

## Fascination and Social Togetherness—Discussions about Spice Smoking on a Swedish Internet Forum

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**ABSTRACT:** Spice is a smoking mixture containing synthetic cannabinoids with psychoactive effects similar to herbal cannabis. It is sold on the Internet and has become popular among young people. The purpose of the present study was to investigate experiences of intoxication induced by Spice, as described on a Swedish internet-based discussion forum. A systematic search yielded 40 reports, which were analyzed using phenomenological method. A total of 7 themes (composed of 27 categories) emerged from the analysis: 1. Spice use as social ritual; 2. Social secretiveness; 3. Intoxication remarks; 4. Well-being and elation; 5. Altered perception of reality; 6. Fears and coping; 7. Unpleasant physical effects. The results show that smoking was a social activity mostly carried out in small peer-groups, and that the substances induced strong intoxication with both positive and negative effects. Despite fears and unpleasant effects, the intoxication was often considered fascinating and rewarding.

**KEYWORDS:** Spice, cannabis, Internet forum, intoxication

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### Introduction

In recent years the market for psychoactive drugs has undergone major changes. Besides traditional drugs such as cannabis, amphetamines, cocaine and heroin, a number of new drugs have emerged<sup>1</sup> that have effects similar to the classic drugs.<sup>2</sup> To date there are virtually no scientific studies of these drugs with regard to eg, effects, risks and consumption patterns, but there is a rich diversity of information shared on internet discussion forums, where people write about their drug experiences more or less anonymously. The validity of such information is obviously hard to assess, but internet forums are nonetheless important domains to investigate, these forums are of great relevance to young people, especially regarding discussions on the normally taboo subject of drugs.

One of the new drugs frequently discussed on internet forums is Spice, which is the name of a brand of smoking mixture marketed as an alternative to cannabis. These products, containing one or more synthetic cannabinoids (SC) sprayed

on dried herbal material,<sup>3,4</sup> are sold worldwide through the Internet under various names, eg, K2, Kronik, Yucutan Fire, Spice Silver, Spice Gold, Spice Diamond, Spice Mojo.<sup>1,5–7</sup> The included herbs, such as *Nymphaea caerulea*, *Leonotis leonurus*, or *Leonurus sibiricus*, are possibly slightly psychoactive.<sup>5</sup> The main psychoactive effects of Spice depend on the SCs, which are functionally similar to THC (tetrahydrocannabinol), the main psychoactive chemical in cannabis. They are full agonists at CB-1 and CB-2 receptors, producing similar but more powerful effects than THC.<sup>1,8–11</sup>

The first noted occurrence of SC (Spice) in Europe was probably in 2004.<sup>12,13</sup> Since 2008, Spice has been frequently traded world-wide.<sup>1,12</sup> Several different SCs have been found during analyses of Spice-products, eg, JWH-018, JWH-073 and CP47,497 (eg,<sup>2,14,15</sup>), but there are also many others. Forensic analyses have discovered over a dozen different cannabinoids, which were not specified on the bags.<sup>16</sup> The composition of the smoking mixtures changes as the constituent



substances become illegal, making it a race against the legislation.<sup>17</sup>

Mainly teenagers and young adults purchase and use these substances,<sup>18,19</sup> based on a review of 41 studies indicating that the average user was about 23 years, and the male/female ratio was 3.16:1.

Spice is sold in small bags and is often labeled as “incense” or with the text “not for human consumption” in an attempt to conceal the fact that it is a drug intended for smoking.<sup>15,20</sup> The reasons for using synthetic cannabinoids (Spice) may be that it is not detectable in drug tests as herbal cannabis,<sup>6,9</sup> that the substance is packaged as tea or incense making it is easier to hide,<sup>5</sup> or that it is cheap, legal and easy to obtain.

Both cannabis and Spice can induce a pleasant and euphoric state,<sup>1</sup> but a survey by Winsock and Barratt<sup>6</sup> showed that 93% of respondents (n = 14,800) preferred natural herbal cannabis to the synthetic version. The respondents believed that herbal cannabis induced a more pleasing intoxication, and that Spice often resulted in paranoia and anxiety, and also had other side effects such as headache and vomiting. Other studies have found similar effects but have also reported on panic attacks, altered vision, hallucinations, excessive fear, and motor impairment.<sup>14,18,19</sup> A systematic review of Spice-related side effects was recently performed by Papanti et al.<sup>19</sup> who identified 223 relevant studies, out of which 41 were finally included in their study, confirming that a variety of psychopathological effects were abundant. The extent of possible adverse long-term effects is still not clear since the clinical experience is small and controlled studies are lacking.<sup>9</sup>

Descriptions of drug effects can be found on different discussion forums on the internet, where primarily young persons and teenagers describe and discuss their experiences. Writing posts on forums enables more or less anonymous sharing of knowledge or opinions, especially regarding topics perceived as less accepted in the physical environment.<sup>21</sup> Such forums exist in different countries. In the present study, we investigated the biggest internet forum in Sweden (www.flashback.org) with several hundreds of thousand members discussing widely different topics, including drugs. Searching for information on internet forums to gather qualitative data can be used for almost any topic; if there is an appropriate method to analyze the material.<sup>21</sup>

The purpose of the present study was to investigate experiential aspects of Spice intoxication, as described on the Swedish internet-based discussion forum www.flashback.org, and to gain insight into the circumstances under which the drug is taken, and other relevant features related to the use of Spice.

## Method

The Empirical Phenomenological Psychological Method (EPP), developed by Karlsson,<sup>22</sup> was used for analyzing the data. This method emphasizes an open and bias-free attitude, and is suitable for describing and exploring subjective

experiences. The EPP method is based in Husserl’s phenomenology. According to Karlsson,<sup>22</sup> the EPP method aims “to describe the meaning-structure of a psychological phenomenon. This method yields descriptive results, which disclose the intentional relationship between the subject and the object of experience.”<sup>22,p.78</sup>

**Data collection.** Initially, a first search using google.se was performed (in Swedish, with the 3 keywords internet drug (Swedish: nätdrog), intoxication report (Swedish: rusrapport) and trip report (Swedish: tripprapport) with the intention to ensure that the flashback site was relevant to use. As there were thousands of hits, only the first 10 result pages were used. A total of 11 Swedish sites with drug-related discussions were identified. 1 site appeared frequently in all searches, namely the discussion forum Flashback.org. The other 10 sites did not have enough postings on this topic for performing analyses or comparisons. Therefore, the site Flashback.org was selected for further searches.

The searches for posts and discussions about the drug Spice were performed on the forum Flashback.org, using its internal search engine. The keywords used were: trip report + Spice (Swedish: tripprapport) and intoxication report + Spice (Swedish: rusrapport). Of the 202 identified posts, only 40 described intoxication where Spice was used as the sole drug. The remaining 162 hits were excluded because they described concurrent drug intoxication (eg, alcohol, cannabis and synthetic opioids). The posts involving the concurrent use of Spice and regular tobacco cigarettes were included in the study. In total 113 pages of text were generated (See Table 1).

These posts were descriptions of people openly sharing their experiences and procedures with Spice as an intoxicant. They also revealed that several other names for Spice were used: Yucutan Fire, Spice Silver, Spice Gold, Spice Diamond, K2 and Kronic.

**Participants.** The study is based on reports posted on the Internet forum flashback.org by 40 persons (37 males, 3 females) of which about half have stated their age, and this ranged from 15–26 years. All participants were anonymous and from unknown locations in Sweden.

**Analysis.** The 40 reports were copied to a Word document for analysis in five steps in accordance with the EPP-method.<sup>22</sup>

Step 1: The reports were read 3 times, to get an overview of the material, and to identify relevant psychological phenomena.

**Table 1.** Number of hits at www.Flashback.org.

KEYWORDS DURING SEARCH AT www.flashback.org	NUMBER OF HITS	NUMBER OF HITS WHERE SPICE WAS THE SOLE DRUG
Trip report + Spice	152	36
Intoxication report + Spice	50	4



Step 2: The text was divided into smaller units (meaning units, MU) without regard to syntax. A new division was made every time the description introduced a new meaning, focus, or topic, as in this example yielding two MUs: “Me and my brother sneaking out to the back of the house as two pimply teenagers who are about to smoke their first cigarette, we are, in other words very excited/10 minutes after we smoked up our Spice-joints it feels like the heart is busting through the chest.” A total of 843 MUs were generated from the 40 reports.

Step 3: All MUs were then transformed from the participants’ language into the language of the researcher. The aim of this transformation was to highlight the significant and implicit meaning of the phenomena described in the texts. The transformed MUs from the example above were restated as: 1. Excitement and anticipation of Spice smoking/2) Strong palpitations caused by intoxication.

Step 4: The transformed MUs were brought together into coherent structures or categories on the basis of their characteristics and similarities. A total of 27 categories were formed. A key aspect throughout the categorization process was to understand what a phenomenon is (noema) and how the phenomenon is expressed (noesis). The categories emerged through repeatedly consulting the raw data, while the big picture in the category was checked and maintained. Each category was described by a synopsis. See Table 2 for a list of all 27 categories.

Step 5: The generated categories were then the object of a new abstraction process to produce more general and overarching themes through the potential patterns in related categories. Finally, 7 themes containing 27 categories were formed: 1. Spice use as social ritual (6 categories); 2. Social secretiveness (2 categories); 3. Intoxication remarks (4 categories); 4. Wellbeing and elation (2 categories); 5. Altered perception of reality (4 categories); 6. Fears and coping (4 categories); 7. Unpleasant physical effects (5 categories).

During the final step in the analysis process, it became evident that 2 additional higher levels of abstraction above the theme-level existed. Throughout the entire study the concepts of fascination, as well as the importance of the social togetherness were evident. All raw data were re-read and it was found that these 2 concepts were in different ways reported by a majority of the persons. The fascination of the effects of the drug were evident in 6 of the 7 themes; the social togetherness appeared as a common thread in all 7 themes.

To ensure high validity, the steps in the EPP method were strictly followed<sup>22</sup> and the data were carefully interpreted in our endeavor to maintain a non-judgmental, non-biased and open attitude. In order to obtain interpretative validity,<sup>23</sup> considerable efforts were made to respect the perspectives of the experiencing individuals. The material was interpreted in terms of the dialectic understanding of the hermeneutical circle and its movement back and forth between a sense of the whole and a sense of its parts.<sup>22</sup> The EPP method is an

analytic process based on the parts of the whole to reach an incremental understanding of the whole picture.

**Ethical considerations.** Participants in the study have anonymously published their texts in an open Internet forum. Everything that could possibly identify a person (such as name, city, school) was excluded from the material.

## Results and Discussion

Several detailed description regarding the circumstances and experiential aspects of Spice intoxication were found on the Swedish Internet discussion forum flashback.org. The findings indicate the importance of the forum to young people as a means of sharing thoughts and reflections about topics likely to be taboo in real life. A total of 7 themes (composed by 27 categories) emerged from the phenomenological analysis. These themes are discussed below together with some representative quotations.

**Spice use as social ritual.** This theme enables insight into circumstances related to drug ingestion, such as the acquisition of the drug, preparation and smoking, as well as activities during intoxication, all of which seemed to be of great importance. Motivation for using Spice came from recommendations of friends or online forums, thus indicating the importance of social relationships. Spice was usually acquired through friends or bought through the Internet and delivered

**Table 2.** Themes and categories from the phenomenological analysis.

THEMES	CATEGORIES
1. Spice use as social ritual	1. Preparation and acquisition of Spice 2. Environmental descriptions 3. Dosage 4. Smoking technique 5. Activities during intoxication 6. Shared intoxication with friends
2. Social secretiveness	7. Hiding and secrecy with intoxication 8. Undesirable embarrassing behavior
3. Intoxication remarks	9. Initial intoxication 10. Reflecting on degree of intoxication 11. Disappointment when intoxication declines or fail 12. Comparison with other types of intoxications
4. Well-being and elation	13. Pleasant and agreeable 14. Humor and laughter
5. Altered perception of reality	15. Altered sensory perception and cognition 16. Dream world 17. Altered body image 18. Perception of time
6. Fears and coping	19. Discomfort 20. Sense of unreality 21. Fears 22. Strategies for managing the effects
7. Unpleasant physical effects	23. Thirst and dry mouth 24. Hungry and eating 25. Nausea and vomiting 26. Vertigo and motor impairment 27. Physical internal discomfort



by post: “I woke up when the post fell into the mail slot, the letter had arrived!”

Smoking was not a spur-of-the-moment activity. On the contrary, it was in most cases carefully planned, which made it appear as a private ritual accompanied by high expectations: “Expectations were high when I went into the post office to pick up the package of Spice we had ordered a few days earlier.” Since drug intoxication in general is not accepted by society at large, the anticipation may contribute to increased expectations or reflect thrill seeking, as well as to create a closed circle of friends sharing the intoxication.

The Spice was vaporized or smoked, either pure or mixed with tobacco, rolled as cigarettes (joints) or in a water bong. In some cases, self-designed smoking equipment was manufactured: “We were looking at Google about the best way to smoke, and decided to build a vaporizer from light bulbs.” The ingested dose of smoking mixture varied from 0.1 gram to several grams shared. Spice was commonly used in a social setting with peers who functioned as security and support during the intoxication. Those using Spice for the first time seemed to be anxious and fearful, perhaps looking for group security in case of a frightening or overwhelming experience. This need probably helps to create group cohesion within the peer group. As previously known, both expectations (set) and the circumstances around it (setting) impact on drug effects.<sup>24</sup>

For the inexperienced, smoking seemed to symbolize an excursion for novel and non-ordinary experiences. Furthermore, it seemed important to share these intoxication experiences with peers. It also seemed to be of great importance for the novice users to write detailed descriptions of the setting, such as environmental descriptions (eg, in the forest, or on the beach), when posting their experiences on the forum. Also, activities during intoxication (planned or unplanned), such as cooking, surfing the internet, watching movies, dancing, going for walks, or just listening to music were described thoroughly and in detail. Since other users on the forum grade these experience reports, it might be of extra importance for beginners to write rich and detailed descriptions in order to be accepted and included in the community.

**Social secretiveness.** An extensive secretiveness related to substance use and intoxication was found. There was a fear of exposing their drug use to uninitiated people, which in turn created strong group cohesion among Spice users. Feelings of guilt and shame associated with Spice use were also described, as well as the fear of being caught with the substance: “What if my mom is awake, what if she realizes that I smoked?” “I understand that I look stoned and try to control myself; if I stagger the cashier will call the police.” Perhaps hiding and secrecy increase the likelihood of fearful and negative intoxication reactions. Also, secrecy might contribute to Spice being more exciting and attractive than it actually is (forbidden fruit tastes the best). Secluded places were used as a way to avoid being caught smoking. Novice users expressed more fear of being caught, and put greater effort into withdrawal

and hiding, than did experienced users. Spice smoking might contribute to alienation by shaping closed groups from which the uninitiated are excluded.

Within the group, social norms seem to be of importance even during intoxication. Many described how they analyzed their own behavior and were afraid of losing control or making fools of themselves: “I did not dare to speak, since everything I said was so silly and I was afraid they’d laugh at me.” However, it is tolerated to laugh at peers who do not behave normally or have lost body control, as long as their behavior remains within reasonable limits. The shared secret of behaving in an unusual way together with friends probably increases the sense of belonging to the group. The freedom to behave in extreme ways during intoxication is not total, but the social context has extended it considerably. Perhaps it is perceived as a freedom to temporarily be allowed to behave slightly outside the box, and one of the reasons for using of the drug?

**Intoxication remarks.** This theme comprises the writer’s own evaluating remarks on the intoxication, which often also were communicated within the group. The quick onset (within minutes) of the intoxication was much appreciated. In most cases it was very intense, something which could be experienced as either satisfying or shocking: “Felt the first effects after 30 seconds, tingling, light head and joy”/“Felt right away that this trip was going to hell.”

It was common to wait before re-dosing. Some expressed disappointment with the short duration of the effects, or worse, not noticing any intoxicating effect at all: “I felt angry, disappointed and betrayed at those fucking idiots who recommended Spice.” Possibly this disappointment reflects the initial high expectations. Re-dosing when the effects subsided resulted in an intoxicated state again. While affected by Spice, it was common to compare the state of intoxication with states induced by other psychoactive substances such as alcohol or cannabis: “The buzz is very reminiscent of good potent grass but this is more psychedelic and amazing”/“... feel as if I had been drinking a lot ... starting to feel bad and I feel a hang-over.” Spice was perceived as stronger than herbal cannabis, which can be explained by the synthetic cannabinoids’ higher affinity with the body’s cannabinoid receptors than those from herbal cannabis.<sup>2</sup> Some forum writers experienced a stronger intoxication than expected, which caused them to express caution: “It’s probably time for me to start treating these smoking mixtures with respect and stop seeing them as playing tools.” In general, it seemed to be of importance to comment on, evaluate, and share the intoxication experience within the group during the smoking ritual. Perhaps this act of reflection is undertaken in order to strengthen social belonging, just as tasting, evaluating and sharing is a large part of the wine culture.<sup>25</sup> Also earlier studies<sup>26</sup> have pointed out that drugs can have a role in developing friendship by creating a feeling of closeness from engaging in a shared behavior.

**Wellbeing and elation.** Positive effects induced by Spice were mostly experienced as a general and profound state of



wellbeing, expressed in the form of humor, laughter and relaxation: “I am smiling to the surroundings.” Muscle relaxation could be so intense that body control was partially and temporarily lost, which was described in positive terms. Also, altered body sensations could be experienced as pleasurable: “... My legs and my body start to twitch in spasms; every time the body gets spasms my body was full of total euphoria.”

General feelings of pleasure and euphoria, often related to altered body perception, were experienced during the intoxication: “I did not know where my arms were, we waved with them into the air in front of us, we then both laughed since the arms felt like spaghetti.”

Music was appreciated and enjoyed in new and more profound ways than normal, influencing the emotional state and the overall musical experience. Some also described how music was experienced in a much deeper way than in everyday life: “The music flowed into me, and my body started to pulsate with the music”/“all of a sudden I heard the music... so fucking good.” Earlier studies have pointed out that music is enhanced and more appreciated during cannabis intoxication,<sup>27</sup> and according to the descriptions on the forum, synthetic cannabinoids seem to have the same effect.

Furthermore, unanticipated and surprising thoughts and associations gave rise to laughter, humor and a pleasant group atmosphere: “I was fascinated by the way his voice sounded, and started to laugh.” Another form of well being was a deep thoughtfulness and a huge gratitude for life on earth and all that it meant to be alive: “The thought occurs to me that I am truly grateful for everything I have, my sister, my family and friends who love me”/“I really love my mom and my dad who let me stay in their house even though I do not give anything back. I am aware that I have difficulty showing my gratitude for all that they give me when I need it.”

Feeling good together in a social context is certainly important; it is fun to laugh together, and to share memories and experiences together, and such factors contribute to group cohesion within the peer group. These positive effects may well be the main motivational forces for drug use.

**Altered perception of reality.** This theme summarizes experiences of altered perceptions of reality, including cognition and time perception. Altered sensory processes involving vision and hearing were described and sometimes regarded as confusing, but mostly as highly appreciated effects.

Closing the eyes during intoxication was experienced as uncomfortable at times when the intensity of the perceived visual imagery became overwhelming. Opening the eyes reduced the intensity of the inner visuals: “I could not close my eyes because then the carousel started again.” The intensity could also be reduced if focus and attention were directed towards distracting activities. However, these inner images or dream worlds were mostly considered as a highly pleasant, interesting and amazing state: “I ended up in some kind of 3D world, unbelievable.” Closed eyes were used in order to intensify the experience and thereby become absorbed in it.

It may be assumed that this fascination for inner images and altered perception in general (although scary at times) may be a strong motivational factor for using Spice. The many rich and detailed descriptions of altered perceptions probably indicate its importance for the writers.

No one described detailed sceneries with open eyes, which was interpreted as an absence of visual hallucinations. However, some described an inability to distinguish between drug-induced experiences and everyday reality, thus suggesting that hallucinatory changes actually did occur: “Now I am in 3 different worlds, have to shake my head to get to reality.”/“There was a large orchestra playing and they stared at me and now I became uncertain about which of the worlds was for real.” It might be that intoxication became too intense and overwhelming, resulting in an overall experience of confusion and disorientation, which in turn gave rise to a mixing of inner and outer worlds.

Also, the perception of time was altered, either by being experienced as very slow, or experienced as a timeless state where the conception of time ceased to exist: “It seems like an eternity since I went to the toilet but it is only 10 minutes ago”/“I have no conception of time and space anymore.” Altered perception of time is one of the hallmarks of altered states of consciousness,<sup>28</sup> which indicates that substantial intoxication had occurred. Sometimes the time of ingestion was noted out of curiosity to know how long they had been intoxicated, but also as an attempt to obtain control: “I wondered how long I had been intoxicated, so I’m staring at the watch, it’s only been 30 minutes”/“Checking at 03:35, intoxication lasts twice as long this time.”

Descriptions of altered perception of the body were also described on the forum. Such effects were considered interesting and funny: “I started to laugh at my hands and arms, they did not feel like my own. They floated around and did what they wanted.” Memory and ability to focus shifted during intoxication, and sometimes they forgot what they coincidentally were doing: “I am lying in my bed, but do not remember when I came here, but suddenly I remember and start laughing.” Sometimes it was also difficult to speak since they forgot what they were talking about. One reason may be that working memory became impaired (similar to cannabis intoxication,<sup>10,13</sup>), making it impossible to “keep the thread” and remember what the discussions were about. Another explanation could be that the ability to speak requires precise fine motoric and sensory control, which had been severely impaired by intoxication.

On the whole, altered perceptions of reality were much appreciated even though some of them were confusing. According to Weil,<sup>29</sup> the motivation to alter one’s state of consciousness is an innate drive that motivates many people to use psychoactive substances. Another speculation on this appreciation might be that these inner images are fascinating in themselves, which contributes to an overall positive experience adding to the motivation of using these substances. According



to Attention Restoration Theory (ART), as explained by Kaplan and Kaplan,<sup>30,31</sup> fascination helps individuals recover from fatigue more quickly. The reason is that reasonably complex, coherent and fascinating stimuli (in this case inner images) have proved to induce an effortless type of attention, which contributes to increased wellbeing and recovery.

**Fears and coping.** In this theme many unpleasant effects such as general fears and fear of death were described. Strategies for dealing with overwhelming intoxication were also described. Several pleasant and relaxing effects were encountered, but beneath the surface of euphoria and joy were fears that occasionally surfaced. At times, people felt that they did not dare to relax (ie, release control) out of fear of dying. This can be interpreted that fear of death symbolically means fear of losing control: “As soon as I relax I feel death creeping up just around me”/“I will die if I relax.” Sometimes there were moments when the person was convinced that death was imminent: “I got an image in my head what my funeral will look like since I will not survive this night.” There were also fears of death related to concerns of overdose or having ingested the wrong substance. Although death was perceived as a threat, someone also said: “to face death” is an effect you sometimes have to expect and learn from. “Starting to think about my asthma and bad heart, and that it may not be so good to ingest a lot of unknown chemicals... and this confirmed my suspicions that I was going to die.”/“It felt like I would die, I saw ‘the light’ and talked to my dead relative.”

Unpleasant experiences of unreality during intoxication were described. This involved altered experience of self and of different parallel realities, which felt surreal in a scary way: “Everything around me disappears and it feels like I’m in a bubble and everything, except the sound coming from the TV, bounces off”/“I feel like I’m losing this reality.” This was also experienced as being vanished or reduced, and sometimes even interpreted as a process in which something of the self was lost: “I could feel how I was crimped inside”/“If the heart stops, the soul can finally get out.”

Fears could be triggered by external factors such as occasionally being left alone, or by some unexpected sound; factors that probably would not have induced fears in a sober state. Sensitivity appears to be heightened during intoxication, and feelings of panic can easily occur: “Got stuck in the shower with hot water streaming over me for four hours screaming out of genuine fear and panic.”

The most common strategy for dealing with overwhelming intoxication was trying to perform distracting activities or talk with friends in the group: “I start walking around the apartment and fiddling around with things to dispel my thoughts.” The aim was to try to regain control in order to calm down the emotional discomfort that arose. Another strategy, used as a last resort, was to ask for medical emergency care: “The doctor told me I had a panic attack.”/“... I felt that if I do not get help now I will die so I called my father in panic and asked him to pick me up and drive me to the emergency room.”

In other similar studies,<sup>32,33</sup> the most common effective coping strategies described were “acceptance” and “to go with the flow” during overwhelming experiences. Experienced persons in particular used acceptance strategies. In the present study, no such approaches were described, which might indicate that the persons here were more inexperienced and had not considered the contingency of having to handle too powerful experiences. Without doubt, Spice smoking comes with an increased risk of accidents due to irrational behavior during states of fear or panic.

It is remarkable that people continue to use these substances, despite all fearful experiences. There must be more than a desire for pleasant experiences; perhaps the experience that “something” is happening is fascinating and rewarding in itself (as speculated in a similar earlier study<sup>32</sup>) or that other positive effects (such as being in a social group) outweigh the negative ones.

**Unpleasant physical effects.** A wide variety of unpleasant physical effects during intoxication were described, such as hunger and thirst, pains, vomiting, heart palpitations and coughing.

Dry mouth and throat were commonly described: “I was sore in my throat so I poured myself a liter of water.” Also sudden attacks of increased appetite struck, resulting in excessive ingestion of snacks or whole meals: “I suddenly became extremely hungry and staggered into the kitchen to empty the pantry and fridge.” Some people also experienced nausea and vomiting: “I threw up huge amounts, still feel bad and do not even dare to sleep.”

Heart palpitations, tachycardia and frightening feelings of irregular heartbeat were commonly described as physiological side effects: “My heart was beating like hell, I started to get worried”/“After 10 minutes, it felt unpleasant, like the heart would shatter the chest.” Other alarming physical symptoms described were coughing and difficulty breathing. One possible explanation for these symptoms is that fear or panic simultaneously induced can make it difficult to breathe normally. Also other studies have reported similar effects (eg, 20) during Spice intoxication.

Different kinds of bodily pains (headaches and muscular pains) similar to having the flu were experienced, as well as several other non-specific physical symptoms: “Now it feels as if my brain is boiling over and wants to drain through my ears ... I also have burning sensations in my spinal cord.” The physical effects sometimes induced worries, and some persons had sought medical care due to fear of acute illness or dangerous poisoning.

Some of the physical effects described are similar to the effects of herbal cannabis intoxication (eg, dry mouth, hunger, increased heartbeats) but others are not. In general, cannabis is considered to have anti-emetic and pain-reducing effects,<sup>34</sup> while Spice experiences reportedly included vomiting and bodily pains. Previous studies have shown that synthetic cannabinoids often induce more side effects compared to herbal



cannabis.<sup>6</sup> There are possible explanations for these differences; 1 might be the synthetic cannabinoids' higher affinity to cannabinoid receptors (compared to THC in herbal cannabis), which induces a stronger effect.<sup>13,35</sup> Another explanation could be that Spice products lack constituents (eg, phytocannabinoids), which might have a protective or counteracting effect in the natural product.

## Conclusion

The 7 themes described above, provide a greater understanding of the circumstantial and experiential aspects of Spice use. Furthermore, during the final step of the analysis a more general understanding emerged. 2 factors seem to be of the utmost importance, namely the sense of social togetherness within the peer group, as well as a strong fascination incentive for both pleasant and unpleasant intoxication effects. This fascination of the effects of the drug was evident in 6 of the 7 themes; social togetherness was evident as a common thread in all 7 themes.

Spice smoking was mainly performed in social settings; the substances induced strong intoxication including positive and negative physiological and psychological effects. In comparison with herbal cannabis, the synthetic cannabinoids seemed to induce a more intense intoxication. It can be suspected that many of the writers on the internet forum are young, inexperienced and curious people who search for novel and non-ordinary experiences. Positive effects probably constitute a motivational force for using Spice. Interestingly enough, strong social connectedness within the peer group also seemed to act as a strong motivational factor and coping strategy. Besides the more obvious hazards of Spice use, the emergence of closed and alienated groups need to be addressed. The general knowledge of the dangers associated with new and untested substances, like Spice, appeared to be small or ignored. In order to prevent future abuse, accidents, and injuries there is an urgent call for effective drug prevention and harm reduction strategies among young people. According to other studies (eg, 6), most users prefer herbal cannabis to Spice because of greater pleasurable effects. Reasons for using Spice (instead of cannabis) might be that it is not screened on regular drug tests and it is available without visits to dubious drug dealers or dangerous environments.

It is not possible to assess whether the information collected in the current study is representative of Spice use in general or specific to those who use Spice as the sole intoxicating drug. If data had been collected from other discussion forums, different results could have emerged. Also, the results of this study can be criticized for not proving that the forum descriptions are truthful. There is no control over which drug the persons actually smoked. Obviously, there is also a risk that lies or exaggerations were included in the analysis. However, the multitude of negative descriptions emerging from this study indicates that the posts were not written in a drug-glorifying manner. On the contrary, it is more likely that the result

actually reflects a reality experienced by drug experimenting youths. This study does not claim to present an objective truth but it certainly presents a "reality on the Internet" that young people encounter in daily life.

Suggestions for further research are to continue following discussions on internet forums and interviewing people about their experiences. The social effects and stigmata associated with the formation of closed drug-using peer groups also need to be addressed. Young people's desire and motivation for experimenting with intoxicating substances and to experience non-ordinary states need more detailed study. Moreover, data obtained from surveys at poison control centers or emergency medical services are of the utmost importance. There is also a need to document unexpected new effects, and the possible risks and effects of concurrent drugs.

## Author Contributions

Conceived and designed the experiments: AK. Analyzed the data: HH, AK. Wrote the first draft of the manuscript: AK. Contributed to the writing of the manuscript: AK, HH, CS. Agree with manuscript results and conclusions: AK, HH, CS. Jointly developed the structure and arguments for the paper: AK, HH, CS. Made critical revisions and approved final version: AK, HH, CS. All authors reviewed and approved of the final manuscript.

## DISCLOSURES AND ETHICS

As a requirement of publication the authors have provided signed confirmation of their compliance with ethical and legal obligations including but not limited to compliance with ICMJE authorship and competing interests guidelines, that the article is neither under consideration for publication nor published elsewhere, of their compliance with legal and ethical guidelines concerning human and animal research participants (if applicable), and that permission has been obtained for reproduction of any copyrighted material. This article was subject to blind, independent, expert peer review. The reviewers reported no competing interests.

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