Protective behavioural strategies of Belgian young adults who use psychoactive medicines nonmedically: insights for harm reduction

Frédérique Bawin (frederique.bawin@ugent.be)
Ghent University

Mafalda Pardal
Ghent University

Julie Tieberghien
Katholieke Hogeschool Vives

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Abstract

The increase in the non-medical use of prescription drugs (NMUPD) has become a global health concern. Evidence shows that people who use psychoactive substances employ different strategies to minimise the harmful consequences of their use. However, most of the research investigating these protective behaviours focusses on the use of illicit drugs or alcohol. The goal of this paper is to improve the understanding of young adults’ nonmedical use practices of prescription drugs, perceptions about risks associated with use, and protective behavioural strategies (PBS), including the type of information they consult and rely on regarding prescription drugs. In order to gather in-depth insights into these issues, we conducted semi-structured interviews among young adults who have used prescription drugs nonmedically in Belgium. The PBS employed by the young adults encompass a spectrum of strategies that aim to minimise the negative consequences associated with NMUPD. They were mainly used to avoid acute side effects and long-term negative consequences. Reflecting on young adults’ own PBS and perceptions may be informative for developing harm reduction initiatives in the context of NMUPD.

Introduction

The increase in the non-medical use of prescription drugs (NMUPD) has become a global health concern. The types of prescription drugs that are mostly associated with non-medical use include sedatives, analgesics and stimulants. Earlier research conducted in the US shows that prevalence rates of NMUPD are the highest among young adults compared to other age groups (Faraone et al., 2020; McCabe et al., 2018; Schepis et al., 2018). The available evidence suggests that NMUPD is often associated with the goal of enhancing academic or work performance (i.e. performance enhancement), treating (undiagnosed) physical or mental health symptoms (i.e. self-medication) and having fun or getting high (i.e. recreational use) (e.g. McCabe & Cranford, 2012; Brandt et al., 2014; Faraone et al., 2020; Drazdowski, 2016; Eickenhorst et al., 2012; Papazisis et al., 2018; Holloway & Bennett, 2012; Lord et al., 2011; Peck et al., 2019).

Conceptualisations of ‘nonmedical use’ differ across studies examining NMUPD. For instance, it has been defined as the use ‘without a prescription’ (e.g. Holloway et al., 2013), ‘for nonmedical purposes’ (e.g. recreational use) (e.g. Chan et al., 2019) and/or ‘in a way other than prescribed’ (e.g. Faraone et al., 2020). In the context of our analysis, we define ‘nonmedical use’ as the use of a medicine without a prescription; and/or for purposes other than prescribed; and/or the use of a medicine in larger amounts, more often or for longer than prescribed; and/or the administration of a medicine by methods other than those prescribed.

When medicines are consumed in a manner not intended by the prescriber this may increase the associated acute and chronic health risks. For instance, ingesting prescription drugs through alternative administration routes can lead to negative health consequences (Faraone et al., 2020; Katz et al., 2011). The concurrent ingestion of prescription drugs with other psychoactive substances can cause overdoses or harmful drug interactions (Edwards et al., 2017; Jiao et al., 2009). In addition, evidence shows that
NMUPD resulting in emergency department visits has increased over the years (Faraone et al., 2020; Novak et al., 2016; Liakoni et al., 2017). Short-term adverse effects caused by the nonmedical use of stimulants include for instance headache, stomach-ache, irritability, feeling sad, reduced appetite and sleep problems (Faraone et al., 2020). The misuse of prescription opioids can lead to (unintentional) non-fatal overdoses and overdose deaths (Frank et al., 2015). Finally, long-term harms associated with extensive NMUPD are the development of mental health problems and disorders, such as substance use disorders (Martins et al., 2015).

**Protective behavioural strategies and harm-reduction**

Evidence shows that people who use psychoactive substances employ different strategies to minimise the harmful consequences of their use. Examples of these protective behavioural strategies (PBS) include stop using at a predetermined time, taking periodic breaks when using too frequently or not using before going to work or school (Pedersen et al., 2018). However, most of the research investigating these protective behaviours focusses on the use of illicit drugs (e.g. Fernández-Calderón et al., 2014, Fernández-Calderón et al., 2019; Day et al., 18, Pedersen et al., 2018) or alcohol (e.g. Villarosa et al., 2018, Doumas et al., 2017, Bravo et al., 2018). Although most of these studies have been conducted with young populations, we know very little of the protective behaviours of young people who use prescription drugs nonmedically, while this age group reports the highest rates of NMUPD (Faraone et al., 2020; McCabe et al., 2018; Schepis et al., 2018). In addition, most of these studies look into recreational drug use, whereas less is known about harm reduction in the context of substance use for performance enhancement and self-medication.

Furthermore, our contribution is in particular relevant since the context in which the nonmedical use of psychoactive medicines takes place is distinct from the contexts in which other psychoactive substances – illicit or licit - are used. This is in part because the substances have different legal, medical and social statuses, such as society’s views on the substances, accessibility, production processes, motives for use. As a result, harm reduction strategies for psychoactive medicines will have to be tailored to that specific context(s) of use. Nevertheless, harm reduction principles and strategies specifically concerning NMUPD – perhaps in part because of a more benign public perception of that consumption (within a ‘pill popping society’) are a less explored area of research.

**Our research goals**

The goal of this paper is to improve the understanding of young adults’ nonmedical use practices, perceptions about risks associated with use, and protective behavioural strategies, including the type of information they consult and rely on regarding prescription drugs. We focus on the nonmedical use of three different classes of psychoactive medicines, including sedatives, analgesics and stimulants. We distinguish between the different motives for using prescription drugs, including performance enhancement (e.g. to study), self-medication (e.g. to reduce stress) and recreational use (e.g. to party). The first two types of use can also be grouped together as functional or instrumental use.
In order to prevent or mitigate possible NMUPD-related harms among young adults, it is important to learn more about whether they apply particular strategies themselves to minimise the negative consequences of their use. To do so we relied on first-hand accounts from young adults in Belgium, drawing on qualitative data gathered through a study of NMUPD. We focus in particular on the perceived harms of NMUPD and protective behavioural strategies (consciously) applied by young adults to shield themselves from the negative consequences of their use. The second contribution of our analysis is thus to identify possible leads and recommendations for harm reduction interventions.

In our analysis we bring young adults’ voices to the foreground, and acknowledge that their own experiences of use and protective behavioural strategies may be informative for harm reduction policies (Pawson, 2019).

**Methods**

In order to gather in-depth insights into these issues, we conducted semi-structured interviews among young adults who have used prescription drugs nonmedically in Belgium. Eligibility criteria to participate in the study were having used at least one of the three studied prescription drugs (i.e. sedatives, analgesics, stimulants) nonmedically and being between 18–29 years old.

The qualitative data presented here was one of the data sources mobilized in a nation-wide study of NMUPD in Belgium (please see Bawin et al., 2021 for full details on that research project). In addition to the interviews, we conducted an online survey (N = 381), which also served as the main recruitment tool for interviewees. After completing the survey, participants were asked to leave their contact details if they were interested in participating in an in-depth interview. Other respondents were reached via snowball sampling. The interviews were conducted from July 2020 until October 2020. In total, 64 young adults were interviewed. The majority of the young adults were female, currently studying and were, on average, 23 years old - see Table 1 for additional characterization of the respondent sample. While the study sample is not representative of the total young adult population who have experience with NMUPD in Belgium, the interviews offered particularly rich accounts of respondents’ perceptions of use and protective behavioural strategies. and in this analysis we focus exclusively on that data.

We used an interview protocol, which included the general interview topics and subsequent interview questions. The following topics relevant for this paper were discussed: current medical use of the three types of prescription drugs; initiation, progress and current nonmedical use of psychoactive medicines; supply channels; information sources; perceptions of risk; attitudes and social acceptability.

While we had planned to conduct the interviews in person, due to the COVID-19 pandemic we were forced to conduct the majority of the interviews online, via video call platforms (N = 42). All the interviews were audio or video recorded and lasted on average one hour. All participants provided written or oral informed consent for participation in the study. The recordings of the interviews were transcribed verbatim and coded and analysed thematically using NVivo. Regarding the data analysis, firstly, two researchers coded a subset of interview transcripts independently in preparation for the coding phase. They developed a preliminary coding scheme from the transcripts based on the broader topics addressed in the interviews.
Subsequently, this code tree was tested by other researchers within the team and afterwards refined. Once the coding scheme had been agreed upon by the entire research team (cfr. intercoder reliability), the interview data was subsequently coded. The data analysis followed a cyclical process. The research team discussed the interpretations emerging from the interviews on a regular basis.

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<tr>
<th>Table 1</th>
<th>Socio-demographic characteristics of our respondents</th>
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**Results**

Self-perception of use

The young adults in our sample described themselves as careful and responsible actors when taking prescription drugs nonmedically. Many discussed making reasoned and considered choices in relation to their use patterns, the context of use, information sources and supply sources, including administration methods, doses, activities undertaken before and during use, etc. The young adults often explicitly claimed to ‘properly’ manage their own consumption by relying on varying PBS. They indicated wanting to take good care of their bodies and health in general. For instance, one respondent commented that:
“I think you need to be careful when using prescription medicines. I give myself some general guidelines, like what is acceptable and what is not.” (R20)

The young adults noted that they were disciplined when using psychoactive substances. To demonstrate control of their use and that there were no signs of dependence, some young adults explained that they had leftover medicines or full packages at home which they had not used nor did they feel attempted to take.

At the same time, the young adults’ emphasis on having self-control might be a way to justify their NMUPD and a strategy to minimise stigma associated with substance consumption. Indeed, several young adults made a distinction between themselves and ‘other people’ – the latter being a fictional group of others who used psychoactive substances in a problematic way, according to those respondents. Similarly, the young adults also noted that prescription drugs should not become more readily accessible, as they feared this might be problematic for people who they considered to be more vulnerable for substance addiction. These statements can be seen as a form of scapegoating groups of (more) problematic drug users, and constitutes a typical stigma management strategy utilized by people who use illicit drugs, for instance (Peretti-Watel, 2003; Pedersen & Sandberg 2013; Perrin et al., 2021).

Use patterns

PBS in a larger framework of substance use

Some young adults illustrated their reported self-control concerning NMUPD by drawing comparisons with their own PBS in using other psychoactive substances. For instance, several noted they did not consume alcohol while working or before driving, and that they adopted a similar strategy when using prescription drugs. They believed that particular medicines could impair their functioning and they considered themselves accountable for the consequences of their use, as the following quote illustrates:

“This is why I never take such strong medication when I work. Because I really know what the consequences can be. […] Also, I will never drive then. I know this isn't responsible.” (R04)

Some of the young adults who used psychoactive medicines recreationally explained why they used medicines instead of other illicit drugs (e.g. cocaine). Several preferred taking medicines because they perceived those substances as being more enjoyable. Their preference seemed to be related more often to the intensity of the psychoactive effects which was perceived to be less intense for medicines than for illicit drugs. The adverse effects of illicit drugs were also considered as being more severe compared to those of prescription drugs. Other reasons why prescription drugs were preferred for recreational use related to safety considerations. Some young adults thought the thresholds to use prescription drugs were lower than for illicit drugs, because they were considered less physically and mentally harmful, as well as more readily available and socially acceptable.

Setting limits on use frequency, dosage and brand selection
Most of the young adults in our study reported low frequencies of NMUPD. For instance, their nonmedical use was limited to weekly or monthly use or to defined periods, such as exam periods. Some even had used only once or a few times in their lifetimes. While many young adults reported low frequencies of use, because they only needed or wanted to use the medicines in particular circumstances, other young adults set deliberately limits on their frequency of use. Successfully adhering to a limited frequency or defined period was considered to be effective to prevent problematic use or particular health risks. Several young adults described what they considered to be controlled use, and most believed that long-term daily or almost daily use was unacceptable and/or harmful. In their view, one of the reasons to moderate use was to reduce the risk of dependence, especially in the case of prescription sedatives as they were regarded as highly addictive. One of the young adults told us:

“When I look at myself I think it would be very easy to become dependent and because I know this I try to take a sleeping pill only every once in a while when it is needed and certainly no more than two nights in a row.” (R05)

In addition, some young adults said that they consciously inserted (longer) breaks from using from time to time, in order to avoid building tolerance and to prevent dependence. Also this strategy seemed to be most common among those young adults who used prescription sedatives nonmedically. One young adult noted:

“I try not to use it as long as possible, because: 1) your tolerance builds and 2) the less you use it, the more effective it is when you really need it.” (R01)

In addition to frequencies of use, dose limits were also considered important to reduce possible harms. As illustrated in the following quote of a young adult who stresses the importance of being careful with the doses of the analgesic codeine:

“It makes you very drowsy and you have slurring speech. You have the feeling that you are being sucked into the seat that you are sitting in, you can't sit up straight. We were aware that Codeine is an opioid so that you shouldn't exaggerate with it because you can actually die from it. For instance, if you take you take a little too much Xanax, you're going to feel unwell but the chances of dying from it are quite low. While if you take a bit too much opioid you may stop breathing and it's over.” (R35)

The young adults determined the dose for NMUPD based on information they retrieved from different sources, including the package insert, previous prescriptions, online sources, advice from friends and family members and their own experiences. Other young adults also experimented to find what they considered to be an optimal dose. One of the respondents explained:

“I wasn't really aware of the doses and I was experimenting. So I used more back then. Now, I know very well that with that many milligrams I can handle this much, and I know how it affects me.” (R43)

The young adults were in particular careful with initial doses: participants noted following the ‘start with low and go slow’ principle to find a dose they were most comfortable with and to avoid overdosing. The
same young adult noted:

“I have a preference for the principle ‘Start with a low dosage and increase slowly.’ So, you have control if something goes wrong... you never know. It is important not to put yourself in danger.” (R43)

More generally, the young adults reported using ‘low(er)’ dosages to avoid acute adverse effects, but also to prevent intoxication or ‘feeling high’ when the medicines were used functionally. Some young adults mentioned taking lower doses than those usually prescribed or recommended, mainly to prevent adverse effects. Especially in the case of stimulant medicines used for study performance, participants talked about carefully striking a balance between the beneficial and adverse effects, such as arrhythmia, nervousness, hyperthermia, tremor, dehydration and insomnia. Some young adults reported using low doses of prescription drugs to avoid what they considered irresponsible behaviour caused by intoxication and to avoid building tolerance. One of them told us:

“You can keep taking Xanax and you keep feeling chiller until you don't know what you're doing anymore. You just keep eating it like candy. Then you make the rational decision: 'I'm not going to do it because I'm going to do stupid things and I'm not going to remember what I've done.'” (R07)

Another protective strategy that contributed to the perception of reduced harm related to the types and brands of medicines used nonmedically. The young adults decided not to use particular types of prescription drugs or not to switch to stronger or higher dosing units of the medicines they were already using. They were cognisant of the range of effects of different types of medicines and their dosing units and selective about specific brands or active ingredients. For instance:

“I try to stay away from everything stronger than tramadol. I dare not touch or order it”. (R01)

Some young adults noted that they replaced a type of medicine with another type or brand when they wanted to obtain so-called ‘better’ or ‘less adverse’ effects. They would substitute a brand they were not satisfied with, with another one:

“Concerta 27mg was a bit too strong so I decided to use Ritalin.” (R56)

Selecting administration methods

The young adults also paid attention to the administration methods for prescription drugs. The vast majority administered prescription drugs orally, thus via the recommended or conventional route of administration. Several young adults had also administered prescription drugs through alternative ways, mainly in order to alter the prescription drugs’ psychoactive effects in recreational contexts. Most of them reported intranasal administration (‘snorting’), mainly with stimulant medicines. None of the young adults reported having experience with inhaling or intravenously injecting prescription drugs.

Some of the young adults elaborated on which administration routes were most likely to produce the desired effects while causing the least adverse effects and health risks. They noted that they were most
familiar and comfortable with oral consumption and that snorting was a 'step too far', often describing this administration method as more ‘dangerous’ or ‘unnatural’. One of the young adults commented that:

“Pulverising and snorting medication – that isn’t natural. That is not how it is intended to be used. Also, it involves a dangerous component and it is bad for your nose, too [smiles]. Those pills are made to be swallowed and that works.” (R39)

Nonetheless, it is important to note that many young adults did not snort their prescription drugs simply because they never considered it.

While medicines were most often administered intranasally in recreational contexts, a few young adults reported having snorted stimulant medicines for study purposes as well. They explained that when using this administration method their concentration was higher and the effects occurred faster and lasted for a shorter period of time compared to oral ingestion. Interestingly, one young adult explained that he snorted stimulants for study purposes to reduce particular harms, i.e. to avoid the acute physical adverse effects he experienced when ingesting the medicines orally. He explained that when snorting the medicines he also needed a lower dose. He said the following:

“I started using it orally and then you have to use a lot more. Now I use it intranasally and I notice I have enough with much less. The impact on my stomach is also less bad. When using orally you really cannot eat anything for a whole day, which also greatly affects your well-being. If you use intranasally, you can still eat properly.” (R42)

Also in this regard, the strategy of administration seemed informed by health concerns. Finally, although the young adults did not have a prescription nor medical instructions for the medicines they used or used the prescription drugs differently than prescribed, they still tried to use the medicines as close as possible to the instructions included in the prescription or in the package insert. One of them told us that:

“I always swallowed it. I tried to take it as prescribed as much as possible.” (R35)

Setting limits on polysubstance use

Several young adults reported the concurrent use of prescription drugs with other medicines or other psychoactive substances, such as caffeine, alcohol and cannabis, despite being aware of potential harms. A common reported type of concurrent use among the young adults was the consumption of sedative hypnotics (e.g. cannabis, benzodiazepines) to induce sleep after having taken stimulants (e.g. cocaine, methylphenidate). As illustrated in the next quote:

“I used to go to the Festival Dour. Then you use substances that keep you awake. I know that it is quite dangerous, but then I dared to take half a sleeping pill to get to sleep afterwards, at 6 o'clock in the morning.” (R05)
However, other young adults explained that it was important not to combine ‘uppers’ (stimulants) with ‘downers’ (depressants) because of the perceived acute health risks. One young adult spoke about a ‘vicious circle’ and a ‘bad lifestyle’, when taking stimulants to wake up and to be energized, and depressants to fall asleep. Another respondent told us:

“Almost every one of the staff - those who work until 2 or 3 o'clock at night, they take coke to work and also after work and they are awake until 6–7 am. Then they want to go to sleep, but that's impossible and they take Xanax to be able to sleep. They do it again the day after because, they have to work again and they haven't slept much. I don't want to do that”. (R35)

Differently, several young adults consciously avoided mixing particular medicines with other psychoactive substances (e.g. alcohol, prescription or illicit drugs), also because of acute health risks. Particular combinations were described as ‘unsafe’ or ‘dangerous’, such as combining multiple depressants (e.g. alcohol with prescription sedatives or opioids). For instance, several young adults spoke about having experienced ‘blackouts’ when combining prescription sedatives (e.g. benzodiazepines) with alcohol – one of them commented that:

“That's not really safe [combination of benzos with alcohol]... because after a while you don't realize anything anymore. You think you’re sober, the benzo doesn't affect you. But in reality you are really screwed up, and then you go to sleep and everything is just a black hole. It's not like it happened that often. I don't know why I did that in the end. It was a habit to take it when I went out.” (R32)

Similarly, another young adult said:

“I try to use as little clonazepam as possible, especially when I go out partying. If you combine it with alcohol, then chances of dissociation are high. So that you don't remember what happened. I've been through that a few times. Then sometimes I really misbehave and I have to hear afterwards 'you did that and that and...'. I try to. Either I let someone know that I took something or I just don't take it.” (R01)

Motive and context of use

The young adults in this study used prescription drugs nonmedically mainly for study purposes and self-medication, and recreational purposes to a lesser extent. According to many young adults, ‘managing’ NMUPD also involved taking into account the context and motive most appropriate for the use of prescription drugs. This means that they set limits on the contexts (e.g. set and setting) in which and motives for which they use prescription drugs. For instance, some young adults who used prescription stimulants for study purposes decided deliberately not to use these medicines recreationally (e.g. to get high). They were mainly concerned the stimulants would no longer be effective for their main purpose of use when also using them for other purposes. One of them told us:

“I don't need it to have fun. It is meant for studying, and I don't want to use it in other contexts. I sometimes use the medication at work, but I am not comfortable with it. So, I want to keep its use as limited as possible. The medication helps me to study, and I want to keep it like that.” (R08)
One young adult explained that he never used his prescription sedatives (benzodiazepines) for recreational purposes because of the risk of addiction, whereas he did use other (prescription) drugs recreationally. Many young adults who had (medical) experience with analgesics did not use them for reasons other than pain relief as they were aware of the health risks. This was explained by one of our participants as follows:

"In the hospital they gave me tramadol for the pain. So I got a box of tramadol and I used it longer than necessary. Last Wednesday even, I ended up using it. But I try to save it for emergencies, when I'm in a lot of pain and have slept very little. Because it can give you a 'high' effect too. Pain that goes away can give someone the feeling that…. A bit like drugs, really. Tramadol is almost an opiate, so it comes closer to heroin or morphine. So it's also a really dangerous one I think." (R01)

Another young adult used stimulant medicines without a prescription for study purposes. However, this respondent deliberately chose to not use the medicines for enhancing sports or athletic performance, he commented:

"It's the same with coke, it gives you energy but when you take 10 steps you immediately have the feeling that your heart is going to explode, so I would never do that. Mainly because of being scared for my own health. In terms of sports, I can really get self-confidence and pride from it. So if I could bench, for example, x number of kilos suddenly because of taking Ritalin, I would be like 'that's not 100% me who did that, so it isn't something I can be proud of'. I would feel like I'm cheating myself." (R35)

Other young adults explained that they held on to particular routines of use to avoid impairing their daily functioning or productivity. For instance, many young adults avoided taking stimulant medicines for performance enhancement purposes in the evening or right before going to bed, in order to have a good night's sleep. One young adult explained:

"I know that I shouldn't take tramadol at 10 o'clock in the morning. It's a bad idea, it's not good for my productivity, because then I get too tired and too groggy. Then I won't be able to concentrate fully. Unless I know I'm having such a bad day and I know in advance 'this is going to be a day where I'm not going to do anything anyway. So I might as well try some medication.'" (R39)

The young adults we interviewed also paid attention to the emotional state they were in when consuming prescription drugs. For several of them, the decision to use also seemed to depend on their mood. For example, some stated that they avoided using prescription sedatives whenever feeling depressed or being in a bad mood, because they were afraid of exacerbating their negative emotions. In addition, several young adults preferred to use their medicines in what they perceived as safe, familiar environments, whether alone or with the presence of trusted friends or family members, but hidden away from judgemental or negative attitudes.

Finally, young adults also anticipated possible adverse effects caused by NMUPD. For instance, some of the young adults who took prescription stimulants for study purposes indicated drinking more water
beforehand and after taking the medicines in an effort to prevent dehydration.

“I think you can compare it to energy drinks. If you drink those, then you are constantly awake and boosted, but from the moment you stop you have a very bad crash. Then it’s very important in combination with Ritalin and energy drinks that you also constantly drink water, that your brain doesn’t dry out. Otherwise you can no longer concentrate and the effects of Ritalin are actually nullified.” (FB22)

PBS differences across different motives of use

The young adults in our study used prescription drugs for varying motives and in different contexts. When the medicines were used for self-medication and performance enhancement this was seen as a more responsible, reasoned and rationalised use, then when those substances were used recreationally. This perceptions seemed to be based on different aspects. For instance regarding use patterns, most young adults commented that they were able to specify the doses they consumed. However, when the prescription drugs were used in recreational contexts, it was more difficult for participants to tell how much they exactly used, because they were intoxicated or the pills were crushed, divided among friends and snorted. In general, the dose of prescription drugs taken for recreational use (e.g. to party) tended to be higher than the dose of the same medicines when used for self-medication or enhancement (e.g. to study). This was the result of users trying to intensify the medicines’ psychoactive effects. For instance, one young adult noted that when he used sedatives to sleep it was a “normal” dose, but when using them recreationally he consumed higher doses (e.g. 0.5 mg alprazolam to sleep versus at least 1.5 mg for recreational use). In addition, in recreational contexts, when young adults were intoxicated – from alcohol, prescription drugs, illicit drugs or a combination– they were less mindful about doses and more likely to increase them, as commented by this young adult:

“At the moment itself it always seems a good idea, then it’s like, I don’t feel anything. Or you forget that you have already taken some. Then the day after you notice how much has gone.” (R13)

In addition, when prescription drugs were administered through non-oral routes, mainly via intranasal administration, this was typically done in recreational contexts and far less often for self-medication or performance enhancement purposes. Prescription drugs were also most often purposely combined for recreational purposes. In these cases, the medicines were combined with other psychoactive substances because of the synergetic effects (e.g. to intensify the overall psychoactive experience). When prescription drugs were mixed with other substances in the context of enhancement or self-medication, it was mainly to counteract psychoactive effects.

Finally, typically when prescription drugs were used recreationally this was concealed from parents, whereas when the medicines were used for performance enhancement or self-medication this was not always the case (see the section on disclosure below).

Supply sources: limiting accessibility and ensuring reliability
Most young adults obtained prescription drugs used nonmedically from close family members or friends for free, or they had their own prescription for a medical problem. Only very few bought prescription drugs via other channels, e.g. online or street dealers. As such, several respondents discussed the importance of having safe access to prescription drugs, or in other words obtaining prescription drugs from reliable or trustworthy supply sources. Firstly, some young adults explained that they deliberately never bought medicines that were not produced by pharmaceutical companies and from which the origin was unknown, such as designer medicines. They only trusted the medicines originating from official pharmacies. Obtaining prescription medicines from street dealers or unregulated online sources was considered unreliable and to pose severe health risks (e.g. the risk of buying medicines contaminated with adulterants). The following citation addresses that concern:

“Xanax from a dealer? I would not buy that, it is shifty. I am sure that the sedatives are contaminated with dangerous rubbish.” (R13)

Similarly, one other respondent indicated that:

“If I have to get it illegally, I'd rather not do it, because you never know what's in those pills. I really don’t trust that at all.” (R39)

On the other hand, other young adults who were not in the possession of a prescription or who lacked a social supply source (e.g. friend, family member) sometimes turned to other (online) sources, such as the dark web. Even so, some of these young adults argued that the comprehensive review systems available on the dark web made it possible to identify reliable vendors and that this was a form of quality control which might help to avoid possible harms with the products acquired through this unregulated channel. One of them explained:

“Modafinil, that is the original package. First of all, I check the reviews. You can evaluate, like..., if 10,000 or 1,000 add a positive review like ‘I bought this, it is good stuff, I got it tested in a lab.’ And there are only two bad reviews like ‘Order is not delivered, bad rating.’ In that case you know, and you can be sure that it is ok. Of course, if 500 reviews tell you that the package is not what they have ordered, you know that it is problematic, so you don’t order.” (R43)

Some young adults even applied their own quality control assessments and trusted their own ability to check the purity of the medicines they bought or received. These measures were mainly visual inspections, for instance medicines that were still in the original package or blister, or the inclusion of a package insert, were signs that inspired confidence that they had obtained authentic medicines, as illustrated in the following quote:

“It is still in the blister and it's undamaged. And it says Ritalin. So-[laughs]. Then I know it's real and then I really trust it 100 percent.” (R39)

Finally, another protection measure applied by only a few young adult was limiting one's own access to particular medicines. Some had given away or returned their medicines to friends or family members.
because they considered it too dangerous to have the medicines at their disposal. Mainly after having had negative experiences, they did not trust themselves using the medicines alone, for instance because of possible acute health risks or an unintentional or intentional overdose (e.g. suicide attempt). Also, the risk of dependence, especially concerning sleep medication, was a reason to give the medicines to others. The following quote illustrates this idea:

“It [Ritalin] worked for 4.5 hours and then I completely collapsed. The euphoria was gone and then it hit me hard, the sadness came. It had a very bad impact. I then decided to give the Ritalin I had to a friend. That I can't use it. It's just never the right solution, instead I should watch my sleep and not use stimulants. Because, it can also be very addictive, that particular feeling. I mean, you notice it immediately, after using it 2 times in 3 weeks, that it can be very overwhelming.” (R01)

Information seeking behaviour

A commonly reported strategy to reduce possible health risks caused by NMUPD was gathering information about the prescription drugs. Being well-informed about the medicines’ health risks and adverse effects, in particular when using them for the first time, was considered to be an important precautionary measure by our respondents. But also more experienced users stressed the importance of informing themselves. Most young adults did not use prescription drugs of which they did not have any knowledge. In contrast, a limited number of young adults stated that they (consciously) did not inform themselves. While some did not look for information simply because they were uninterested, a few others were too afraid about what they would find out regarding the health risks of their use.

Most young adults looked for the following types of information: the medicines’ chemical components, intended and adverse effects, dosage, administration methods and health risks associated with use, often conceived of in terms of dangerous combinations and dependence potential. As noted by this respondent:

“I'm not a person who thinks ‘Here is a pill, I don't know what effects it has, I'll take it and wait and see.’ No, no, no [laughs]. That's too dangerous. I do some research, I check websites with chemical information, with information about side effects, the combination of products, etc. In a way, it makes use safer.” (R39)

The young adults mentioned several information sources that they consulted to inform themselves, both online and in-person. The first encounter with particular psychoactive medicines was more often through friends or family members who had (non)medical experience with these medicines. In these cases, the young adults partially constructed their knowledge on their relatives’ or friends’ advice and instructions, as noted in the following:

“I got Ritalin from a friend of mine. I first asked my dad if this was harmful. He said it wasn't. [...] and then I searched the internet too.” (R02)

However, it is important to note that most young adults did not rely solely on these initial sources, but consulted other information sources too. In the interviews the emphasis was placed on online platforms,
such as general and professional websites and forums, as key sources of information. In this context, the young adults stressed the ease of access and the multitude of information available on the internet. The young adults recognised the value of the (online) package insert and websites of professional organisations as important and objective sources of information. Nevertheless, there were also young adults who believed that particular types of information were lacking in those sources. For instance, the information that was offered was considered too generalist and not describing users’ actual experiences. In addition, according to some, that information overly relied on technical terminology that was difficult to understand for laypeople like themselves. Furthermore, they sometimes criticised these sources for adopting a one-sided discourse that depicts nonmedical use as inherently problematic.

Therefore, online peer-based forums were consulted by some young adults and this information was often triangulated with other sources. Several young adults were specifically looking for user experiences (e.g. trip reports) in order to inform themselves and peers’ personal witnesses were prominent in these online platforms. Some young adults considered the experience-based advice sufficient trustworthy for managing their own use:

“Users often describe ‘I feel like...’ or ‘The problem I experience is...’. These users have obtained prescriptions, but these descriptions show what to expect exactly.” (R44)

Nonetheless, several young adults had reservations about the credibility of these peer witnesses. Although the mechanisms of the medicines are well known, most young adults seemed well-aware that the actual experienced (adverse) effects can vary because of individual physical differences for instance, and therefore also use patterns are more often personalised (e.g. doses). Consequently, they believed that caution should be exercised before deciding to experiment relying on such information, as this respondent illustrates:

“If you read 700 reactions coming from people who are using medication, there will be plenty of different experiences. [...] Based on your own experiences, you know what or what not to believe. [...] Some people who have been experimenting share their knowledge. The more you read those experiences, the more untrue stories you discover. After a while, you learn how to filter these stories, I think.” (R01)

It is noteworthy that most young adults appeared to adopt a critical stance when consulting and using internet-based information. For most of them, the key was to effectively sort through all of the available online information found and to locate reliable sources. To this end, more often young adults critically evaluated the credibility of the external information in light of their own experiences and cross-checked information coming from different sources:

“Different websites... you cannot trust just one website, so I always try to search for different sources and look for similarities.” (R18)

In addition to consulting online platforms, many young adults informed themselves by reading the prescription drugs’ package inserts included in the package of the medications. These were described as
giving standard information of the dose and the (adverse) effects of the medicines, as recounted:

“I did read the package insert and there were things like... very rare... 1 in 10,000 sudden death, and then you think holly shit [laughs], I hope I won’t be that one of these 10,000. But as long as I stay healthy and I can take that package insert into account, I don’t see any harms in it myself.” (R33)

Finally, a few of the young adults recognised physicians, and in particular general practitioners (GPs), as generally sound information sources. They trusted their prescribing physician or they relied on the fact that prescription drugs were strictly regulated and controlled. A respondent commented in this regard that:

“I trust the prescriber... I don't feel the need to look for more information [...] The package insert? I don't read it.” (R45)

One young adult explained that he thought the use of a stimulant medicine not available in Belgium (Armodafinil) was safe because of the research he did and because his cardiologist was not opposed to it:

“I had the feeling that the Armodafinil was pure because it has been checked and the package looks good. Also the cardiologist doesn't seem to be opposed to it.” (R37)

However, except for those young adults who were prescribed psychoactive medicines (but used them in a way not intended by the prescriber), medical professionals such as physicians or pharmacists, were mentioned rarely as an easily accessible source of information. Some indicated that medical professionals were difficult to approach with questions about nonmedical use and may have contrasting opinions to theirs. These professionals were sometimes described as experts using another language, and questioning or even disapproving their use:

“Because then they will pop the question, 'Why are you taking that? Do you really need that?' I don't feel the need to have such a conversation [laughs].” (R44)

Disclosure of NMUPD

Another PBS employed by a number of young adults was the disclosure of their NMUPD to other people, including family members, friends and, to a lesser extent, their general practitioners.

Disclosure of nonmedical use to health professionals, including physicians and pharmacists, was rarely reported by the young adults. It was clear that the young adults did not often discuss their use for other purposes, such as self-medication, performance enhancement or recreation. A few young adults had discussed their nonmedical use with their GPs. According to some of them, when physicians were informed about their use, they were unsupportive and considered it unhealthy. Most young adults did not seek medical approval from their GPs for their NMUPD. This was considered unnecessary or irrelevant, in particular when they thought of themselves of not having substance use problems (e.g. dependence) or
mental health disorders (e.g. ADHD). The young adults also sometimes claimed that their GPs were not informed about their use simply because of consulting them seldomly. The young adults who were prescribed medicines by their physicians believed that if they were to tell them about their nonmedical use practices (e.g. using more frequently than prescribed), it was likely that their physicians would discontinue prescribing the medicines to them and thus they would lose their access to the medicines. Nevertheless, the frequency of consultations with a GP was considered to be an indirect control mechanism by a few young adults who obtained prescription drugs via their physicians. In these instances, respondents thought that their GP, with whom they had a good relationship, would notice if they asked for more prescriptions than usual. In other words, they assumed that GPs would observe rapid increases in the amount of medicines needed or would be alert to if the use was leading to negative consequences, such as dependence. In these cases, their GP was described as a protective observer of their use patterns:

"He really takes into account which medications I have to take. He knows my past. I really would like to obtain Xanax, honestly, but I know this is not a good idea. Before, when I had another doctor, I just asked for some medication while faking some symptoms, and I got a prescription. So yes, yes,... now, it is better, my doctor offers me a very important protection." (R40)

In the importance of their own health, several young adults indicated that they would inform physicians about their NMUPD in particular circumstances, such as when experiencing severe adverse effects from their use, when having health problems or when undergoing certain medical treatments (e.g. surgery). They stressed to be transparent and that physicians were fully informed in those cases.

The young adults were more likely to discuss their nonmedical use with family and friends than with medical professionals. While some shared their intention to use only if it came up in conversations, others shared it proactively. This gave them a sense of safety, as these specific others could watch over them. These other people were not only those using prescription drugs with them or supplying the medicines, but also non-users who were open to or did not condemn their nonmedical use, as illustrated in the following citation:

"I try to take as few drops as possible, and certainly if I go out. Or I let someone know that I have taken something, or I just don't take it [...] I hope that other people, who use the same medication on prescription, also have someone to talk to. That is very important, that honesty. You feel guilty somehow. You have the feeling that there is social control which supports you to take decisions. If no one knows what you are doing...." (R01)

Frequently, young adults were transparent with their close friends about their NMUPD. However, they sensed it was important not to boast about their use. Their peers were informed, but they did not necessarily have deep conversations with them about NMUPD. For instance, one of our respondents commented that:
"People don't make a big deal out of using Ritalin. If there are people who say, 'I'm going to try it' they never say anything such as 'Be careful', it's always, 'Ok, tell me how you felt about it.'" (R38)

Whether parents were informed about their children's NMUPD varied widely among the young adults we interviewed. For instance, the young adults did not inform their parents about their NMUPD when they expected them to be disappointed or to disapprove of their use. On the other hand multiple young adults noted that they did not want to worry or hurt their parents, as they knew they would be concerned. A few young adults said they were too embarrassed to tell their parents about their NMUPD. Other young adults claimed that they could discuss their NMUPD freely with their parents. They argued that their parents considered them responsible and/or had received tacit approval from their parents for the use of prescription stimulants for study purposes. They also pointed out that their parents’ approval was linked to the visible positive impact of the stimulant medicines on their study performance:

“They could see that it worked a little but without any real impacting side effects.” (R46)

Nonetheless, the young adults indicated that when prescription stimulants were used for study purposes, they did not think their parents were actually fully aware of the dose they were using for that purpose.

Discussion

The current study examined young adults’ PBS related to the nonmedical use of prescription drugs. The PBS employed by the young adults encompass a spectrum of strategies that aim to minimise the negative consequences associated with NMUPD. They were mainly used to avoid acute side effects (e.g. physical harms) and long-term consequences (e.g. substance dependence). The young adults reported applying PBS in relation to their use patterns, supply sources and information seeking behaviour. We found that their general self-perception of use was associated with ‘carefulness’ and ‘responsible use’. The analysis further revealed that there may be different degrees of what is understood as ‘responsible use’ by young adults, and these tended to be associated with the purpose of use and the classes of medicines used. The young adults in our study took psychoactive medicines mainly for functional use, including self-medication and performance enhancement. They tried to make sure that their use did not impair their daily functioning. Instead they believed their functioning and productivity was improved, as their use helped them dealing with problems they encountered in daily life. In their view, a functional (nonmedical) use of prescription drugs (in a context of self-medication or performance enhancement) was seen as ‘more responsible’ than the recreational use of those substances. Several reasons were put forward by the young adults to explain this differentiation: accordingly, the capacity to measure dose, to take a lower dose, to adhere to conventional administration methods and the willingness to disclose their use was higher when using the medications for a functional purpose. When prescription drugs were used recreationally, young adults reported less PBS. Using these strategies might be then seen as counterintuitive when intoxication is the main goal of consuming prescription drugs (Bravo et al., 2018). There seemed to be also some transfer of knowledge between young adults’ PBS with other substances, which they also extended to their nonmedical use of prescription drugs. A first broad area which we
focused on related to use patterns. In that regard, we identified similar behavioural strategies as reported in studies examining the use patterns of other psychoactive substances (including cannabis and alcohol), such as inserting breaks, avoiding polysubstance use and not using particular medicines before going to work or school (Pedersen et al., 2018; Treloar et al., 2015). The limitation of the frequency and/or dosage of nonmedical use was a commonly used strategy among the young adults to limit the risks of acute and chronic harms. The young adults seemed to consciously restrict the frequency and context of use motivated by health-related concerns.

Corroborating previous studies, the young adults we interviewed perceived prescription drugs as safer than illicit drugs because they were produced by legal pharmaceutical companies and thus have a known quality (Mui et al., 2014; Quintero, 2012; DeSantis & Hane, 2010; Cutler & Kremer, 2017; Rönka & Katainen, 2017). This was also on the basis of their preference for supply sources, which was another area we explored in our study. They trusted the quality of the medicines produced by legal pharmaceutical companies and obtained via known supply sources such as family members, friends or physicians. Furthermore, those who bought prescription drugs from unknown sources (e.g. internet, dealer), applied their own quality control assessments. Differently than users’ assessments of the quality of illicit drugs, the young adults did not (need to) inspect nor evaluate the products themselves, but assessed the authenticity of the products by the way they were packaged. In common with people who purchase illicit drugs online, they also relied on the reviews of vendors in the discussion forums of the dark web (Bancroft & Reid, 2016).

Our study suggests that seeking information and being well-informed was another important way to reduce possible harms associated with NMUPD. The young adults sought for what was considered as ‘objective’ medical knowledge as well as more ‘subjective’ and peer-based reports. Similarly as other users of prescription or illicit drugs they looked for peer-to-peer harm reduction advice on dosing, adverse effects of polysubstance use, etc. (Bancroft & Reid, 2016; Rönka & Katainen, 2017). Corroborating previous studies, most of the young adults in our study obtained information about prescription drugs from online sources (Dertadian et al., 2017; Quintero & Bundy, 2011) and rarely from medical professionals. Nevertheless, health care professionals are important credible sources of information on prescription drugs and could play a key role in identifying, preventing and reducing harms of NMUPD. For instance, young adults who use prescription drugs nonmedically could benefit from being able to discuss their use with physicians – especially if these are open to harm reduction strategies. At the same time, and given the reliance on online information sources by youth, useful engagement strategies could include making sure that the information available on professional websites is comprehensible and evidence-based, and supporting a closer collaboration of (health) professionals with youth on websites, forums and other online platforms (Davitadze et al., 2020; Dertadian et al., 2017).

To the best of our knowledge, no previous research has studied protective behavioural strategies of young adults who report NMUPD. The current study provides unique insights which can inform harm reduction strategies by relying on young peoples’ direct accounts of their experiences and perceptions and by reflecting on their own PBS. Despite the valuable contributions that can be provided by qualitative
studies about harm reduction, quantitative research using a standardised measure for prescription drugs, such as existing scales for alcohol (e.g. Treloar et al., 2015) and cannabis (e.g. Pedersen et al., 2017) could also be of added value to measure the impact of PBS on NMUPD related harms. This knowledge could be useful to develop harm reduction interventions and prevention programs for young adults who use medicines nonmedically. The findings could prove useful for both practitioners and researchers, and can help underpin and inform future research in the area.

Declarations

Ethics approval and consent to participate

The study was approved by the ethical commissions of the Faculty of Law and Criminology of Ghent University and Université Saint-Louis Bruxelles. All participants provided written or oral informed consent for participation in the study after having received information about the study and receiving the study information sheet.

Consent for publication

All data is anonymised. The interview participants provided oral or written consent for anonymised findings to be published.

Availability of data and materials

The datasets during and/or analysed during the current study available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

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Authors' contributions

FB co-designed the study, drafted the manuscript, generated the qualitative data and conducted the qualitative analyses. JT co-designed the study, generated the qualitative data and conducted the quantitative analyses. JT was a major contributor in writing the manuscript. MP co-designed the study and conducted the qualitative analyses. MP was a major contributor in writing the manuscript. All authors read and approved the final manuscript.

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Authors' information

Frédérique Bawin: is a post-doctoral researcher at the Institute for Social Drug research at Ghent University (Belgium). She has a PhD in Criminology. Her research interests include the use of illicit drugs and the nonmedical use of psychoactive medicines.

Mafalda Pardal: is a post-doctoral researcher at Ghent University, Belgium (Research Foundation Flanders, fellowship grant: 1231821N). Her research interests focus on illicit markets and drug policies, as well as on social movements and resistance.

Julie Tieberghien: is a lecturer and a researcher in the department of Applied Social Studies at VIVES University College. She has an PhD in Criminology and her expertise and main interests focus on drug use and policy, crisis and disaster management, and local governance of societal security.

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