incense? Overview of the online available information on spice products. *International Journal of Culture and Mental Health*, 2(2), 137–144.
- Schmitt, R. (2005). Systematic metaphor analysis as a method of qualitative research. *The Qualitative Report*, 10(2), 358–394.
- Schneir, A. B., Cullen, J., & Ly, B. T. (2011). "Spice" girls: synthetic cannabinoid intoxication. *The Journal of Emergency Medicine*, 40(3), 296–299.
- Shinebourne, P., & Smith, J. A. (2010). The communicative power of metaphors: an analysis and interpretation of metaphors in accounts of the experience of addiction. *Psychology and Psychotherapy: Theory, Research and Practice*, 83(1), 59–73.
- Sobolevsky, T., Prasolov, I., & Rodchenkov, G. (2010). Detection of JWH-018 metabolites in smoking mixture post-administration urine. *Forensic Science International*, 200(1–3), 141–147.
- Soussan, C., & Kjellgren, A. (2014). The flip side of "spice": the adverse effects of synthetic cannabinoids as discussed on a Swedish internet forum. *Nordic Studies on Alcohol and Drugs*, 31(2), 207–220.
- Spaderna, M., Addy, P. H., & D'Souza, D. C. (2013). Spicing things up: synthetic cannabinoids. *Psychopharmacology*, 228(4), 525–540.
- Tait, R. J., Caldicott, D., Mountain, D., Hill, S. L., & Lenton, S. (2016). A systematic review of adverse events arising from the use of synthetic cannabinoids and their associated treatment. *Clinical Toxicology*, 54(1), 1–13.
- Tung, C. K., Chiang, T. P., & Lam, M. (2012). Acute mental disturbance caused by synthetic cannabinoid: a potential emerging substance of abuse in Hong Kong. *East Asian Archives of Psychiatry*, 22(1), 31–33.
- Tuv, S. S., Strand, M. C., Karinen, R., Øiestad, E. L., Christophersen, A. S., & Vindenes, V. (2012). Effect and occurrence of synthetic cannabinoids. *Tidsskrift for den Norske laegeforening: tidsskrift for praktisk medicin, ny raekke*, 132(20), 2285–2288.
- Uchiyama, N., Kikura-Hanjiri, R., Ogata, J., & Goda, Y. (2010). Chemical analysis of synthetic cannabinoids as designer drugs in herbal products. *Forensic Science International*, 198(1–3), 31–38.
- UNODC. (2013). The challenge of new psychoactive substances. *A Report from the Global SMART Program*. Available at: https://www.unodc.org/documents/scientific/NPS_2013_SMART.pdf. Retrieved: 22-04-2018.
- Van Der Veer, N., & Friday, J. (2011). Persistent psychosis following the use of spice. *Schizophrenia Research*, 130(1), 285–286.
- Van Hout, M. C. (2017). The dynamic landscape of novel psychoactive substance (NPS) use in Ireland: results from an expert consultation. *International Journal of Mental Health and Addiction*, 15(5), 985–992.
- Van Hout, M. C., & Bingham, T. (2012). "A costly turn on": patterns of use and perceived consequences of mephedrone based head shop products amongst Irish injectors. *International Journal of Drug Policy*, 23(3), 188–197.
- Van Hout, M. C., & Brennan, R. (2011a). Plant food for thought: a qualitative study of mephedrone use in Ireland. *Drugs: Education, Prevention and Policy*, 18(5), 371–381.
- Van Hout, M. C., & Brennan, R. (2011b). "Bump and grind": an exploratory study of mephedrone users' perceptions of sexuality and sexual risk. *Drugs and Alcohol Today*, 11(2), 93–103.
- Van Hout, M. C., & Brennan, R. (2011c). 'Heads held high': an exploratory study of legal highs in pre-legislation Ireland. *Journal of Ethnicity in Substance Abuse*, 10(3), 256–272.
- Van Hout, M. C., & Brennan, R. (2012). Curiosity killed M-cat: a post-legislative study on mephedrone use in Ireland. *Drugs: Education, Prevention and Policy*, 19(2), 156–162.
- Van Hout, M. C., & Hearne, E. (2017). User experiences of development of dependence on the synthetic cannabinoids, 5F-AKB48 and 5F-PB-22, and subsequent withdrawal syndromes. *International Journal of Mental Health and Addiction*, 15(3), 565–579.
- Vandrey, R., Dunn, K. E., Fry, J. A., & Girling, E. R. (2012). A survey study to characterize use of spice products (synthetic cannabinoids). *Drug and Alcohol Dependence*, 120(1–3), 238–241.
- Vardakou, I., Pistos, C., & Spiliopoulou, C. (2010). Spice drugs as a new trend: Mode of action, identification and legislation. *Toxicology Letters*, 197(3), 157–162.
- Vearrier, D., & Osterhoudt, K. C. (2010). A teenager with agitation: higher than she should have climbed. *Pediatric Emergency Care*, 26(6), 462–465.
- Wallace, B. (2004). Editorial. *Addiction Research and Theory*, 12(3), 195–199.
- Westphal, F., Junge, T., Sönnichsen, F., Rösner, P., & Schäper, J. (2010). Ein neuer Wirkstoff in SPICE-artigen Kräutermischungen: Charakterisierung von JWH-250, seinen methyl- und Trimethylsilylderivaten. [a new compound in herbal mixtures: characterisation of JWH-250, its methyl- and trimethylsilyl-derivatives]. *Toxichem Krimtech*, 77(1), 8–22.

- Winstock, A. R., & Barratt, M. J. (2013). Synthetic cannabis: a comparison of patterns of use and effect profile with natural cannabis in a large global sample. *Drug and Alcohol Dependence*, *131*(1–2), 106–111.
- Winstock, A., Lynskey, M., Borschmann, R., & Waldron, J. (2015). Risk of emergency medical treatment following consumption of cannabis or synthetic cannabinoids in a large global sample. *Journal of Psychopharmacology*, *29*(6), 698–703.
- Zawilska, J. B., & Wojcieszak, J. (2014). Spice/K2 drugs—more than innocent substitutes for marijuana. *International Journal of Neuropsychopharmacology*, *17*(3), 509–525.
- Zimmermann, U. S., Winkelmann, P. R., Pilhatsch, M., Nees, J. A., Spanagel, R., & Schulz, K. (2009). Withdrawal phenomena and dependence syndrome after the consumption of “spice gold”. *Deutsches Ärzteblatt International*, *106*(27), 464–467.
- Zuba, D., Byrska, B., & Maciow, M. (2011). Comparison of “herbal highs” composition. *Analytical and Bioanalytical Chemistry*, *400*(1), 119–126.

Affiliations

Zsuzsa Kaló¹ • Szilvia Kassai^{1,2} • József Rácz^{1,3} • Marie Claire Van Hout⁴

✉ Marie Claire Van Hout
m.c.vanhout@ljamu.ac.uk

¹ Institute of Psychology, ELTE Eötvös Loránd University, Izabella street 46, Budapest 1064, Hungary

² Doctoral School of Psychology, ELTE Eötvös Loránd University, Budapest, Hungary

³ Faculty of Health Sciences, Semmelweis University, Vas street 17, Budapest 1088, Hungary

⁴ Public Health Institute, Liverpool John Moore’s University, United Kingdom Henry Cotton Campus Level 2 15-21 Webster Street, Liverpool L3 2ET, UK