

Abstract

Background: Ecstasy pills with MDMA as the main ingredient were introduced in many European countries in the 1980s, and were often linked to the rave and club scenes. However, use gradually levelled off, in part as a response to increased concerns about possible mental health consequences and fatalities. Extensive use of MDMA now seems to be re-emerging in many countries. In this study, we investigated the cultural and social meaning associated with MDMA use in Oslo, Norway, with an emphasis on how users distinguish MDMA crystals and powder from “old ecstasy pills”.

Methods: Qualitative in-depth interviews (n=31, 61,3% males) were conducted with young adult party-goers and recreational MDMA/ecstasy users (20–34 years old, mean age 26.2 years).

Results: Research participants emphasised three important perceived differences between the MDMA crystals and ecstasy pills: (i) The effects of MDMA were described as better than ecstasy; (ii) MDMA was regarded as a safer drug; (iii) Users of MDMA crystals were described as more distinct from and less anchored in out-of-fashion rave culture than those using ecstasy. These differences were an important part of the symbolic boundary work MDMA users engaged in when justifying their drug use.

Conclusion: MDMA has re-emerged as an important psychoactive substance in Oslo’s club scene. One important reason for this re-emergence seems to be its perceived differentiation from ecstasy pills, even though the active ingredient in both drugs is MDMA. This perceived distinction between MDMA and ecstasy reveals the importance of social and symbolic meanings in relation to psychoactive substance use. Insights from this study can be important in terms of understanding how trends in drug use develop and how certain drugs gain or lose popularity.

Keywords: Recreational substance use, MDMA crystals, ecstasy pills, symbolic boundaries, club drug use, lay epidemiology.

Highlights

- MDMA use has been re-emerging in Western Europe.
- MDMA crystals and ecstasy pills are chemically similar substances, but Norwegian users describe and experience them as substantively different drugs.
- The symbolic boundaries drawn between MDMA and ecstasy were based on users' perceptions of drugs' effects and their relative safety, as well as on how user groups were perceived.
- The importance of symbolic meaning of drugs needs to be acknowledged in order to understand drug use trends.

Introduction

After more than a decade of decreasing MDMA/ecstasy use, the drug is now on the rise in several European countries (EMCDDA, 2015, 2016b). The introduction of new drugs often accompanies the diffusion of styles and fashions, where psychoactive substances are associated with subcultural values (Gourley, 2004). The *acid house* and *rave* movements in the 1980s (Welsh, 1995), for example, were closely associated with ecstasy. Starting in the island of Ibiza in the early 1980s, ecstasy rapidly spread to mainland Spain, Germany, France, the UK and the USA (Goulding & Shankar, 2011). "Generation Ecstasy" (Reynolds, 1998) paved the way for dancing, house and techno music, and for the new psychoactive substances (Forsyth, Barnard, & McKeganey, 1997; Weir, 2000).

The use of ecstasy rapidly spread in the early 1990s, but then the use levelled off (UNODCCP, 2000). There may be several reasons why this happened. The rave, house, and techno scenes gave way to rap and hip hop (Kubrin, 2005), which are typically associated with marijuana as the drug of choice, and not ecstasy and MDMA (Primack, Dalton, Carroll, Agarwal, & Fine, 2008). Another contributing factor may be the growing reports of ecstasy being mixed with other dangerous substances, and of ecstasy-related fatalities, most notably the death of Leah Sarah Betts in 1995 (Blackman, 2004: 172). At the same time, research started to point to the risk of psychiatric problems (Kalant, 2001), reduced cognitive processing, sleep and eating disorders, dependence and tolerance in regular users (Parrott, 2001). At the turn of the century, the rave scene had lost its popularity, ecstasy was framed as a dangerous drug, and the prevalence of use dropped.

Oslo, the capital of Norway, has been experiencing a recent revival in the use of ecstasy/MDMA, just as the rest of Europe. Prevalence rates are still relatively low. In 2014 2,3 % of 15-34 year olds reported lifetime use of ecstasy/MDMA in Norway (EMCDDA, 2016a). In the Oslo Nightlife Study, that this research was part of, 19% of the respondents reported lifetime use of ecstasy/MDMA (Nordfjærn, Bretteville-Jensen, Edland-Gryt, & Gripenberg, 2016). Prevalence rates in the Nordic countries are much lower than in the UK, where lifetime use of MDMA were reported 9,2 % in 2014 (EMCDDA, 2016a). While drug seizures primarily reflect police strategies, they can also indicate drug trends and serve as a proxy for use. Seizures of ecstasy/MDMA in Norway have risen sharply between 2010 and 2015, from 5,000 to 336,000 pill equivalentsⁱ, and since 2012, the increase in seizures of powder and crystals has been higher than the increase in pills (National Criminal Investigation Service, 2016). These seizures may indicate and reflect personal preferences for MDMA crystals/powder among Norwegian users.

In most studies, ecstasy and MDMA are classified as a single category of drugs, although some studies have acknowledged the differences (Palamar, Acosta, Ompad, & Cleland, 2017; Smith, Moore, & Measham, 2009; Turner, Gautam, Moore, & Cole, 2014). However, the cultural connotations of the terms “ecstasy” and “MDMA” differ. Together with increased prevalence rates, users have started to label their product of choice as MDMA, whereas ecstasy has become a derogatory term. These perceived differences between ecstasy pills and MDMA crystals may be an important part of the social identity of a new generation of users – as well as a key to understand drug trends in Europe.

The difference between ecstasy and MDMA

MDMA has been marketed and used under different names in the illicit drug scene since the 1980s, for example ecstasy, happy pill, E, pure MDMA, MDMA powder, and MDMA crystals. Molly (USA), Mandy (UK), Emma, Adam, Crystal and other names are more recent slang terms (Durant, 2014; EMCDDA, 2016b). Animal studies reveal that MDMA produces a rapid enhancement in the release of both serotonin and dopamine, as well as increased locomotor activity, which may be a reason for its popularity in dance cultures (Green, Mehan, Elliott, O'Shea, & Colado, 2003). Many studies have elaborated on different aspects of the pharmacological effects of MDMA (Brunt, Koeter, Niesink, & van den Brink, 2012; Giné et al., 2016; Kalant, 2001; Kirkpatrick, Delton, de Wit, & Robertson, 2015), and the risks associated with the use of MDMA, including dependence, is debated (Nutt, King, & Phillips, 2010; Parrott, 2013; Uosukainen, Tacke, & Winstock, 2015). Research literature often classifies MDMA/ecstasy as a single substance, but there are differences between ecstasy pills (containing varying amounts of MDMA) and MDMA crystals (often crushed into crystal-like powder). Many studies have labelled the substance either MDMA (for ecstasy pills) or ecstasy, or used the term ecstasy/MDMA (Bahora, Sterk, & Elifson, 2009; Beck &

Rosenbaum, 1994). The active substance in both products, however, is MDMA (3,4 – methylenedioxymethamphetamine) (Kalant, 2001).

An early meta-analysis revealed high levels of MDMA in ecstasy pills early on, but in the mid-to-late 1990s, lower levels were observed. Sometimes, analogue substances (such as MDA or MDEA) were found instead (Parrott, 2004). Amphetamine drug mixtures or substances such as caffeine, ephedrine, or ketamine were also observed. In Norway, the toxic designer drug PMMA, also known as “Death”, was occasionally found in street drugs offered as ecstasy, resulting in several fatal intoxications and national awareness about the uncertainty of the pills’ contents (Vevelstad et al., 2016; Vevelstad et al., 2012). However, already by the turn of the century, before the recent increase in use prevalence, MDMA purity in ecstasy pills had returned to previously observed levels (Parrott, 2004). The ecstasy market in the EU seems to have been relatively stable after the turn of the century, with ecstasy pills mainly containing MDMA and/or MDMA-like substances (Brunt et al., 2012:752).

The content of ecstasy pills differs between countries (EMCDDA, 2015, 2016b). Few studies have compared the degree of purity in ecstasy pills to that of MDMA crystals or powder. A recent study from Spain found that the MDMA content was higher in crystals than in pills, but emphasises that there has been limited research on MDMA in crystal form (Giné et al., 2016). In the Netherlands, the MDMA content is especially high in pills (van der Gouwe & Rigter, 2016), and the purity had increased in the Netherlands and Switzerland from 2010 onwards (Brunt et al., 2016). There is no Norwegian data on the MDMA amount in ecstasy pills, but since one major smuggling route to Norway goes through the Netherlands, the content of pills sold in Norway may be similar to those sold in the Netherlandsⁱⁱ. Brunt et.al (2016) shows that there are considerable between-country variations in regard to prevalence of MDMA crystals vs. ecstasy pills . This study (Brunt et al., 2016) also, to some extent, addresses the difference between ecstasy pills and crystal powder, but nevertheless,

these remain seen as a single category. While the MDMA content in ecstasy pills and crystals varies, among Norwegian MDMA users, the differences between the two drugs seem to be more important in terms of social identity than pharmacology.

Social identity and symbolic boundary work

Identity is the “human capacity - rooted in language - to know 'who's who' (and hence what's what)”. It is an ongoing and multidimensional process of “classification or mapping of the human world and our places in it” (Jenkins, 2008:5), and this process is also used to claim membership for ourselves and others in distinct groups. Distinctions between insiders and outsiders are crucial to understanding the development of identities (Zerubavel, 1991:14). Barth (1969) early on described the importance of boundaries for ethnic groups, famously arguing that the focus should be on the “boundary that defines the group, not the cultural stuff it encloses” (Barth, 1969). Social identity is a multivalent process in which individuals identify themselves in terms of similarity to some people and not to others, and drawing symbolic boundaries is an integrated part of this social identity work (Järvinen & Demant, 2011). Following Lamont and Virag (2002), symbolic boundaries indicate struggle over definitions of reality, and reveal how symbolic boundaries separate people into groups and generate feelings of similarity and group membership (Lamont & Virag, 2002:168). Drawing on the work of Bourdieu, Lamont asserts that individuals and groups use symbolic boundaries to define status and construct representational markers that differentiate them from “others” (Lamont, 1992).

Social identity work is especially important for people at risk of stigmatisation (Goffman, 1963), for example, those who are substance users (Copes, Leban, Kerley, & Deitzer, 2016; Radcliffe, 2011). Drawing symbolic boundaries allows people engaged in potentially stigmatised behaviour to distance themselves from those clearly defined as

stigmatised. They do so by recounting claims about the differences between in- and out-groups (Lamont, 1992; Lamont & Virag, 2002; Loseke, 2007). As shown in a study of ‘hustler’ versus ‘crackhead’ identity, it is particularly important to draw social boundaries against stigmatised groups that are close in social proximity. Such identity work allows protagonists to make sense of their social world by distinguishing themselves from the clearly defined stigmatised “other” and by portraying themselves in culturally relevant terms, in addition to signalling their respectability and noteworthiness (Copes, Hochstetler, & Williams, 2008). Previous research on drug users shows how they – as any other social group – tend to portray their own behaviour as appropriate and the behaviour of “others” as less appropriate (for a review, see Copes, 2016). For drug users, the distinction between functional and dysfunctional use and acceptable and unacceptable relationships to drugs is also crucial when drawing symbolic boundaries in identity work (Foster & Spencer, 2013).

The aim of this study was to study the social and cultural dimensions of MDMA use in Norway. Branding and rebranding of drugs, or what may be described as lay epidemiology (Davison, Smith, & Frankel, 1991; Miller, 2005), and drug risk perceptions (Caiata-Zufferey, 2012; Peretti-Watel, 2003), are crucial in the understanding of drug use trends. Users’ perceptions may not necessarily reflect pharmacological “facts”, but are nevertheless important because drug users act according to these perceptions when deciding if and what drugs to use. This study examines the culture surrounding the use of MDMA, focusing on the perceived differences between MDMA (crystals/powder) and ecstasy (pills containing MDMA). In what follows, we will demonstrate how recreational drug users symbolically distinguish between the two drugs, and how this enables them to justify and make sense of their MDMA use.

Data and methods

The study is based on qualitative interviews with 31 young adult recreational drug users who reported having used MDMA/ecstasy. Half of them reported using the drug more than five times. The participants were on average 26.2 years old (age range 20-34) and 19 out of 31 were males. The majority were university students or employed in a variety of occupations ranging from chef, bartender and manual worker, to school teacher and civil servant. Only three were recently unemployed. Illicit drug use was primarily reported as recreational, at weekends, as part of partying and a night on the town. Interviews were conducted from April to December 2014, as part of 35 interviews with young adults in the Nightlife Study in Oslo - a multi-method investigation of the club scene and the culture surrounding the use of different substances (Nordfjærn, Bretteville-Jensen, et al., 2016; Nordfjærn, Edland-Gryt, Bretteville-Jensen, Buvik, & Gripenberg, 2016) modelled after British and Danish club studies (Demant, Ravn, & Thorsen, 2010; Measham, Aldridge, & Parker, 2001).

Study participants were recruited outside clubs and bars in Oslo city centre between 23.00 and 04.00 for several days. The quantitative part of the study included a short survey. Those who reported use of illicit substances during the previous 12 months, were invited to take part in future qualitative interviews and to provide their phone number. The first author contacted participants by phone and conducted interviews afterwards (i.e., some days or weeks after the recruitment). This sampling method has been used in other club studies (Järvinen & Ravn, 2011; Ravn, 2012). Such an approach is sometimes described as “targeted sampling” (Watters & Biernacki, 1989), and is evaluated as effective for studying issues in hidden and stigmatised populations.

Participants were offered the choice of the interview location, which most often ended up being the first author’s office. Interviews were semi-structured but open-ended and the

young adults were invited to share their knowledge and experiences on their own terms (Holstein & Gubrium, 2004). A semi-structured interview guide was used as a checklist to assure that important topics were covered, such as the use of legal and illegal substances and the culture surrounding clubbing, including dating, routines, health effects of drugs etc. The informal interviewing approach allowed the participants to actively shape the interviews, to freely bring up various topics, and to spontaneously share their drug use experiences, ultimately revealing information about different perceptions of “MDMA” and “ecstasy” that otherwise would not have been discovered.

Most interviews lasted around two hours and were audiotaped with a digital recorder and later verbatim transcribed. Data were analysed thematically. Predefined topics based on the interview guide were supplemented by topics that emerged from detailed interview readings. Interview notes written after each interview were also employed in the analyses of each interview. HyperRESEARCH software was used in the coding process, and a broad range of codes was created to systematize the data. One of the most central codes used in this study was “MDMA/ecstasy”. The next analytical step was to reanalyse all of the quotes in the relevant codes. This procedure identified common themes and led to their classification into the main categories presented later in the results (i.e., perceptions of drug effects, perceptions of safety and health, and perceptions of user groups). Two researchers coded two interviews: this procedure ensured mutual understanding of the data, and that topics were coded in the same way. While the collected data provided insights into club drug use in Oslo, it cannot necessarily be generalised to the city of Oslo or Norway.

The study was approved by the Regional Committee for Medical and Health Research Ethics (application No. 2014/192). All participants were reimbursed NOK 300 (approximately 30 €) for their time. Participation was voluntary, following the written informed consent procedure. Those who reported having experienced negative emotions associated with the

interview session were offered a free appointment with a psychologist (see: Nordfjærn, Edland-Gryt, et al., 2016). The participants' names and any sensitive information were changed when anonymizing data.

“New” drugs, new meanings

Recreational drug users in this study perceived MDMA crystals and ecstasy pills as substantively different drugs. Participants described how the old connotations of ecstasy use rooted in the early 1990's culture had given way to new perceptions and new meanings associated with MDMA. Henry, for example, stated: *We quit using ecstasy now that we have MDMA crystals (Henry, 23 years old, school teacher)*. In fact, distinctions between these two drugs were at the centre of several of the young adults' accounts of their drug use. They described how the effects of MDMA were better and how MDMA had fewer harmful consequences in terms of safety and health when compared to ecstasy. MDMA was also less associated with a stigmatised scene (the rave scene of the 1990s) and a rather stigmatised group of drug users (Radcliffe, 2011). Peter said:

Ecstasy has existed for so long that people have created an understanding that it's not that good for you, physically, that is. MDMA is new. It is the main element in ecstasy, and it doesn't hurt you, kind of. Now there is a way of taking ecstasy without the bad effects. (Peter, 34 years old, bartender)

Jamie added along the same lines:

It [MDMA] is socially accepted. Even though MDMA is the same ingredient they used in ecstasy when it flourished in the 90s, it still isn't ecstasy. That might be the reason

why it doesn't have the same bad reputation among young people. (Jamie, 21 years old, university student)

Peter and Jamie described what they perceived as real differences between these two drugs, but also acknowledged that the drug's reputation was important for understanding and influencing its use.

Most participants preferred MDMA crystals or powder over ecstasy pills and explained their preferences for MDMA by pointing to what they believed and understood to be major distinctions between the two drugs. These distinctions were crucial in the social boundary work MDMA users engaged in when describing, justifying, and understanding their drug use. They were based on these three primary aspects: (1) perceptions of drug effects, (2) perceptions of safety and health, and (3) perceptions of user groups.

Perceptions of drug effects

Ecstasy is usually swallowed as pills, while the crystal or powder form of MDMA is most often “dropped”, or swallowed wrapped in paper to conceal the strong chemical taste. MDMA is usually the main ingredient in ecstasy pills, but the effects of MDMA and ecstasy were described as radically different by most participants. Eddie, an experienced MDMA user, depicted those differences as follows:

I have tried regular ecstasy pills. God knows whether it was something shitty or something old, but it didn't give me a kick. MDMA in a clean form is in a different league. So, my impression is that ecstasy is just weaker, MDMA is cleaner.
(Eddie, 29 years old, manual worker)

Eddie devaluated ecstasy by describing it as less potent and “old”. In general, MDMA was regarded as a “purer” substance than ecstasy by our participants. Peter similarly described how “MDMA is the essence of ecstasy”. He also argued that MDMA was uncontaminated, while ecstasy typically was MDMA mixed with other substances, for example amphetamines. Robert emphasised the difference in this manner:

Ecstasy has never been a type of drug that has interested me. A lot of the euphoria disappears and it all becomes a bit more stressful... (...) MDMA crystals were interesting because they're purer. (...) Ecstasy is about sharp edges, in a way. Not something I would recommend. (Robert, 32 years old, chef)

Using the negative connotations such as “stressful” and “sharp edges”, Robert defined ecstasy as an unfavourable drug, while MDMA was “interesting” and “pure”. This was part of his boundary work, contrasting in-group (Lamont & Virag, 2002) MDMA users with out-group ecstasy users. MDMA was framed as an acceptable drug because it was believed to have better effects than ecstasy. These statements framed symbolic boundaries between acceptable and unacceptable practises, and eventually, between morally acceptable and morally unacceptable drug users (Copes, 2016). The purity of MDMA crystals was claimed to give a distinct high and a euphoric feeling that was stronger than that obtained from ecstasy. Some participants even used bio-chemical terminology:

The same feeling might appear when you work out or eat chocolate: a feeling that makes you happy and makes you smile. MDMA opens up all the locks of your brain and all endorphins exit at the same time. It just comes like a big bang and you become

really, really happy: you love everything and everyone around you. You don't have a single problem in the whole world. (Tim, 20 years old, University student)

Comparing MDMA to chocolate, and sometimes to having sex, participants associated the drug with pleasure, and several mentioned endorphins. Sylvia said that it was *a constant pleasure, 110 % all the time, you just love everybody, and cuddle everyone (Sylvia, 24 years old, university student)*. Many participants seemed to use the word endorphins to show that MDMA users had scientific knowledge of the brain and of the pharmacological effects of the drug they favoured. Emily described the MDMA high the second time she tried it:

Probably the best experience I have ever had in my life (laughing). I just became so euphoric and everything was perfect. I was just walking around in nature and couldn't stop smiling. I danced for many hours in a row, and everything was just fabulous. (Emily, 20 years old, University student)

Echoing the descriptions of ecstasy effects found in popular culture in the early 1990s (Welsh, 1995), feelings of unity and euphoria were common in our participants' descriptions of MDMA crystal effects. It appears that the MDMA has replaced ecstasy in the symbolic universe of illegal and recreational drugs. MDMA is apparently consumed to achieve greater quality highs, and not because of one's addiction, or the uncontrolled need to take the drug (Järvinen & Demant, 2011). The purity of MDMA was linked to better quality and more reliable drug effects than ecstasy pills, where the latter were frequently described as suspect, and potentially mixed with other unknown substances. Positive descriptions of drug effects - such as the experienced pleasure and increased sociability - dominated the boundary work drug users engaged in when explaining, rationalizing, and understanding their own MDMA

use. Pleasurable drug effects were associated with both the acceptable drug use and with morally acceptable drug users throughout our participants' narratives.

Perceptions of safety and health

Concerns about safety and health were the second important aspect of MDMA-users' boundary work. The perceived purity of MDMA was connoted with safety and the assurances that users "knew what they were getting". Roger for example, emphasised that he had used MDMA, not ecstasy:

Roger: MDMA. Clean MDMA. So they don't have ecstasy at all. There was one guy who took it [ecstasy] a while ago and he got totally messed up.

Interviewer: While you won't get messed up by MDMA?

Roger: Yes! They will be messed up, but they become a lot calmer. So there's probably a lot of bad shit in ecstasy. (Roger, 30 years old, civil servant)

That there was "bad shit" in ecstasy pills was widely accepted as a fact. This was an important reason why the powder or crystal form of MDMA was clearly preferred over ecstasy pills. Statements such as "the pill can contain anything" were common, and were used to distinguish between ecstasy pills and MDMA crystal/powder. Carol told about one time abroad when she had not managed to find MDMA, and had accidentally gotten ecstasy instead:

So then we got something quite different, and that was a terrible experience, I just passed out, and was lying there shaking for an hour and a half. Almost unconscious (...). It was really nasty. I'll never do ecstasy again. I don't feel that it's safe. You

don't know what it is, because the pill can contain anything. (Carol, 21 years old, university student)

By describing bad experiences following ecstasy use as distinctly different than MDMA use, Carol and other young adults justified why MDMA was a better and more sensible drug to use. Participants seemed to operate on a “continuum of purity”. They placed pure MDMA crystals at one end and ecstasy pills, which could possibly contain anything, at the other end of such self-constructed continuum. Moreover, the situations where the participants acquired the crystal MDMA and crushed it themselves were perceived as safer than those where MDMA was bought in the form of powder. Purchasing MDMA from a trusted, albeit unknown source was perceived as better than purchasing it from a random seller.

Many participants were preoccupied with having a healthy lifestyle and lower health risks were frequently mentioned as a reason for using MDMA instead of other drugs. Many took great steps to ensure that they minimised the risks of use, echoing previous findings about increased drug knowledge among users (Aldridge, Measham, & Williams, 2011). Jamie, an experienced user, described how he always took magnesium before using MDMA, as well as various other strategies for reducing the risks of drug use:

I live quite healthily. That's not because of my drug use, but it does help you get a better effect though. The day after might also be milder. Because you might feel a bit empty and drained of energy. It [MDMA] releases quite a lot of serotonin and stuff. Many people use supplements called “preloading” or “postloading”. Then you take vitamins, supplements, amino acid or stuff like that before you take the drug and then finish off with something else afterwards. It's all just to make your body regain its balance. (Jamie)

By describing the use of preloading, postloading and magnesium, Jamie subtly justified his decision to use MDMA in a way that distanced him from what he saw as the dysfunctional and unacceptable use of ecstasy. His drug knowledge and preference for MDMA positioned him in a “superior” group of drug users (Bahora et al., 2009; Foster & Spencer, 2013). MDMA was sometimes compared to alcohol and viewed as milder for the body, although possibly more damaging to the brain. This was one of the few adverse effects of the drug mentioned by participants, but it was downplayed by emphasizing that most of them used the drug relatively seldom. While MDMA was compared to several other substances, the most important comparison was against ecstasy. Peter, for example, compared coming down from MDMA and ecstasy:

I think you become less depressed on MDMA than on ecstasy actually, for some reason I don't know. Maybe because there is a lot of shit in ecstasy pills.
(Peter)

Purity was crucial for drug users understanding of experienced effects and perceptions of safety. They primarily related *good, safe and healthy* drug experiences to the purity of the MDMA crystals as compared to the ecstasy pills. This symbolic boundary work has previously been described in terms of emphasising good mental health, and in describing own drug use as morally and physically superior to the drug use of other groups (Foster & Spencer, 2013; Järvinen & Demant, 2011). MDMA users frequently described the unfavourable health effects of ecstasy to define an out-group (Zerubavel, 1991), while simultaneously emphasizing the relative safety of MDMA as part of symbolic boundary work aimed at

constructing their acceptable drug use and defining themselves as a group of morally acceptable drug users.

Perceptions of user groups

Symbolic boundaries distinguish between groups of people (Lamont & Virag, 2002). This is implicit, and sometimes made explicit, in the two dimensions described above. MDMA users in this study were concerned about achieving pleasurable drug effects and they were concerned about safety and physical and mental health effects— *as opposed to* ecstasy users who were both perceived and described as caring less about these issues. In this manner ecstasy users were seen as more dysfunctional and therefore more unacceptable than MDMA users, the characteristics which previously have been described as defining symbolic boundaries among drug users (Foster & Spencer, 2013). These boundaries were even more clearly expressed in participants' more explicit characterizations and descriptions of these two drug user groups.

Several participants stated that MDMA was not linked to subcultural connotations of raves and house music in the same manner as was ecstasy. Robert, an experienced MDMA user, portrayed ecstasy users as follows:

The people I have talked to who have taken ecstasy or offered me ecstasy have always fit well into the rave aesthetic, if you can call it that, while MDMA includes everyone from engineers and architects to... yeah. (Robert)

Arguing that “everyone” uses MDMA highlights the normality of MDMA users, as well as their ability to be rational and to exhibit self-control (Ravn, 2012). Just as people in general, drug users constantly aim to maintain positive images both of themselves and of the group

they belong to (Rødner, 2005). Many participants brought up the differences between MDMA and ecstasy users, as they experienced and perceived them. The ecstasy-rave association of the 1990s was important in these portrayals, and referred to a scene that was now completely out of fashion.

For example, MDMA users were described as more sophisticated than ecstasy users because MDMA could be used in multiple contexts, and not only for dancing. Even though MDMA was also labelled as a dancing drug in the same manner as ecstasy was described in the 1990s (Riley, James, Gregory, Dingle, & Cadger, 2001), several participants also used it as a “sofa drug”. They described how they could take MDMA while at home, or while talking to close friends, and they linked such diverse MDMA use contexts to feelings of closeness and empathy. MDMA highs were commonly described as more suitable for broader purposes than only dancing, implicitly making MDMA users both more sophisticated and less associated with rave culture than ecstasy users. Robert further explained the difference between users:

Ecstasy is a bit, like, you are going to dance and like, yeah, you have a glow stick in your mouth. While MDMA is just a bit more, yeah, like an extra high that isn't necessary. (Robert)

The context, or setting, of drug use is important for understanding the nature of drug use (Zinberg, 1984), and it is also a way MDMA users draw boundaries against users of ecstasy. The possibility of MDMA use within multiple contexts, and not only at rave parties, linked the drug to more complex patterns of use. This also was associated with the socially valued ability to use the drugs in a controllable manner. The varied contexts of use made it easier for MDMA users to categorise MDMA users and ecstasy users as two different groups.

The use of MDMA in different contexts and settings shows how symbolic boundaries were not merely formed in rhetoric, but actually shaped the routine behaviours of users in practice (Kelly et al., 2015).

Gender was also mentioned as a differentiating factor between MDMA and ecstasy users. Peter mentioned how girls more often used MDMA than other drugs:

A lot of girls take it; that's a bit different compared to other things. There have always been fewer girls taking coke and that kind of stuff. But with MDMA, if there are not more girls, there are at least as many. (Peter)

This assumed gender equality when it came to MDMA use was regarded as positive, and contributed to the narrative that “everybody” was using MDMA. About half of the participants thought girls used MDMA as much as men. For other substances, almost all thought more men used the substances.

Traditionally, ecstasy use has often been part of a poly-drug use pattern (Boeri, Sterk, Bahora, & Elifson, 2008; Pedersen & Skrondal, 1999). Among our participants, those using ecstasy pills were also described as being more into poly drug use than those using MDMA crystals. Poly-drug use was often associated with a lack of control and addiction, so this was yet another layer differentiating MDMA users as more responsible and mainstream when compared to ecstasy users. Being in control of one’s drug use was seen as a key part of possessing self-control, which is a highly regarded cultural value in most Western countries (Copes, 2016; Ravn, 2012).

MDMA users portrayed themselves as open, resourceful, and more sophisticated. Most importantly, this user group described itself as inclusive, encompassing a wide variety of people. Several participants stated: “MDMA is for everybody!” The accounts seen in the

interviews do not necessarily intend to convey or suggest that everyone is using, but are instead reflecting fear of being perceived as deviant, and are meant as a demarcation from users of other, harder drugs. Peter had been working in bars for a long time, and argued that MDMA use was on the rise, linking such trends to inclusion and openness. He described the situation in clubs in Oslo:

I believe there is a huge, huge curiosity for it (MDMA). (...) I think it is quite strange, because there are so many different people trying it. Usually [for other drugs] there are special groups. With LSD you get the people in tie-dye shirts babbling around, right? Then you get the ones smoking and not giving a shit. But with MDMA everyone can just gather and have an enjoyable time together. You don't care where they come from or what group they belong to. It's just accepted everywhere. (Peter)

As seen in this quote, MDMA users not only distanced themselves from ecstasy users, but also from people using cocaine, LSD and cannabis. The distance from ecstasy users still remained the most salient differentiating factor, and as seen in Peter's statement above, it reflected the general idea that MDMA was used by "everybody".

Boundary work among MDMA users was therefore less about establishing a subculture oriented towards differences and more about downplaying these differences and appearing as responsible and "normal". This study shows the centrality of 'the claim of normality' (Coleman, 1988) in boundary work towards other drug users. It reflects a fear of being perceived as deviant and marginal (Sandberg, 2012), and is a way of achieving self-respect and respect from others. Pointing out that "everybody" uses MDMA adds to the boundary work emphasising pleasurable drug effects, safety, and rejection of the 1990s rave

scene and the associated fashions, which were all strategies employed by MDMA users to distinguish themselves from dysfunctional and untrendy ecstasy users.

Discussion

Individuals often maintain positive self-image by distinguishing themselves from those of lower status. In this study, it was striking how MDMA users actively constructed their social identity in opposition to and differentiation from ecstasy users. They did this by drawing symbolic boundaries between MDMA and ecstasy along three dimensions: (i) perceptions of the effects of the substances, (ii) perceptions of safety and health, and (iii) perceptions of the differences between the two user groups.

Previous studies have revealed the importance of drawing boundaries against those closest in social distance (Copes et al., 2008). For MDMA users, it was important to distinguish themselves from ecstasy users because this was the group of drug users they were most often associated with – and could be mistaken for. From a purely bio-chemical standpoint, these two drugs are considered the same. From a sociological perspective, however, the fact that they are perceived as different is particularly interesting. The Thomas theorem famously states that: “If men define situations as real, they are real in their consequences” (Thomas & Thomas, 1928:572). We suggest that the new MDMA social identity may have real-life consequences reflected in recent drug trends because these perceived differences may make more young adults willing to use the drug. MDMA crystals are ecstasy reconsidered and reframed to fit a particular – less stigmatizing and more normative – narrative.

Participants in this study repeatedly distanced themselves from ecstasy users, and described MDMA as a more functional, pleasurable, and safer drug. While laymen, researchers, law enforcement agencies and policy-makers tend to regard MDMA and ecstasy

as the same drug, most of our participants did not. Rather, they distinguished between MDMA and ecstasy use, and were in this respect especially concerned about health related issues. They framed their use of MDMA in a way that downplayed the harmful effects of the drug. Strategies to present MDMA as safe included self-initiated ways of minimising the negative physiological, psychological and social effects of use. This lay epidemiology emphasising the health and drug effects was the basis for symbolic boundaries that made MDMA more attractive than ecstasy. In this way, participants constructed a social identity as MDMA users, and justified their use of the drug. Such a way of explaining use of one specific drug as not so harmful is shown in previous studies. What is interesting here, is how a distinction is drawn to a drug that is chemically similar, while other studies typically have identified distinctions to other, usually harder drugs (Demant & Ravn, 2010; Peretti-Watel, 2003).

Barth (1969) argues that feelings of communality are defined less by a shared culture and more by an opposition to the perceived identity of other groups. For MDMA users in this study, the “boundary that defines the group” (Barth, 1969) was drawn against ecstasy and ecstasy users. This distinction was crucial in distinguishing in-groups from out-groups (Lamont & Virag, 2002). The boundary work also implied drawing lines between acceptable and unacceptable drug use (Boeri et al., 2008; Foster & Spencer, 2013), and was a way for MDMA users to distinguish themselves from unfashionable and risk-seeking ecstasy users. MDMA users described how MDMA could be used in a number of contexts, in particular those connoting closeness and intimacy, while ecstasy was limited primarily to club and party settings. These new perceptions of MDMA use informed their presentation of self and helped build moral identities. Because they saw MDMA use as not as risky as ecstasy, they could defend their use as part of their moral identity.

It is certainly possible that what is sold as MDMA is actually chemically purer than ecstasy (Brunt et al., 2012; Brunt et al., 2016; Giné et al., 2016). This may partly explain the

renewed interest in the drug. However, the *perceived* differences between these drugs among users seem more important in the observed drug use patterns, including the recent surges in MDMA popularity. When introduced to larger groups of users in Oslo around 2013/2014, MDMA was perceived as a relatively new drug and therefore more open to alternative and new interpretations. For MDMA users, distinguishing between “pure” MDMA and “contaminated” ecstasy made it possible to use a previously highly stigmatised substance while simultaneously avoiding being associated with a stigmatised user group. This borderwork highlighted distinctions between insiders and outsiders and helped young adults frame an acceptable relationship to drugs.

There are several reasons why drug trends develop. Availability and markets are important (Babor et al., 2010), but the participants’ perceptions about what is new and trendy will also affect drug trends. The development of new drug trends can occur rapidly, as witnessed in the recent introduction of so-called new psychoactive substances or “legal highs” (Seddon, 2014). Developments of online marketplaces have also influenced drug trends (EMCDDA, 2015). Based on the findings from this study, we argue that new cultural framings of drugs and symbolic boundaries between “new” and “old” drugs may play into these trends as well. We show how symbolic boundary work can contribute to our understanding of recreational drug trends. This lay epidemiology of drug use is important to take into account, because the young adults elaborate on the risks of drug use and the ways to deal with it. MDMA crystals and ecstasy pills are, to some extent, pharmacologically similar, and often lumped together by researchers and policy-makers. But they are very different in the eyes of the users. In efforts to understand individual use and drug trends, this might be as important as any “real” difference between the drugs.

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Conflict of interest

The authors have no conflict of interest to report.

References

- Aldridge, J., Measham, F., & Williams, L. (2011). *Illegal leisure revisited: Changing patterns of alcohol and drug use in adolescents and young adults*: Routledge.
- Babor, T., Caulkins, J., Edwards, G., Ficher, B., Foxcroft, D., Humphreys, K., . . . Strang, J. (2010). *Drug policy and the public good*: Oxford University Press.
- Bahora, M., Sterk, C. E., & Elifson, K. W. (2009). Understanding recreational ecstasy use in the United States: a qualitative inquiry. *International Journal of Drug Policy, 20*(1), 62-69.
- Barth, F. (1969). *Ethnic groups and boundaries: the social organization of culture difference*. Oslo: Universitetsforlaget.
- Beck, J., & Rosenbaum, M. (1994). *Pursuit of ecstasy: The MDMA experience*: SUNY Press.
- Blackman, S. (2004). *Chilling Out: The Cultural Politics of Substance Consumption, Youth and Drug Policy*. New York: McGraw-Hill International.
- Boeri, M. W., Sterk, C. E., Bahora, M., & Elifson, K. W. (2008). Poly-drug use among ecstasy users: Separate, synergistic, and indiscriminate patterns. *Journal of Drug Issues, 38*(2), 517-541.
- Brunt, T. M., Koeter, M. W., Niesink, R. J. M., & van den Brink, W. (2012). Linking the pharmacological content of ecstasy tablets to the subjective experiences of drug users. *Psychopharmacology, 220*(4), 751-762.
- Brunt, T. M., Nagy, C., Bücheli, A., Martins, D., Ugarte, M., Beduwe, C., & Ventura Vilamala, M. (2016). Drug testing in Europe: monitoring results of the Trans European Drug Information (TEDi) project. *Drug testing and analysis*.
- Caiata-Zufferey, M. (2012). From danger to risk: Categorising and valuing recreational heroin and cocaine use. *Health, risk & society, 14*(5), 427-443.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology, 95*-S120.

- Copes, H. (2016). A narrative approach to studying symbolic boundaries among drug users: A qualitative meta-synthesis. *Crime, Media, Culture*, 12(2), 193-213.
- Copes, H., Hochstetler, A., & Williams, J. P. (2008). "We Weren't Like No Regular Dope Fiends": Negotiating Hustler and Crackhead Identities1. *Social Problems*, 55(2), 254-270.
- Copes, H., Leban, L., Kerley, K. R., & Deitzer, J. R. (2016). Identities, boundaries, and accounts of women methamphetamine users. *Justice Quarterly*, 33(1), 134-158.
- Davison, C., Smith, G. D., & Frankel, S. (1991). Lay epidemiology and the prevention paradox: the implications of coronary candidacy for health education. *Sociology of Health & Illness*, 13(1), 1-19.
- Demant, J., & Ravn, S. (2010). Identifying drug risk perceptions in Danish youths: Ranking exercises in focus groups. *Drugs: education, prevention and policy*, 17(5), 528-543.
- Demant, J., Ravn, S., & Thorsen, S. K. (2010). Club studies: methodological perspectives for researching drug use in a central youth social space. *Leisure Studies*, 29(3), 241-252.
- Durant, B. (2014). *Ecstasy: The Ultimate Guide for Understanding MDMA, The Molly Drug, And What You Need to Know (Ecstasy, MDMA, Molly Drug, Mandy Drug, Legal Drugs)* London: CreateSpace Independent Publishing Platform
- EMCDDA. (2015). *European Drug Report. Trends and Developments 2015*. Luxembourg: Publications Office of the European Union. Retrieved from http://www.emcdda.europa.eu/attachements.cfm/att_239505_EN_TDAT15001ENN.pdf
- EMCDDA. (2016a). *European Drug Report. Trends and Developments 2016*. Luxembourg: Publications Office of the European Union. Retrieved from <http://www.emcdda.europa.eu/system/files/publications/2637/TDAT16001ENN.pdf>
- EMCDDA. (2016b). *Recent changes in Europe's MDMA/ecstasy market. Results from an EMCDDA trendspotter study*. Luxembourg: Publications Office of the European Union. Retrieved from <http://www.emcdda.europa.eu/system/files/publications/2473/TDO116348ENN.pdf>
- Forsyth, A. J. M., Barnard, M., & McKeganey, N. P. (1997). Musical preference as an indicator of adolescent drug use. *Addiction*, 92(10), 1317-1325.
- Foster, K., & Spencer, D. (2013). 'It's just a social thing': Drug use, friendship and borderwork among marginalized young people. *International Journal of Drug Policy*, 24(3), 223-230.
- Giné, C. V., Vilamala, M. V., Espinosa, I. F., Lladanosa, C. G., Álvarez, N. C., Fruitós, A. F., . . . de la Torre Fornell, R. (2016). Crystals and tablets in the Spanish ecstasy market 2000–2014: Are they the same or different in terms of purity and adulteration? *Forensic science international*, 263, 164-168.
- Goffman, E. (1963). *Stigma. Notes on the Management of Spoiled Identity*. New Jersey, USA: Prentice-Hall Inc., Englewood Cliffs,.
- Goulding, C., & Shankar, A. (2011). Club culture, neotribalism and ritualized behaviour *Annals of Tourism Research*, 38(4), 1435-1453.
- Gourley, M. (2004). A subcultural study of recreational ecstasy use. *Journal of sociology*, 40(1), 59-73.
- Green, A. R., Mehan, A. O., Elliott, J. M., O'Shea, E., & Colado, M. I. (2003). The pharmacology and clinical pharmacology of 3,4-methylenedioxymethamphetamine (MDMA, "ecstasy"). *Pharmacological Reviews*, 55(3), 463-508.
- Holstein, J. A., & Gubrium, J. F. (2004). The active interview. *Qualitative research: Theory, method and practice*, 2, 140-161.
- Jenkins, R. (2008). *Social Identity*. London; New York: Routledge.
- Järvinen, M., & Demant, J. (2011). The normalisation of cannabis use among young people: Symbolic boundary work in focus groups. *Health, risk & society*, 13(2), 165-182.
- Järvinen, M., & Ravn, S. (2011). From recreational to regular drug use: qualitative interviews with young clubbers. *Sociology of Health & Illness*, 33(4), 554-569.
- Kalant, H. (2001). The pharmacology and toxicology of "ecstasy" (MDMA) and related drugs. *Canadian Medical Association Journal*, 165(7), 917-928.

- Kelly, B. C., Trimarco, J., LeClair, A., Pawson, M., Parsons, J. T., & Golub, S. A. (2015). Symbolic boundaries, subcultural capital and prescription drug misuse across youth cultures. *Sociology of Health & Illness*, 37(3), 325-339.
- Kirkpatrick, M., Delton, A. W., de Wit, H., & Robertson, T. E. (2015). Prosocial effects of MDMA: A measure of generosity. *Journal of Psychopharmacology*, 0269881115573806.
- Kubrin, C. E. (2005). Gangstas, thugs, and hustlas: Identity and the code of the street in rap music. *Social Problems*, 52(3), 360-378.
- Lamont, M. (1992). *Money, morals, and manners: The culture of the French and the American upper-middle class*: University of Chicago Press.
- Lamont, M., & Virag, M. (2002). The Study of Boundaries in the Social Sciences. *Annual Review of Sociology*, 28, 167-195.
- Loseke, D. R. (2007). The study of identity as cultural, institutional, organizational, and personal narratives: Theoretical and empirical integrations. *The Sociological Quarterly*, 48(4), 661-688.
- Measham, F. C., Aldridge, J., & Parker, H. (2001). *Dancing on Drugs: Risk, health and hedonism in the British club scene*: Free Association Books.
- Miller, P. G. (2005). Scapegoating, self-confidence and risk comparison: The functionality of risk neutralisation and lay epidemiology by injecting drug users. *International Journal of Drug Policy*, 16(4), 246-253.
- National Criminal Investigation Service. (2016). *Narkotika- og dopingstatistikk 2015 (Statistics on Narcotics and Doping 2015)*. Oslo: KRIPOS. Retrieved from www.kripos.no
- Nordfjærn, T., Bretteville-Jensen, A. L., Edland-Gryt, M., & Gripenberg, J. (2016). Risky substance use among young adults in the nightlife arena: an underused setting for risk-reducing interventions? *Scandinavian journal of public health*, 1403494816665775.
- Nordfjærn, T., Edland-Gryt, M., Bretteville-Jensen, A. L., Buvik, K., & Gripenberg, J. (2016). Recreational drug use in the Oslo nightlife setting: study protocol for a cross-sectional time series using biological markers, self-reported and qualitative data. *BMJ Open*, 6(4).
- Nutt, D. J., King, L. A., & Phillips, L. D. (2010). Drug harms in the UK: a multicriteria decision analysis. *The Lancet*, 376(9752), 1558-1565.
- Palamar, J. J., Acosta, P., Ompad, D. C., & Cleland, C. M. (2017). Self-reported ecstasy/MDMA/"Molly" use in a sample of nightclub and dance festival attendees in New York City. *Substance Use & Misuse*, 52(1), 82-91.
- Parrott, A. C. (2001). Human psychopharmacology of Ecstasy (MDMA): a review of 15 years of empirical research. *Human Psychopharmacology-Clinical and Experimental*, 16(8), 557-577.
- Parrott, A. C. (2004). Is ecstasy MDMA? A review of the proportion of ecstasy tablets containing MDMA, their dosage levels, and the changing perceptions of purity. *Psychopharmacology*, 173(3-4), 234-241.
- Parrott, A. C. (2013). Human psychobiology of MDMA or 'Ecstasy': an overview of 25 years of empirical research. *Human Psychopharmacology: Clinical and Experimental*, 28(4), 289-307.
- Pedersen, W., & Skrondal, A. (1999). Ecstasy and new patterns of drug use: a normal population study. *Addiction*, 94(11), 1695-1706.
- Peretti-Watel, P. (2003). Neutralization theory and the denial of risk: Some evidence from cannabis use among French adolescents. *The British journal of sociology*, 54(1), 21-42.
- Primack, B. A., Dalton, M. A., Carroll, M. V., Agarwal, A. A., & Fine, M. J. (2008). Content analysis of tobacco, alcohol, and other drugs in popular music. *Archives of Pediatrics & Adolescent Medicine*, 162(2), 169-175.
- Radcliffe, P. (2011). Motherhood, pregnancy, and the negotiation of identity: The moral career of drug treatment. *Social science & medicine*, 72(6), 984-991.
- Ravn, S. (2012). Managing Drug Use in Danish Club Settings: A Normalized Enterprise? *Young*, 20(3), 257-276.
- Reynolds, S. (1998). *Generation Ecstasy. Into the world of techno and rave culture* [\[https://books.google.no/books?hl=no&lr=&id=tGaRjXe74UC&oi=fnd&pg=PA3&dq=reynolds+1998+generation+ecstasy&ots=NWW2l1wns9&sig=Vet1FJihwFW2zNXbdmhuYPf4vwM&re\]](https://books.google.no/books?hl=no&lr=&id=tGaRjXe74UC&oi=fnd&pg=PA3&dq=reynolds+1998+generation+ecstasy&ots=NWW2l1wns9&sig=Vet1FJihwFW2zNXbdmhuYPf4vwM&re)

- [dir_esc=y#v=onepage&q=reynolds%201998%20generation%20ecstasy&f=false](#)]. New York: Routledge.
- Riley, S. C. E., James, C., Gregory, D., Dingle, H., & Cadger, M. (2001). Patterns of recreational drug use at dance events in Edinburgh, Scotland. *Addiction*, *96*(7), 1035-1047.
- Rødner, S. (2005). "I am not a drug abuser, I am a drug user": A discourse analysis of 44 drug users' construction of identity. *Addiction Research & Theory*, *13*(4), 333-346.
- Sandberg, S. (2012). Is cannabis use normalized, celebrated or neutralized? Analysing talk as action. *Addiction Research & Theory*, *20*(5), 372-381.
- Seddon, T. (2014). Drug policy and global regulatory capitalism: The case of new psychoactive substances (NPS). *International Journal of Drug Policy*, *25*(5), 1019-1024.
- Smith, Z., Moore, K., & Measham, F. (2009). MDMA powder, pills and crystal: the persistence of ecstasy and the poverty of policy. *Drugs and Alcohol Today*, *9*(1), 13-19.
- Thomas, W. I., & Thomas, D. S. (1928). *The child in America: Behavior problems and programs*. New York: Knopf.
- Turner, A., Gautam, L., Moore, C., & Cole, M. (2014). Investigating the terminology used to describe Ecstasy. *Drugs and Alcohol Today*, *14*(4), 235-244.
- UNODCCP. (2000). *World Drug Report*. New York: Oxford University Press.
- Uosukainen, H., Tacke, U., & Winstock, A. R. (2015). Self-reported prevalence of dependence of MDMA compared to cocaine, mephedrone and ketamine among a sample of recreational poly-drug users. *International Journal of Drug Policy*, *26*(1), 78-83.
- van der Gouwe, D., & Rigter, S. (2016). *Annual Report 2015: Drugs Information and Monitoring System (DIMS)*. Utrecht: Trimbos-instituut.
- Vevelstad, M., Øiestad, E. L., Bremer, S., Bogen, I. L., Zackrisson, A.-L., & Arnestad, M. (2016). Is toxicity of PMMA (paramethoxymethamphetamine) associated with cytochrome P450 pharmacogenetics? *Forensic science international*, *261*, 137-147.
- Vevelstad, M., Øiestad, E. L., Middelkoop, G., Hasvold, I., Lilleng, P., Delaveris, G. J. M., . . . Arnestad, M. (2012). The PMMA epidemic in Norway: comparison of fatal and non-fatal intoxications. *Forensic science international*, *219*(1), 151-157.
- Watters, J. K., & Biernacki, P. (1989). Targeted Sampling: Options for the Study of Hidden Populations. *Social Problems*, *36*(4), 416-430.
- Weir, E. (2000). Raves: a review of the culture, the drugs and the prevention of harm. *Canadian Medical Association Journal*, *162*(13), 1843-1848.
- Welsh, I. (1995). *The Acid House*. London: W.W. Norton & Company.
- Zerubavel, E. (1991). *The Fine Line. Making Distinctions in Everyday Life*. Chicago: The University of Chicago Press.
- Zinberg, N. E. (1984). *Drug, Set and Setting. The Basis for Controlled Intoxicant Use*. New York: Yale University Press.

ⁱ The seized amount of powder is converted into the number of pills containing 100 mg active ingredient. This is based on the seized powder having a strength of 85%. During the last year, the strength of the powder seized was between 85–95% (National Criminal Investigation Service, 2016).

ⁱⁱ Personal communication with Senior Engineer in National Criminal Investigation Service (NCIS).