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# Predictors of using social media to purchase drugs in New Zealand: Findings from a large-scale online survey

## Authors:

Robin van der Sanden<sup>a</sup>, Chris Wilkins<sup>a</sup>, Jose S. Romeo<sup>a</sup>, Marta Rychert<sup>a</sup> and Monica J. Barratt<sup>b,c</sup>

<sup>a</sup> SHORE & Whāriki Research Centre, College of Health, Massey University, Auckland, New Zealand

<sup>b</sup> Social and Global Studies Centre and Digital Ethnography Research Centre, RMIT University, Melbourne, Vic, Australia

<sup>c</sup> National Drug and Alcohol Research Centre, UNSW Sydney, NSW, Australia

**Corresponding author:** Robin van der Sanden ([r.vandersanden@massey.ac.nz](mailto:r.vandersanden@massey.ac.nz))

## Author email addresses:

Robin van der Sanden: [r.vandersanden@massey.ac.nz](mailto:r.vandersanden@massey.ac.nz)

Chris Wilkins: [c.wilkins@massey.ac.nz](mailto:c.wilkins@massey.ac.nz)

Jose S. Romeo: [j.romeo@massey.ac.nz](mailto:j.romeo@massey.ac.nz)

Marta Rychert: [m.rychert@massey.ac.nz](mailto:m.rychert@massey.ac.nz)

Monica J. Barratt: [monica.barratt@rmit.edu.au](mailto:monica.barratt@rmit.edu.au)

# Predictors of using social media to purchase drugs in New Zealand: Findings from a large-scale online survey

**Keywords:** Social media, online drug markets, drug purchasing, youth drug education

## **Abstract**

*Background:* There are increasing reports of social media being used to buy and sell illegal drugs internationally. Studies of social media drug markets to date have largely involved general explorations of social media drug transactions in select countries. Social media drug markets may operate differently for different drug types and in different country contexts.

*Aims:* To identify predictors of the use of social media to purchase cannabis, methamphetamine, LSD and ecstasy/MDMA in New Zealand using a large-scale online survey sample.

*Methods:* The annual New Zealand Drug Trends Survey (NZDTS), an online convenience survey promoted via targeted Facebook™ campaign, was completed by 23,500 respondents aged 16+. Logistic regression models were fitted to identify demographic, drug use and drug market predictors of reporting the use of social media to purchase cannabis, methamphetamine, LSD and ecstasy/MDMA.

*Results:* Fifty-one percent of the sample had purchased cannabis, methamphetamine, ecstasy/MDMA or LSD in the past six months, of which 22% had done so via social media (n = 2,650). Cannabis was the drug type most purchased from social media among drug purchasers (24%), followed by ecstasy/MDMA (13%). Sixty percent of social media purchasers had used Facebook™, 48% Snapchat™, and 20% Instagram™. The leading advantages of social media purchasing were “high convenience” (74%), and “fast transaction speed” (43%). Younger age was a significant predictor of social media purchasing for all drug types (particularly among 16-17 year olds). Purchasing from someone identified as a “drug dealer” was a predictor of social media purchasing among respondents for all drug types.

*Conclusion:* Social media drug markets may have significant implications for drug purchasing by youth through providing greater access to supply and breaking down age-related barriers between social supply and commercial drug markets. Our findings highlight the importance of incorporating social media platforms into youth drug prevention and harm minimisation strategies.

## Introduction

Social media are a diverse range of online websites and mobile apps facilitating diverse forms of social connection via the production of user-generated content (Kaplan & Haenlein, 2010). These platforms are increasingly recognised as facilitating retail-level illegal drug transactions, but academic scholarship investigating this phenomenon remains in the early stages. To date, studies of the online drug trade have largely focused on darkweb cryptomarkets (Barratt & Aldridge, 2016), surface web online pharmacies (Orizio, Merla, Schulz, & Gelatti, 2011), or the online trade in new psychoactive substances (NPS) (Hillebrand, Olszewski, & Sedefov, 2010). In general, researchers have placed social media platforms as serving a connective function between buyer and seller, where the transaction is organised via the chosen platform, but completed via in-person pick up or delivery (e.g. Moyle, Childs, Coomber, & Barratt, 2019). This is a point of difference from cryptomarkets, and online pharmacies which rely on postal services and can more readily service international markets (e.g. Aldridge & Décary-Héту, 2014). However, research on social media drug markets to date has been limited to a handful of exploratory studies of general social media drug market transactions and attributes in select countries (Demant & Bakken, 2019; Demant, Bakken, & Hall, 2020; Demant, Bakken, Oksanen, & Gunnlaugsson, 2019; Moyle et al., 2019).

Moyle et al. (2019) have published the first exploratory study of social media drug purchasing involving respondents from Australia, the U. S., Canada, and the U. K. The authors investigate differences between cryptomarket drug purchasing and use of social media, reporting that social media purchasers value convenience and easy to use security measures, such as encryption functions or data ephemerality. Participants in their online survey had predominantly used social media to access cannabis (64.5%), LSD (7.9%) and ecstasy/MDMA (6.5%) (Moyle et al., 2019). Researchers in Scandinavia have investigated social media drug markets in Sweden, Denmark, Norway, Finland and Iceland using interviews and online ethnography. Their findings highlight considerable variation in app use, size, shape and selling dynamics across social media drug markets by country (Demant et al., 2019). Demant and Bakken (2019) suggest that social media drug markets may have an impact on drug use and drug-

trying behaviours among young people, facilitating their access to commercial drug markets as opposed to social supply options within their networks. Demant et al. (2020) also propose that social media drug markets operate as fluid junctions between different (online) drug market environments and seller types within the context of the social media trading of pharmaceuticals.

Currently, only two studies have incorporated quantitative survey methods in analysis of social media drug purchasing. Firstly, Moyle et al.'s (2019) mixed methods study employed a survey (N = 358) of an international group of social media purchasers from Australia (n = 74), the U.S. (n = 152), Canada (n = 21) and the U.K., (n = 17) recruited via *reddit*. Oksanen et al. (2021) conducted a large survey of young people aged 15-25 in the United States (n = 1,212) and Spain (n = 1,212) aimed at evaluating psychological, behavioural and social risk factors that may influence more general online drug purchasing behaviours. Social media purchasing was found to be the most common way young people purchase drugs online with 77% of online drug purchasers having used social media. Furthermore, online purchasing of substances was associated with several risk factors in developing drug dependency among young people, such as low self-control or problems with mental wellbeing (See also, Oksanen et al., 2020).

To date there has been limited quantitative analysis of the relationship between demographic and drug market variables such as age, occupation, drug type, and seller types within the context of social media drug purchasing. This is coupled with a growing acknowledgement of online drug trading as geographically patterned and influenced by offline drug market trends and structures, as has been highlighted in a growing body of literature on cryptomarkets (Broséus, Rhumorbarbe, Morelato, Staehli, & Rossy, 2017; Demant, Munksgaard, Décary-Hétu, & Aldridge, 2018; Norbutas, 2018). In relation to social media drug purchasing, indications of the diversity of market structures and patterns of app use have been highlighted by researchers (Demant et al., 2019). Furthermore, Moyle et al. (2019) found differences in app preferences across different groups of survey respondents, with Australian buyers more likely to use Wickr™, and those from the UK more likely to use Whatsapp™. These findings highlight the need to build a broader understanding of how social media drug markets may be positioned within and patterned by geographically and demographically distinct drug markets. We therefore

suggest that considering these factors in a New Zealand context characterised by geographic isolation and a small population can contribute to our understanding of these relationships.

### *The New Zealand drug market*

The New Zealand illegal drugs market has a number of unusual characteristics, including low population density outside of major cities, as well as geographic isolation and distance from major drug production and supply routes (Wilkins, Romeo, Rychert, Prasad, & Graydon-Guy, 2018). Domestically produced drugs, such as cannabis and methamphetamine, have been found to have higher levels of availability than drug types manufactured overseas that must be smuggled into New Zealand, such as MDMA (Wilkins et al., 2018). As a result, ecstasy/MDMA has often been expensive and of poor quality, while drug types such as methamphetamine tend to be widely available, even in rural areas (Wilkins, Romeo, Rychert, Prasad, & Graydon-Guy, 2020). Since the late 1990's, New Zealand ethnic and motorcycle gangs are believed to have played an active role in the importation, manufacture and sale of illegal drugs (Gilbert, 2013). Initially this took place through the cultivation and sale of cannabis via 'tinny houses' (street drug markets based out of private residences) (Gilbert, 2013; Wilkins, Reilly, & Casswell, 2005), but in recent years also through the import, manufacture and sale of methamphetamine, particularly in rural regions (Savage, 2020; Wilkins et al., 2018).

Cannabis is the most widely used illegal drug in New Zealand with past-year prevalence of cannabis use in the general population estimated to be 15% in 2019 by the representative New Zealand Health Survey (NZHS). Stimulants such as ecstasy/MDMA and methamphetamine represent more recent additions to New Zealand's drug market, emerging only in the late 1990's and early 2000's, with stimulants gradually eclipsing LSD as New Zealand's second most used group of illicit drugs during this period (Wilkins, Bhatta, & Casswell, 2002; Wilkins, Bhatta, Pledger, & Casswell, 2003).

Currently there is a dearth of research considering online drug purchasing in New Zealand, with no studies currently published on social media drug markets. However, there are anecdotal reports that online purchasing – via cryptomarkets, social media or otherwise – is increasing (e.g. Dillane, 2019;

Marshall, 2021; Morrah, 2018). Results from the Illicit Drug Monitoring System (IDMS) – a face-to-face interview-based survey with people in the main cities who frequently use drugs – has shown steady increases in the number of respondents indicating purchasing substances via the “internet” (Wilkins, Prasad, Romeo, & Rychert, 2017). Online purchasing (in the past 6 months) reportedly increased for methamphetamine (up from 3% in 2014 to 10% in 2016), cannabis (up from 2% in 2014 to 10% by 2016) and ecstasy (up from 10% in 2014 to 15% in 2016) (Wilkins et al., 2017).

This paper is part of a larger mixed methods project examining the impact of social media drug markets in New Zealand, in which we report the findings from a quantitative survey designed to provide the foundation for future qualitative investigation of social media drug markets in New Zealand. The aim of the quantitative survey was to explore demographic, drug use and drug market predictors of purchasing different drug types from social media using a large survey sample of New Zealanders. The use of different drug types is associated with specific consumption and purchasing patterns, as well as specific socio-demographic characteristics of different groups of people who use drugs, and this is particularly likely to be the case in New Zealand’s unusual drug market.

## **Method**

The New Zealand Drug Trends survey (NZDTS) is an anonymous online convenience survey designed to provide an annual snapshot of drug use and drug market trends in New Zealand using Qualtrics software (Wilkins et al., 2018, Wilkins et al., 2020). The 2020 NZDTS survey was promoted solely via a targeted Facebook™ (e.g. Ramo & Prochaska, 2012; Thornton et al., 2016) advertising campaign from 24 January 2020 until 19 May 2020. The promotional campaign was targeted at Facebook™ users aged 16 or older and living in New Zealand who had expressed interest in a range of entertainment options and activities associated with drug use, such as alcoholic beverages, music genres and the night time economy (Van Havere, Vanderplasschen, Lammertyn, Broekaert, & Bellis, 2011). No incentive payment was offered to participate.

A total of 26,121 people clicked on the link and began the survey. IP addresses were not stored; rather a custom software solution was designed to convert respondent IP addresses into non-reversible

numbers. Survey responses with the same numbers were flagged as potential duplicates and then checked for demographic similarities and extent of completion to determine if they had been submitted by the same person. In cases where the demographics matched, the most complete survey response was kept. If the demographics differed, both responses were kept. Surveys with less than 15% completion (i.e., only demographic questions answered), or responses in which age was unspecified or did not fall within the age range 16-90 were also removed. In total 2,621 responses were removed: 110 of these were duplicates, 826 were insufficiently complete, and 1,685 were removed for either not specifying an age or entering an age of under 16 or over 90. This left a total sample size of 23,500.

The median time to complete the survey was 17 minutes. The research was approved by the Massey University Human Ethics Committee (Application code: SOA 17/43).

### *Measures*

#### *Demographics*

Participants were asked their age (open text field), gender (“male”, “female”, “gender diverse”), ethnicity (“Māori”, “NZ European/Pākehā”, “Pacific Islander”, “Asian”, “Indian”, “other” (including open text field)), level of education (“none”, “primary/intermediate”, “high school”, “polytech/trade”, “university”) and their employment status (“employed”, “student”, “unemployed”, “retired/parenting”, “sickness”). Participants were also asked what region of New Zealand they resided in and whether they lived in a “city”, “small town” or “rural area”.

#### *Drug use patterns*

Participants were asked to select all the drug types they had used in the previous six months (including alcohol and tobacco), and asked to indicate how frequently they had used a selected drug type in the past six months (i.e., “daily or near daily”, “once or twice a week”, “monthly”, “once or twice in the last 6 months”).

#### *Drug market indicators*

For each drug type reported used in the past six months, participants were asked about the perceived current availability (i.e., “very easy”, “easy”, “difficult”, “very difficult” to get), price change (i.e., “increasing”, “fluctuating”, “stable”, “decreasing”), and current strength (i.e., “low”, “fluctuating”, “medium” and “high”). Respondents were also asked to indicate all the locations where they had purchased each drug type in the past six months and could select all that applied (i.e., “street drug market”, “agreed public location”, “darknet”, “social media”, “other website”, “a pub/bar/club”, “work or educational institute”, “private house”, “dial up/text/home delivery”). Respondents were then asked to indicate all the seller types they had purchased a drug type from in the past six months (i.e., “gang member/seller”, “drug dealer”, “social acquaintance”, “friend/partner/family member”). Gang members in New Zealand are identifiable by distinctive gang regalia including back patches, colours, symbols and tattoos, with many mimicking the motorcycle gang subcultures first established in the United States (Gilbert, 2013; Savage, 2020). The term “drug dealer” is used in the survey to distinguish people who sell drugs from those who the respondent has some personal relationship (i.e. “friend/partner/family” or “social acquaintance”). Respondents were only asked about purchasing location and seller type for the drug types they had indicated using in the past six months.

### *Social media measures*

All participants who indicated having purchased a drug from social media in the past six months were asked to indicate what app(s) they had used to purchase drugs (i.e., “Facebook”, “Snapchat”, “instagram”, “Whatsapp”, “Wickr”, “Kik”, “Telegram”, “Dating apps (Tinder/Grindr), “Discord”, “other” – an open-ended field). They were also asked to indicate the advantages of purchasing drugs from social media from a fixed list (i.e., “more convenient”, “easier to use than the darknet”, “wider range of drug types available”, “faster delivery/transaction”, “drugs are cheaper”, “drugs are higher potency/quality”, “is more anonymous (protects identity)”, “avoids risk of drug dealer violence”, “no need to travel to bad neighbourhoods”, “buyers can see the ratings of sellers/products”, “other” (including open text field)). Multiple options could be chosen.

### *Analysis*

Variables that predicted social media drug purchasing (Y/N) were explored using logistic regression, including drug use patterns, drug market variables and controlling for demographics factors as described above. Four separate logistic regression models were developed for predicting social media purchasing of cannabis, methamphetamine, ecstasy and LSD, respectively. Models were separated by drug type to better account for different consumption and purchasing patterns, as well as socio-demographic characteristics of different groups of people who use drugs. Furthermore, differing sample sizes for each drug type meant that fitting separate regressions would avoid the need to assess interaction terms between drug types and predictor variables, facilitating more streamlined interpretation of results.

The frequency of drug use was coded slightly differently for different drug types as some drug types were used less frequently than others; for example; daily use of LSD and ecstasy/MDMA was very rare. In all comparisons, the category “once or twice in the past six months” was used as the reference category as this category represented the lowest frequency of drug consumption. For methamphetamine and cannabis, “daily or near daily”, “once or twice a week”, and “monthly” use were compared to the reference category. For ecstasy/MDMA, three frequency categories were compared (i.e., “once or twice a week or more often” and “monthly” versus “once or twice in the past six months”), and in the case of LSD two categories were compared (“monthly or more often” versus “once or twice in the past six months”).

To address the fact that purchasers of one drug type may also have used other drug types in the past six months (e.g. cannabis purchasers may also have used methamphetamine), for each regression model, the remaining frequencies of drug use indicated by purchasers of that drug type were assessed as predictors. These frequencies were included in the model as continuous variables, i.e., assuming the values 0 to 4 for none (0), once or twice (1), monthly (2), weekly (3), and daily (4), respectively. This was done to explore drug use among social media purchasers in a broader way and to consider possible relationships between the use and purchasing of multiple drug types within the previous six months. Due to the unbalanced spread of the frequency of use data, a continuous variable was found to enable the most consistent fit across the models.

The drug market variables “current availability”, “price change” and “current strength” were included in the model as dichotomous variables (“very difficult/difficult” vs “easy/very easy”, “increasing” vs “decreasing/stable/fluctuating”, and “low” vs “fluctuating/medium/high, respectively”). Types of sellers were also included as independent dichotomous variables (i.e., buyers who had purchased from a “gang member/seller” vs buyers who had *not* purchased from a “gang member/associate”). Additionally, the variable “COVID-19 period” was considered (i.e., “during 1<sup>st</sup> lockdown” and “pre-lockdown”), however this variable, along with “price change” and “current strength”, was not significant across the models.

The demographic variables including age were categorised using dummy variables for the groups 16–17, 18–20, 21–23, 24–25, 26–35 and 36+ (reference). Age was categorised, rather than included as a continuous variable to avoid the inclusion of polynomial terms or smoothing functions (e.g. splines), in order to better facilitate the interpretation of results across drug types purchased. Gender was categorised as 1= “male”, 0= “female”, while “gender diverse” was removed due to small respondent numbers. Ethnicity was categorised using dummy variables for the groups “Māori”, “NZ European” (reference) and “other ethnicity”. Highest level of education was grouped by tertiary education (high) versus other levels of education such as high school (low). The dummy variable was then fitted as 0= “trade/technical” or “university”, 1= “none”, “primary/intermediate”, “high school”. Employment status was fitted as dummy variables for the groups (“student”, “employed” (reference), and “unemployed/others”). The “geographical” variables included were New Zealand regions and town type (0=“rural area” or “small town”, 1=“city”).

Covariates were kept in the logistic regression models if they were statistically significant ( $p < 0.05$ ). The goodness of fit for all the logistic regression models was assessed using the Hosmer and Lemeshow test (Hosmer & Lemeshow, 2000). All analysis was undertaken using SAS software (version 9.4).

## **Results**

### *Demographics*

Sixty-one percent of the survey sample (N = 23,500) were male, 38% were female and 1% gender diverse. The median age of the sample was 23 years (mean: 28.5, IQR = 14). Respondents of New Zealand European ethnicity accounted for 74% of the sample, while 16% of respondents were Māori (the indigenous people of Aotearoa/New Zealand), 3% Asian and 2% Pacific Islanders. Thirty-eight percent of respondents had completed secondary school, 26% a trade or technical qualification, and 33% had a university degree. Sixty-two percent of respondents reported they were working full- or part-time, 26% were students and 11% were unemployed, retired, in unpaid work or on a sickness benefit. The drug types reported most widely used in the last six months by the total survey sample were alcohol (91%), cannabis (75%), tobacco (61%), ecstasy/MDMA (51%) and LSD/psychedelics (31%). Seventy-four percent of the sample (n = 17,453) had used cannabis, methamphetamine, ecstasy/MDMA or LSD in the past six months, and 51% had purchased those drugs in the past six months.

#### *Extent of purchasing from social media*

Twenty-two percent of the respondents who had purchased cannabis, methamphetamine, ecstasy/MDMA or LSD in the past six months (n = 11,953) had done so from social media (n = 2,650). Social media purchasing of drugs was highest among cannabis purchasers (at 24% of those who had purchased cannabis during the last six months), followed by ecstasy/MDMA (13%) methamphetamine (9%) and LSD purchasers (9%). Facebook™ was the app most commonly used by social media purchasers of drugs (60%), followed by Snapchat™ (48%) and Instagram™ (20%) (Table 1).

#### *Advantages of purchasing from social media*

The most commonly reported advantages of accessing drugs using social media were “high convenience” (74%), “speed of transactions” (43%) and “ease of use in comparison to the darknet” (41%) (Table 2). “Drug quality/potency” (10%), “lower price” (13%) and “ability to see reviews of sellers and products” (13%) were only reported by a minority (Table 2).

<Insert table 1>

<Insert table 2>

### *Social media and non-social media purchaser comparison*

Table 3 provides an initial comparison of the demographic, geographic and drug market indicators of social media purchasers versus non-social media purchasers for cannabis, methamphetamine, LSD and ecstasy/MDMA. Higher proportions of students and Māori purchased drugs from social media than from other means of supply. Those who purchased from social media were also more likely to report the current availability of a drug as “very easy”. Table 3 also indicates higher proportions of social media drug purchases were made from “gang members/associates” and “drug dealers”.

### *Results of logistic regression models*

Table 4 presents the results of the logistic regression models to identify independent predictors of having used social media to purchase cannabis, methamphetamine, LSD and ecstasy/MDMA in the last six months. Younger age was a strong predictor of using social media to purchase all four drug types via social media. For example, purchasers aged 16-17 were significantly more likely than those aged 36 years or older to have purchased cannabis (OR = 8.11), ecstasy/MDMA (OR = 10.21) and LSD (OR = 8.12) via social media. For methamphetamine, purchasers aged 21-23 had the highest probability of having purchased from social media compared to those aged 36 years or older (OR = 6.13). Similarly, for all drug types excluding methamphetamine, social media purchasers were more likely to indicate a drug type was “very easy” or “easy” to obtain (Cannabis OR = 1.28, ecstasy/MDMA OR = 1.26, LSD OR = 1.28).

Purchasing from a person selling drugs who the respondent identified as a “drug dealer” (as opposed to a “friend/family member/partner” or “social acquaintance”) was a strong predictor of having used social media to purchase all four drug types. For cannabis, social media purchasers were three times more likely than non-social media purchasers to have bought cannabis from a “drug dealer” in the last six months. A similar association was found for methamphetamine (OR = 4.99), ecstasy/MDMA (OR = 3.07) and LSD (OR = 2.28). Purchasing from a “gang member/associate” was also predictive of social media purchasing for cannabis (OR = 2.35), methamphetamine (OR = 2.48), ecstasy/MDMA (OR = 2.32) and LSD (OR = 2.24).

Social media cannabis purchasers were more likely to be unemployed (OR = 1.29) and of Māori ethnicity (OR = 1.17). Furthermore, living in a city predicted social media purchasing for cannabis (OR = 1.23), as well as residing in the Waikato (1.60), Wellington (1.28), Canterbury (1.35) and Otago (1.46) regions compared to Auckland (the city with the highest population in New Zealand). Daily cannabis use was associated with an increased likelihood of buying from social media (OR = 1.35).

Social media methamphetamine purchasers were more likely to have a low education level (OR = 1.93), be students (OR = 3.24) and be unemployed (OR = 1.98). Social media ecstasy/MDMA purchasers were more likely to reside in an urban area (OR = 1.28) and had a higher likelihood of residing in the Bay of Plenty/Gisborne/Hawke's Bay regions (1.34).

<Insert table 3>

<Insert table 4>

## **Discussion**

This paper adds to the emerging understandings of how social media drug markets are located within larger geographically distinct drug market environments, in particular highlighting the potential for significant changes to how younger age groups interact with local drug markets.

We found age was the strongest predictor of having used social media to purchase cannabis, methamphetamine, ecstasy/MDMA and LSD in the past six months in New Zealand. Drug purchasers under the age of 20 were many times more likely than older drug purchasers to have purchased a given drug type from social media. This relationship was strongest for respondents aged 16-17 years old. These findings are consistent with previous research suggesting high use of social media to buy drugs among young people (Demant & Bakken, 2019; Moyle et al., 2019; Oksanen et al., 2020). This likely reflects a range of factors including high prevalence of drug trying behaviours among younger age groups (e.g., Van Havere, Vanderplasschen, Broekaert, & De Bourdeaudhui, 2009), as well more intense engagement with social media platforms (GlobalWebIndex, 2019; Pew Research Center, 2018). A range of research has highlighted the increasing visibility and normalization of drug related material

and content on social media more generally (Cook, Bauermeister, Gordon-Messer, & Zimmerman, 2013; George et al., 2019; Hanson et al., 2013; Petersen, Petersen, Poulsen, & Nørgaard, 2021)

For methamphetamine, social media purchasers were most likely to be slightly older (i.e., aged 21-23) as opposed to under 20 years. Methamphetamine use is often associated with older age groups, who have more experience using a range of drug types. Findings from the IDMS indicate that frequent methamphetamine users tend to be older (mean age 36) compared to frequent ecstasy users (mean age 25) (Wilkins et al., 2017). The New Zealand Health Survey (NZHS) also consistently indicates that past-year prevalence of methamphetamine use is highest among those aged 25-34 (Ministry of Health, 2019). The higher rates of social media drug purchasing among youth overall raises important questions as to how social media drug markets will initiate young people into local drug markets amid quickly changing social media technology (Boyd, 2014; Van Dijck, 2013).

Our findings also contribute to the emerging understanding of the characteristics of social media drug markets in different geographic locations (Demant et al., 2019). Facebook™ was most commonly used among social media drug purchasers surveyed in the NZDTS (60%), followed by Snapchat™ (48%) and Instagram™ (20%), compared to an inverse of this relationship in Moyle et al.'s (2019) seminal article (Snapchat™ = 76%, Instagram™ 48% and Facebook™ 22%). Our survey has also highlighted the emergence of the previously unmentioned social media platform Discord™ (9%). Discord™ allows users to create private online communities called 'servers' to chat and video- or voice-call with friends. New Zealand media reports (Harris, 2021; McKenzie, 2020) have highlighted the use Discord™ servers to facilitate pseudo-anonymous local drug selling groups, with servers accessed using an 'invite-link' and transactions typically completed using in-person pick up or delivery (van der Sanden et al., *forthcoming*).

Māori ethnicity was predictive of purchasing cannabis from social media (OR = 1.17). Historically, Māori have reported higher rates of cannabis use in comparison to other ethnicities in New Zealand (Marie, Fergusson, & Boden, 2008; Theodore, Ratima, Potiki, Boden, & Poulton, 2020; Wilkins et al., 2005). The 2018/19 NZHS found Māori are 2.09 times more likely than non-Māori to have used cannabis in the past year (Ministry of Health, 2019). However, at this stage it is unclear why Māori are

more likely to purchase cannabis from a social media platform. Further research is needed to understand how engagement with social media for drug purchasing may vary across cultural groups.

Social media purchasing of drug types cannabis, ecstasy/MDMA and LSD was linked to an increased likelihood of perceiving these drugs as “easy to get” (OR = 1.22, 1.21, 1.22 respectively). These findings are consistent with reported advantages of social media purchasing, where high convenience and fast transaction speed have been cited by NZDTS respondents and in other studies (Bakken & Demant, 2019; Moyle et al., 2019). However, the causal direction of this relationship is unclear. Social media’s ability to facilitate connections between buyers and sellers as well as the open selling behaviours associated with some social media platforms (Bakken & Demant, 2019) likely increases buyer perceptions of drug availability. Conversely, general availability of a drug type within a certain setting or group may in turn influence the use of social media for drug purchasing.

Greater perceived drug availability may also reflect the density and networked nature of physical drug markets. Our results indicate that the likelihood of purchasing either cannabis or ecstasy/MDMA from social media was greater in city areas. These drug types were the most widely used illegal drugs among survey respondents (cannabis = 75%, ecstasy/MDMA = 51%), as well as the most often purchased via social media (cannabis = 24%, ecstasy/MDMA = 13%). The popularity of these drug types and the concentration of buyer demand in urban centres may create denser and more networked retail drug markets than are found in rural areas. This dynamic may lead to a higher number of sellers on social media simply by virtue of supply and demand. Furthermore, these areas are more likely to support larger, more visible and competitive forms of social media drug market (Bakken & Demant, 2019), such as Facebook™ groups and Discord™ servers – which media reports situate as particularly popular in New Zealand’s capital city of Wellington (Harris, 2021; McKenzie, 2020). A concentration of selling behaviours in more densely networked areas may also lower the perceived risk of apprehension among market participants by creating an enforcement swamping effect (Kleiman, 1993).

We found purchasing from a someone considered to be a “drug dealer” was the strongest predictor of purchasing from social media among survey respondents (cannabis OR = 3.59, methamphetamine OR = 4.99, LSD OR = 2.88, ecstasy/MDMA OR = 3.07), followed by purchasing from someone considered

to be a “gang member/gang associate” (Cannabis OR = 2.35, Methamphetamine OR = 2.48, LSD OR = 2.32, ecstasy/MDMA OR = 2.24). In New Zealand, gangs are known to play a role in the black market cultivation and sale of cannabis and methamphetamine, particularly in rural regions of the country (Wilkins et al., 2018). Purchasing from “family/friends” (i.e., social supply-type sellers) was only a statistically significant predictor of social media purchasing for cannabis (OR = 1.65) and ecstasy/MDMA (OR = 1.51). Purchasing these drug types, particularly among young people, has traditionally been strongly linked to social supply and a separation from the commercial drug market (e.g., Coomber & Moyle, 2014; Coomber & Turnbull, 2007). Moyle et al. (2019) have suggested young people continue to prefer social supply as a means of brokering drug access in comparison to contacting professional sellers on social media. Conversely, Demant and Bakken believe social media may be accelerating young people’s movement into commercial drug market settings (2019). Our findings support this understanding, although in-depth qualitative research is needed to understand the impact social media drug markets are having on young people’s use and perceptions of social supply.

### **Policy Implications**

Our findings have important implications for youth drug education and prevention strategies. The uptake of mobile-technology and m-health apps in drug treatment and harm reduction campaigns has increased in recent years (EMCDDA, 2018; Kazemi et al., 2017). Locally, the New Zealand Drug Foundation has launched online tools such as Drughelp (NZ Drug Foundation, 2021), and collaborates with the festival drug checking service ‘Know Your Stuff’ (KnowYourStuffNZ, 2021) to provide accessible sources of harm reduction information to young people who use drugs via Facebook, Instagram and Twitter. However, given diversity in patterns of social media purchasing and platforms used, disseminating messages geared towards safety online and ensuring they reach the right groups presents a considerable challenge.

Our findings indicate that school students aged 16+ are most likely to purchase a variety of drug types via social media. As such, school-based drug education programmes can provide useful channels

through which to embed these messages in social media settings among youth and may be particularly effective if they make use of social media channels such as Snapchat, of Instagram, that are most used among this group (Pew Research Center, 2018). In the United States, researchers recently evaluated the efficacy of the ‘Living The Example’ (LTE) school-based prevention programme, which trains “youth ambassadors” to disseminate peer-to-peer messaging and user-generated content on social media platforms to influence adolescent perceptions and intentions regarding illicit drug use (Evans et al., 2017; Evans et al., 2020). Preliminary results have indicated this programme to be an effective means of influencing and reducing drug using intentions among youth, however further large-scale evaluation is yet to be completed. The use of peer-to-peer messaging in these settings may provide a valuable tool that can broaden both the reach and legitimacy of targeted social media harm minimization messaging, allowing information to flow through otherwise difficult to access social media channels such as Snapchat and Whatsapp. We suggest future research may also look to consider how these messages may be successfully disseminated within private social media channels more broadly as well as within invite-only social media drug selling groups.

## **Limitations**

Firstly, we note that quantitative studies of drug markets have a limited capacity to adequately portray the meanings, and cultural nuances associated with drug use and drug purchasing behaviour across different markets, groups and geographic locations (e.g. Dwyer & Moore, 2010).

The NZDTS has a number of limitations that should be taken into consideration when interpreting our findings. Firstly, the NZDTS is a convenience survey where participants self-select to take part and is therefore not representative of the drug-user population or wider New Zealand society. NZDTS respondents tend to report higher levels of drug use compared to the general population. For example 75% of the 2020 NZDTS sample indicated past-six-month use of cannabis, compared to the population prevalence estimate from the NZHS of 15% for past-year cannabis use (Ministry of Health, 2019).

Online surveys may encourage greater sharing of sensitive information, including higher levels of drug use, than face-to-face surveys at the respondent's physical residence, as in the NZHS (Miller & Sønderlund, 2010). It is also important to note that the sample of methamphetamine purchasers (n = 907) who had purchased from social media (n = 79) is relatively small and this should be taken into account when interpreting the findings for methamphetamine.

The survey's promotion via Facebook™, including the additional targeting of promotion based on particular music and entertainment interests, is likely to impact the characteristics of the sample. For example, Facebook™ was reported to be the platform most often used to purchase illicit drugs via social media and this finding may have been influenced by our use of Facebook to promote the survey.

The NZDTS sample does broadly approximate the demographic profile of the wider New Zealand population. For example, the proportion of Māori in the NZDTS sample (16%) closely matches the New Zealand census (16.5%), as does the proportion of European respondents (74%) compared to the census figure (70%). The proportion of NZDTS respondents indicating they were unemployed (5%) is also similar to the national population figure (4%) (Stats NZ, 2020b). However, the NZDTS sample is younger (median age of 23 years) than the national population (median age 37) (Stats NZ, 2020c).

Online surveys exclude potential participants who do not have internet access (Miller & Sønderlund, 2010). However, rates of digital engagement in New Zealand are high by international standards, with 2018 census data indicating 86% of New Zealand's population have internet access (Stats NZ, 2020a), and 84% of those aged between 16 and 64 make use of Facebook at least monthly (We Are Social, 2020).

Finally, NZDTS respondents could indicate multiple options for type of seller and type of selling location and this reduces the precision of the associations found between social media purchasing and other variables. This was done to reduce respondent burden (i.e., respondents having to answer the same questions on purchasing for each seller type).

## **Conclusion**

This paper provides the first large scale quantitative exploration of social media drug markets in New Zealand and adds to a small but growing international literature. Our findings confirm that social media drug purchasing is concentrated among youth and associated with higher perceptions of drug availability and increased likelihood of purchasing from a “drug dealer”. The findings highlight the potential for social media to have a considerable future impact on illegal drug markets, particularly as younger age cohorts initiate drug use and participate in drug buying, utilising new apps and bring new trends in social media engagement with them. The apparent dominant role of commercial drug sellers in these settings highlights a potential shift in their accessibility to younger age groups precipitating a movement away from social supply options. Further research is needed to confirm these trends in other countries. Our findings also highlight the importance of broadening the incorporation of mainstream social media platforms into youth drug education and prevention strategies.

#### **Declaration of conflict of interest**

None.

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Predictors of using social media to purchase drugs in New Zealand: Findings from a large-scale online survey: Tables for inclusion in manuscript

*Table 1: Apps reported used by those who had purchased a drug from social media in the last six months.*

<b>Apps</b>	<b>% (n = 2707)</b>
Facebook	60
Snapchat	48
Instagram	20
Wickr	9
Discord	9
Whatsapp	6
Dating apps (Tinder/Grindr)	4
Other <sup>1</sup>	4
Kik	2
Telegram	2

*Table 2: Nominated advantages of using social media to purchase drugs<sup>2</sup>*

<b>Advantages</b>	<b>% (n = 2707)</b>
More convenient	74
Faster delivery/transaction	43
Easier to use than the darknet	41
You don't have to travel to bad neighbourhoods	28
Is more anonymous (protects your identity)	24
Avoids the risk of drug dealer violence	23
Wider range of drug types available	18
Buyers can see the ratings of sellers/products	13
Drugs are cheaper	13
Other	6
Avoids physical contact/travel (COVID-19)	4

*(Note: see bottom of Table 3 for title)*

<sup>1</sup> Open text field responses under "other" included "Signal", "reddit", "texting", "not telling" and "through friends" (paraphrased).

<sup>2</sup> Multiple responses were possible. The advantage "avoids physical contact/travel (COVID-19) was added to the survey in March 2020.

Demographic variable	Cannabis			Methamphetamine			LSD			Ecstasy/MDMA		
	Social media purchasers [n = 1993]	Non-social media purchasers [n = 6279]	All cannabis purchasers [n = 8272]	Social media purchasers [n = 79]	Non-social media purchasers [n = 833]	All meth purchasers [n = 912]	Social media purchasers [n = 317]	Non-social media purchasers [n = 3165]	All LSD purchasers [n = 3482]	Social media purchasers [n = 899]	Non-social media purchasers [n = 5832]	All ecstasy/MDMA purchasers [n = 6731]
<b>Gender (%)</b>												
Male	71	67	68	53	61	60	73	71	71	61	64	64
Female	27	32	31	44	38	38	25	28	27	37	35	35
Gender diverse	2	1	1	3	1	1	2	1	2	2	1	1
<b>Age categories (%)</b>												
16-17	9	3	4	3	2	2	9	4	5	9	4	4
18-20	40	20	25	14	6	6	46	30	30	47	30	32
21-23	24	17	19	23	7	9	26	23	23	27	24	24
24-25	8	8	8	13	7	8	8	11	10	8	10	10
26-35	12	24	21	28	31	30	9	21	20	8	21	20
36+	7	28	23	20	44	45	2	12	11	2	11	10
<b>Age (years)</b>												
Median age	21	26	24	25	35	34	20	23	22	20	23	22
Mean age	23	31	29	28	35	35	21	25	25	21	25	25
<b>Ethnicity (%)</b>												
Māori	20	16	17	32	24	24	18	14	14	16	13	13
NZ/European	70	75	74	62	70	69	74	76	76	76	78	78
Other	10	9	9	6	6	6	8	10	10	8	8	9
<b>Occupation (%)</b>												
Employed	56	68	65	47	69	67	58	68	67	57	66	65
Student	32	21	23	14	4	5	34	25	26	38	28	30
Unemployed/ other	12	12	12	39	27	28	8	7	7	5	6	6
<b>Education (%)</b>												
High (tertiary)	52	65	62	42	58	57	49	64	62	55	64	63

Low (Secondary of lower)	48	35	38	58	42	43	51	36	38	45	36	37
<b>Location (%)</b>												
City	71	66	68	57	59	59	70	71	71	76	72	72
Rural/small town	29	34	32	43	41	41	30	29	29	24	28	28
<b>Island (%)</b>												
North	70	72	71	67	76	75	69	67	67	71	70	70
South	30	28	29	33	24	25	31	33	33	29	30	30
<b>Region (%)</b>												
Auckland	24	29	28	14	27	3	28	28	30	28	30	30
Bay of Plenty/Gisborn e/ Hawke's Bay	10	10	10	18	13	14	8	7	7	10	8	9
Canterbury	16	14	15	24	12	13	19	16	16	17	16	16
Northland	3	4	3	1	5	5	3	3	3	2	3	2
Otago	9	7	8	3	3	3	9	9	9	8	9	9
Southland/We st Coast/Tasman- Nelson- Marlborough	5	7	6	6	9	9	5	7	7	4	5	5
Taranaki/Man awatu- Wanganui	6	7	7	15	11	11	5	6	6	5	6	6
Waikato	10	8	8	6	11	10	6	6	6	9	7	7
Wellington	18	15	15	13	9	9	20	17	18	18	16	17
<b>Availability (%)</b>												
Very easy	34	18	22	58	42	44	17	10	11	35	23	25
Easy	46	47	47	32	39	38	40	38	38	48	49	49
Difficult	18	28	26	3	13	13	36	43	42	16	24	23
Very difficult	3	6	5	6	5	5	7	9	9	2	4	4
<b>Strength (%)</b>												

High	18	41	17	17	20	20	30	26	26	25	23	23
Low	4	4	4	7	11	10	2	3	3	4	5	5
Medium	33	38	37	24	28	28	36	38	38	35	36	36
Fluctuating	46	41	4	53	42	42	32	33	33	36	36	36
<b>Price change (%)</b>												
Decreasing	5	2	3	57	47	48	12	8	8	34	28	29
Increasing	13	15	15	3	5	5	4	5	5	5	6	5
Fluctuating	17	13	14	20	14	14	18	14	14	16	15	15
Stable	65	69	68	20	34	33	67	73	72	44	52	51
<b>Frequency of use (%)</b>												
Daily	60	49	52	29	20	21	1	0.3	0.3	1	0.3	0.5
Weekly	21	23	22	33	24	25	6	3	3	22	11	13
Monthly	12	16	15	20	18	18	26	21	21	43	38	38
Once or twice in last 6 months	7	12	11	18	38	36	67	76	75	34	51	49
<b>Seller type (%)</b>												
Gang member	38	11	18	70	29	33	6	2	2	16	4	6
Drug dealer	86	45	55	92	56	59	61	30	33	70	36	40
Social acquaintance	74	61	58	77	44	50	43	34	34	58	42	44
Friend/family member	77	61	65	58	40	41	46	49	48	64	54	56

Table 3: Demographic comparison between social media and non-social media purchasers of the four drug types.

Table 2: Predictors of social media purchasing for cannabis, methamphetamine, ecstasy/MDMA and LSD<sup>3</sup>.

	Cannabis (n = 8215)		Methamphetamine (n = 907)		Ecstasy/MDMA (n = 6671)		LSD (n = 3443)	
<b>Proportion of "SM purchasers"</b>	0.24		0.09		0.13		0.09	
<b>Effect</b>	<b>OR</b>	<b>95% CI</b>	<b>OR</b>	<b>95% CI</b>	<b>OR</b>	<b>95% CI</b>	<b>OR</b>	<b>95% CI</b>
<b>Gender</b> (Male vs Female)	n.s.		n.s.		n.s.		n.s.	
<b>Education</b> (secondary or lower vs tertiary)	n.s.		1.93*	1.13-3.29	n.s.		n.s.	
<b>Occupation:</b>								
Student vs Employed	0.98	0.84-1.14	3.24*	1.31-8.06	n.s.		n.s.	
Unemployed/others vs Employed	1.29*	1.06-1.56	1.98*	1.13-3.46	n.s.		n.s.	
<b>Ethnicity:</b>								
Maori vs NZ Euro	1.17*	1.01-1.37			n.s.		n.s.	
Other vs NZ Euro	1.22	1.00-1.49	n.s.		n.s.		n.s.	
<b>Region:</b>								
Northland	1.06	0.73-1.54	n.s.		1.04	0.61-1.76	n.s.	
Auckland	REF		REF		REF		REF	
Waikato	1.60***	1.27-2.02	n.s.		1.17	0.87-1.59	n.s.	
Bay of Plenty/Gisborne/Hawke's Bay	1.08	0.86-1.36	n.s.		1.34*	1.01-1.79	n.s.	
Taranaki/Manawatu-Wanganui	1.07	0.83- 1.40	n.s.		1.01	0.70-1.46	n.s.	
Wellington	1.28**	1.06-1.53	n.s.		1.06	0.84-1.33	n.s.	
Southland/West								
Coast/Tasman/Nelson/Marlborough	1.07	0.81-1.42	n.s.		0.93	0.61-1.40	n.s.	
Canterbury	1.35**	1.12-1.62	n.s.		1.20	0.95-1.51	n.s.	
Otago	1.46**	1.16-1.85	n.s.		0.84	0.63-1.13	n.s.	
<b>Island:</b>								
North vs South	n.s.		n.s.		n.s.		n.s.	
<b>City town:</b>								
City vs Rural/small town	1.23**	1.08-1.41	n.s.		1.28**	1.06-1.53	n.s.	

<sup>3</sup> Notes on presented data: \* <0.05, \*\*<0.01, \*\*\*<0.001.

<b>Age:</b>									
16-17 vs 36+	8.11***	5.88-11.20	1.92	0.31-11.84	10.21***	5.63-18.50	8.12***	3.41-19.35	
18-20 vs 36+	5.23***	4.17-6.56	4.72**	1.84-12.11	7.01***	4.12-11.93	7.06***	3.24-15.35	
21-23 vs 36+	3.71***	2.95-4.65	6.13***	2.68-13.98	5.23***	3.05-8.97	5.40***	2.45-11.88	
24-25 vs 36+	2.79***	2.12-3.67	3.43**	1.36-8.64	3.80***	2.13-6.76	3.58**	1.52-8.46	
26-35 vs 36+	1.51**	1.20-1.91	1.48	0.73-2.99	2.03*	1.15-3.60	2.12	0.91-4.94	
<b>Frequency of use (continuous)<sup>4</sup></b>	n.s.	n.s.			n.s.		1.12*	1.01-1.24	
<b>Frequency of use:</b>									
Daily vs 1-2 6months	1.35**	1.08-1.68							
Weekly vs 1-2 6months	1.12	0.89-1.43							
Monthly vs 1-2 6months	0.98	0.76-1.26							
<b>Easy to get:</b>									
Easy/Very easy vs Very difficult/Difficult	1.22**	1.02-1.34	n.s.		1.21*	1.07-1.38	1.22*	1.05-1.43	
<b>Price change:</b>									
Increasing vs Fluctuating/Stable/Decreasing	n.s.		n.s.		n.s.		n.s.		
<b>Strength:</b>									
Low vs Fluctuating/Medium/High	n.s.		n.s.		n.s.		n.s.		
<b>Seller type:</b>									
Gang member/seller	2.35***	2.04-2.70	2.48**	1.40-4.43	2.32***	1.81-2.97	2.24**	1.25-3.99	
Drug dealer	3.59***	3.07-4.18	4.99**	1.99-12.48	3.07***	2.61-3.62	2.88***	2.24-3.70	
Social acquaintance	1.85***	1.62-2.11	3.41***	1.86-6.27	1.79***	1.54-2.09	1.96***	1.53-2.5	
Friend/family	1.65***	1.44-1.88	n.s.		1.51***	1.29-1.77	n.s.		
<b>Hosmer and Lemeshow Goodness-of-fit</b>	0.756		0.186		0.109		0.205		

<sup>4</sup> Continuous frequency of use variable coded as 0 = none 1 = Once or twice in last 6 months, 2 = monthly, 3 = weekly, 4 = daily.

