

A MULTI-METHOD EXAMINATION OF SOCIAL NORMS FOR MEDICAL
PRESCRIPTION DRUG USE AND NON-MEDICAL PRESCRIPTION DRUG USE
AMONG POST-SECONDARY STUDENTS

by

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DEDICATION

My dissertation is dedicated to my mother (Maxine Isaacs) and my sister (Lauren Isaacs). Through all of my endeavours and in all facets of my life, including my dissertation and graduate journey, my mom and sister have been (and continue to be) the most incredible supporters. Their nonstop support has been completely unconditional, and I do not know how I could have reached this monumental point in my life without their continual presence and impact at each step. So, I dedicate this achievement wholeheartedly to my mother and sister.

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ABSTRACT

My dissertation sought to investigate social norms of potentially harmful medical and non-medical prescription drug use (PDU/NMPDU) among emerging adults (EAs). Social norms interventions can curb certain substance use behaviours among EAs. Yet no comprehensive investigation has explored whether such interventions might be useful for PDU/NMPDU in this population. Quantitative, qualitative, and mixed-methods research approaches were used to examine this issue in three studies focused on the most commonly-used categories of psychoactive prescription drugs: opioids, stimulants, and sedatives/tranquilizers. Study 1 explored the influence of sex on descriptive social norms surrounding NMPDU in $N=1986$ university students. Correlational and linear mixed models results highlighted participants perceiving more peer use were significantly more likely to engage in use themselves. While females perceived more frequent peer use than male participants, significant positive correlations were found between perceived peer use frequency and participants' own use regardless of peer and/or participant sex. Study 2 involved six qualitative focus groups with $N=39$ university students who endorsed engaging in recent PDU or NMPDU. Focus groups explored normative perceptions of PDU/NMPDU. A thematic analysis generated three themes (each with three subthemes) highlighting that (1) PDU/NMPDU was perceived to be common, (2) certain contexts were perceived to facilitate higher usage, and (3) individual characteristics were perceived to influence use. Study 3 involved testing a single session, group-based, social norms intervention that was delivered to $N=36$ university students who had endorsed recent PDU/NMPDU. ANOVAs of pre-post quantitative data showed that while providing corrective social norms information during the session significantly decreased participants' overestimations of peer PDU/NMPDU, post-intervention perceptions were still significantly higher than actual use rates. Additionally, participants did not demonstrate a significant reduction in their intention to use prescription drugs post-intervention. A content analysis of qualitative participant reflections about the intervention revealed several issues that could be improved upon to potentially enhance efficacy of social norms interventions for student PDU/NMPDU (e.g., enhancing student 'buy-in'). Taken together, the three dissertation studies highlight that many individual- and group-level factors such as social networks and overall 'buy-in' would be important considerations in determining which information and referents to include in social norms interventions.

LIST OF ABBREVIATIONS AND SYMBOLS USED

ANOVA	Analysis of variance
ADHD	Attention-deficit hyperactivity disorder
CPADS	Canadian Postsecondary Education Alcohol and Drug Use Survey
χ^2	Chi-square
CI	Confidence interval
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
ER	Emergency room
EA	Emerging adulthood
EAs	Emerging adults
<i>F</i>	F statistic
IPV	Intimate partner violence
ICC	Intraclass correlation coefficient
LGBTQ+	Lesbian, gay, bisexual, transgender, queer, and other sexual identities
LMM	Linear mixed model
<i>M</i>	Mean
NMPDU	Non-medical prescription drug use
<i>p</i>	p-value
PAR	Participatory action research
PWLLE	People with lived or living experience
PNF	Personalized normative feedback
PD	Prescription drug
PDU	Prescription drug use
R^2	R-squared
RCT	Randomized control trial
REML	Restricted maximum likelihood approach
<i>N</i> or <i>n</i>	Sample size (sample and subsample, respectively)

S&T	Sedative and tranquilizer
<i>SD</i>	Standard deviation
SAMHSA	Substance Abuse and Mental Health Services Administration
SUD	Substance use disorder
US	United States
VIF	Variance inflation factor

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CHAPTER 1. INTRODUCTION

This dissertation examines social norms for prescription drug use among emerging adults (EAs). Both medical prescription drug use (PDU) and non-medical prescription drug use (NMPDU) for psychotropic drugs were investigated within the scope of this dissertation. The dissertation includes three publication-style manuscripts which each investigate separate aspects of prescription drug (PD) social norms among EAs, attending to three particular classes of psychoactive PDs: opioids, stimulants, and sedatives/tranquilizers (S&Ts). The first study investigated the role of sex in students' normative perceptions and personal behaviours surrounding NMPDU. The second study utilized focus groups to obtain a more comprehensive understanding, from the perspective of student users themselves, of factors impacting social norms and related personal behaviours pertaining to PDU and NMPDU. The third and final study involved testing a group-based, single-session, social norms intervention to further explore the impact of such an intervention on social norm perceptions and behavioural intentions to use for students already engaging in PDU or NMPDU. Prior to presenting the three studies included in this dissertation, relevant information about substance use, specifically PDU/NMPDU, among EAs is outlined. Subsequently, social norms and social norms interventions among EAs, followed by information about the dissertation's objectives, is discussed. Then, the three studies comprising this dissertation are discussed. The three studies have been followed by an integrative discussion that links the studies to each other and to the extant literature. The dissertation then concludes with theoretical and clinical implications of findings, a consideration of limitations in the dissertation, and future directions in this line of work.

Emerging Adulthood

Emerging adulthood (EA) has become recognized as a distinct developmental phase between adolescence and young adulthood that includes profound changes related to identity exploration, education, and occupational attainment (Arnett, 2000). While originally defined as spanning roughly the ages from 18 to 25 years old (Arnett, 2000), the instability and changes associated with EA have shifted to later years of life, leading to an updated conceptualization of this developmental phase as spanning from 18 to 29 years old (Arnett et al., 2014). In this dissertation, the latter updated conceptualization has been used (i.e., 18-29 years old) unless otherwise specified.

The EA developmental phase has been associated with several unique characteristics that can be conceptualized as being distinct from both a primarily *dependent* form of routine/structure typically inherent in adolescence and a primarily *independent* form of routine/structure in young and middle adulthood (Arnett, 2014). For example, post-secondary education and frequent job changes are most common during EA, with approximately half of Canadian emerging adults (EAs; 18-24 years) enrolling in post-secondary institutions (Alessandrini, 2018), and a median number of eight job changes presenting themselves during this developmental period (Arnett, 2014). Similarly, EA is associated with an increased rate of residence relocation, with the rate of movement from one residence to another being highest among EAs compared to any other age group (Arnett, 2014). In addition to objective markers denoting the unique nature of EA, EAs themselves tend to note a subjective sense of being separate from both adolescence and adulthood, indicating that they associate with a distinct “in-between” developmental phase themselves (Nelson & Luster, 2015). Thus, EA can be conceptualized as a unique standalone developmental phase associated with transition and instability.

Substance Use and Misuse

As part of the changes inherent in EA, the EA phase is typically also characterized by a high level of engaging in novel experiences including substance use (Arnett, 2000). First use of several substances in the US has been found to be higher for EAs aged 18-25 relative to both adolescents and adults (Lipari et al., 2018). The prevalence rates of substance use have also been found to be highest for EAs as compared to other age groups. For example, Canadian data demonstrates significantly higher rates of alcohol, cannabis, and illicit substance use among EAs aged 20-24 than among both adolescents and adults (Statistics Canada, 2021).

In post-secondary settings (i.e., university and college; these terms are used interchangeably in this dissertation), factors such as new social networks, increased peer influence, reduced parental monitoring, and more stress have each been associated with increased substance use among post-secondary students (Skidmore et al., 2016). Substance use among post-secondary students is indeed notable with past-month rates of use including 76% for alcohol and up to 33% for cannabis (Government of Canada, 2021; Substance Abuse and Mental Health Services Administration [SAMHSA], 2022). Approximately 15% of students have also endorsed using an illicit substance over the prior year (Government of Canada, 2021).

EAs in post-secondary settings are particularly vulnerable to heavy/frequent substance use and associated adverse consequences of use. For example, EAs in post-secondary programs demonstrate higher rates of binge drinking than their similar-aged, non-student peers (Timberlake et al., 2007). Risky substance use behaviours and adverse consequences of substance use have been particularly noted among social living arrangements for students such as fraternities/sororities (e.g., Park et al., 2009; Thompson et al., 2021; White et al., 2020). More generally, substance use disorders (SUDs) peak during EA (Vasilenko et al., 2017) when many

are involved in post-secondary education. This is a concerning finding, as SUDs (as defined by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition [DSM-5]) are characterized by adverse consequences such as social impairment, physical or psychological problems, and a failure to meet work or school demands (American Psychiatric Association, 2013). Concerningly, fewer than 9% of students who meet criteria for an SUD engage in help-seeking (Caldeira et al., 2009). Given the unique risk factors predisposing EAs in post-secondary programs to substance use, adverse consequences of use, and low help-seeking behaviours pertaining to use, substance use among this group warrants additional attention.

Prescription Drug Use and Misuse

Within the field of substance use, prescription drug use has been assuming an increasingly central research and clinical focus. One notable example has been research and clinical efforts to track and address the opioid overdose crisis (Cerdá et al., 2021). When discussing prescription drugs (PDs), this dissertation will refer to either (a) prescription drug use (PDU) as prescribed/indicated by a healthcare provider or (b) non-medical prescription drug use (NMPDU) that either deviates from healthcare provider recommendations (e.g., with respect to dosage, quantity, or route of administration), or use for reasons not medically indicated, or PDU that involves co-substance/poly-substance use with PDs.

Beginning in the 1990s, new PDs and prescription drug distributors (such as those providing extended-release opioids) increased their presence and influence in the medical management of various physical and psychological symptoms (Paulozzi, 2012). Access to, and use of, PDs generally increased over time (Vadivelu et al., 2018), as highlighted by an increase in the number of opioid prescriptions dispensed in the US from 174.1 million in 2000 to 256.9 million in 2009 (Maxwell, 2011), with an even more notable increase in ‘strong’ opioid

prescriptions dispensed in Canada from 2005 to 2016 (Fischer et al., 2018). Even among categories of PDs in which use has remained relatively stable from the 1990s onwards (such as S&Ts), there has been a noticeable increase in NMPDU and negative consequences associated with NMPDU (such as hospitalizations) during the same time period (e.g., Gleib et al., 2020; Singh, 2021). Adverse consequences of PDs are often striking, such as a notable rate of overdose and dependence associated with use (Florence et al., 2016). In the U.S., recent studies indicate that 20% of all deaths in EAs and young adults aged between 24-35 are related to opioid use, and since 2001 overall deaths related to opioid use have increased almost 300% (Gomes et al., 2018). As highlighted by the previous statistics focusing on Canada and the US, harmful PDU/NMPDU has been particularly impactful in North America, resulting from factors such as less regulatory access restrictions and higher patient expectations regarding ‘effective’ treatments (Fischer et al., 2014). Thus, most of the PDU/NMPDU research discussed during this dissertation will pertain to North American findings.

PDU and NMPDU among post-secondary students and EAs more broadly has been particularly prevalent and concerning. Within the scope of this dissertation, three primary classes of psychoactive PDs will be discussed that have been widely researched among post-secondary and EA samples: Opioids, stimulants, and sedatives and tranquilizers (S&Ts). Opioids (e.g., oxycodone and morphine) are primarily prescribed for pain management and are the most commonly used pharmacologic agent for moderate to severe pain (Terrie, 2011). Stimulants (e.g., Adderall and Vyvanse) are commonly prescribed for attention-deficit hyperactivity disorder (ADHD) among several other medical conditions such as narcolepsy or obesity (Kroutil et al., 2006). S&Ts include benzodiazepines (e.g., alprazolam and diazepam) and other sedating

PDs (e.g., zopiclone) which produce anti-anxiety, sleep-inducing, anticonvulsant, and/or muscle-relaxant effects (Votaw et al., 2019).

Given the notable rates and potential impacts of post-secondary students' PDU (e.g., Fairman et al., 2021) and NMPDU (e.g., McCabe & West, 2013; Oberleitner et al., 2011), both forms of use are further discussed in this dissertation for opioids, stimulants, and S&Ts. The prevalence of EAs and adolescents engaging in past-year NMPDU with opioids has exceeded 16% in some studies, and this prevalence represents an increase from the 1990s (Jordan et al., 2017). Risky use remains concerning among post-secondary specific samples, with approximately 8% of post-secondary students in the US reporting past-year NMPDU of opioids (Ford et al., 2018). Rates of opioid PDU remain concerning alongside NMPDU. For example, recent Canadian data from the Canadian Postsecondary Education Alcohol and Drug Use Survey (CPADS) demonstrates that more than 24% of post-secondary of students have engaged in past-year use of opioids, with almost 80% of these users engaging in only 'as prescribed' use (Government of Canada, 2021).

In addition to opioids, rates of PDU and NMPDU of stimulants are concerning among post-secondary students. Most prior research on stimulant NMPDU among post-secondary students has demonstrated prevalence rates of 5-12% over the past year (Benson et al., 2015; Government of Canada, 2021), though rates of past year NMPDU as high as 35% have also been reported (US data; Low & Gendaszek, 2002). Stimulant NMPDU has been found to be significantly higher among post-secondary students than their similar-aged peers who do not attend post-secondary programs (Ford & Pomykacz, 2016). NMPDU is particularly notable in certain post-secondary contexts such as among sororities/fraternities, in highly stressful academic programs, and when other substances are being used (e.g., Benson et al., 2015; De

Bruyn et al., 2019; Dussault & Weyandt, 2013). Similarly, NMPDU of S&Ts among post-secondary students is noteworthy, with almost 5% of students having engaged in NMPDU of this category of PD over the past year (US sample; McCabe et al., 2018). Rates of PDU with S&Ts is similarly notable, as approximately 8.6% of Canadian students have been found to engage in past-year S&T use, with over 76% of these students only engaging in ‘as prescribed’ use (Government of Canada, 2021). S&T use among post-secondary students is particularly concerning because high rates of stress and depression have been reported in student samples, and the students higher in stress/depression are also more likely to self-medicate with S&Ts (e.g., Pate & Bolin, 2019).

The notable rates of PD use among post-secondary students are important to acknowledge, as PDU and NMPDU among students have been associated with a wide range of adverse consequences. For example, post-secondary students engaging in NMPDU in the United Kingdom reported a variety of negative consequences of use including physical problems (e.g., nausea and vomiting), relationship issues (e.g., antisocial behaviour and paranoia around connections), psychological problems (e.g., insomnia and dissociation), as well as financial and study-related issues (Holloway et al., 2014). Among post-secondary students, there is generally a noticeable association between NMPDU and mental health concerns such as depression and suicidality, highlighting students may be inappropriately and ineffectually self-medicating for mental health symptoms with non-prescribed PDs (Zullig & Divin, 2012). Additionally, PDU and NMPDU are often associated with problematic use of other substances. For example, students who engage in binge drinking are three times more likely to report past NMPDU (Silvestri et al., 2015). NMPDU among students is generally more prevalent among students reporting higher rates of other substance use and risky behaviours (McCabe et al., 2005). Finally,

overdoses (both lethal and non-lethal) are potential adverse consequences of both PDU and NMPDU, with an increased risk of emergency room (ER) visits or inpatient admissions due to overdose being more likely for those engaging in concurrent use of different PDs (Sun et al., 2017).

Social Norms

Given the concerning rates of PDU/NMPDU and their numerous adverse consequences among EAs and, more specifically, post-secondary students, it is crucial to explore constructs and theories that may help to explain risky use behaviours. ‘Social norms’ broadly refer to peoples’ perceptions about the thoughts or behaviours of others. In social psychology, social norms have become recognized as an important construct for explaining the behaviour of individuals and groups. This construct can be parsed into two categories: descriptive and injunctive norms (Cialdini et al., 1990). Descriptive norms are perceptions or beliefs about what people are concretely doing or thinking (i.e., what is ‘actually’ done), whereas injunctive norms refer to perceptions or beliefs about morally approved/disapproved behaviours (i.e., what ‘ought to be’ done) (Cialdini et al., 1990).

Social norms theory proports that when individuals incorrectly perceive behaviours of others, or when they incorrectly perceive approval of others regarding that behaviour, they are more likely to change their own behaviours to more closely align with their normative perceptions (Perkins & Berkowitz, 1986). Research dating back to the 1960s has supported social norms theory predictions by demonstrating that normative perceptions of others’ behaviours influence individuals to behave in similar ways, even with behaviours as morally neutral as looking at the sky (Milgram et al., 1969) or choosing a consumer product (Venkatesan, 1966). Descriptive norms have been found to robustly impact a wide range of both behavioural

intentions (McEachan et al., 2016; Rhodes et al., 2020; Rivas & Sheeran, 2003) and actual behaviours (McEachan et al., 2016; Rhodes et al., 2020). Similarly, injunctive norms have been found to significantly impact numerous behavioural intentions (McEachan et al., 2016; Rhodes et al., 2020), and actual behaviours (Rhodes et al., 2020) though behaviour change appears to be more consistently predicted by descriptive norms than injunctive norms (see Chung & Rimal, 2016 for a review).

Theories and Phenomena Underpinning Social Norms and Their Effects on Behaviour

While the structure of the dissertation studies included herein has primarily been shaped by social norms theory (Perkins & Berkowitz, 1986), social norms theory has evolved alongside several other important social theories that have been used to explain individuals' beliefs and behaviours. The aim of the following section is thus to outline theories with tenets seemingly aligning with social norms theory. By contextualizing social norms theory in its theoretical predecessors and successors, a primary goal of this section is to demonstrate the important weight that social norms theory holds in explaining perceptions and behaviours more generally.

1. Social Comparison Theory

As developed by Leon Festinger (1954), *Social Comparison Theory* posits that humans have a natural drive to evaluate their opinions/beliefs and abilities in comparison to the opinions/beliefs and abilities of others, particularly in the absence of objective or non-social means with which to evaluate themselves. Festinger noted that subjective evaluations of opinions/beliefs and abilities tend to be unstable without a social comparison, and he highlighted the importance of proximal referents (i.e., a perceived other who is relatively similar to oneself) by positing that one's perceptions tend to become less accurate as comparison groups become

more distal/divergent (Festinger, 1954). Social norms theory (Perkins & Berkowitz, 1986) similarly requires a comparator with which one can have beliefs/perceptions.

2. *Social Identity Theory*

Social Identity Theory (Tajfel & Turner, 1979) furthered theoretical tenets introduced by Festinger's Social Comparison Theory (1954). Rather than positing that each individual merely compares their personal thoughts and beliefs to those of others on an individualistic level, social identity theory suggests that individuals are likely to compare in the context of group membership. In particular, this theory purports that one's own group membership notably influences one's self-concept, self-esteem, and related self-opinions. It highlights that individuals are more likely to define themselves in terms of similar group characteristics, leading to increased identity and interaction with certain groups ("in-groups") as opposed to other groups ("out-groups"). Increased identification/interaction with in-groups, in turn, has been shown to contribute to beliefs and behaviours more congruent with one's group identity (Ashforth & Mael, 1989). Given that social norms theory (Perkins & Berkowitz, 1986) involves individuals comparing themselves to others who may or may not be in their in-groups, social identity theory can be viewed as an important precursor of social norms theory.

3. *Social Impact Theory*

Latané (1981) extended the understanding of social norms and social influence of various in- and out-groups with his *Social Impact Theory*, which posits that the amount of influence imposed by a social comparator depends on three primary factors: (1) The strength of the comparator compared to the individual (e.g., the comparator's social status compared to the individual), (2) the immediacy of the comparator compared to the individual (e.g., the physical or psychological distance between the individual and the comparator), and (3) the number of

comparators an individual has in a given context (e.g., a situation with multiple comparators influencing a single individual). The theory generally suggests the influence of social comparators increases as their strength, immediacy, and number increase relative to the individual. As will be discussed in later dissertation sections, aspects of the comparator (namely, strength) have been widely investigated in social norms research, thus making social impact theory a relevant and notable precursor to social norms theory (Perkins & Berkowitz, 1986).

4. Pluralistic Ignorance

Pluralistic Ignorance (Miller & McFarland, 1987) is an erroneous belief or misconception about the thoughts or behaviours of others. It is generally deemed to be a common misperception in social norms research (Berkowitz, 2004). The phenomenon originally pertained to a belief wherein a majority of people reject or disagree with something on an individual or private level, but go along with it because they assume that most other people accept it (Katz, Allport, & Jenness, 1931). More generally, the phenomenon has been understood to arise when someone (e.g., person x) privately believes that others are thinking or behaving differently than the way they (person x) are personally thinking or behaving, even though these other people are actually thinking or behaving similarly to them (i.e., other people are actually thinking/behaving *similarly* to person x) (Miller & MacFarland, 1987). In their original outline of pluralistic ignorance, Katz, Allport, and Jenness (1931) highlighted that changes in beliefs/conventions can stem from individuals' gradual recognition that other people think or behave similarly to them.

5. False Consensus Effect

The *False Consensus Effect* is a phenomenon identified by Ross et al. (1977) that describes individuals' tendencies to view their own thoughts and behaviours as relatively common, while viewing alternate thoughts and behaviours as relatively uncommon. Ross et al.

(1977) highlighted individuals tend to view their own perspectives as the prototypical standard of normalcy. Thus, other perspectives are more likely to be seen as ‘odd’ or ‘deviant’ if they diverge from our own perspectives/behaviours. A central tenet of social norms theory (Perkins & Berkowitz, 1986) involves misperceptions of a norm, which highlights the potential relevance of the bias demonstrated with the false consensus effect.

6. *False Uniqueness Effect*

Misperceptions inherent in social norms also appear to align with other phenomena. In contrast to *False Consensus*, the *False Uniqueness Effect* (Suls & Wan, 1987) describes the tendency to underestimate the extent to which others hold similar beliefs or engage in similar behaviours as oneself. Early research suggested that the need to perceive oneself as unique from others stems from a desire to see oneself in the most positive or socially desirable light possible; however, subsequent research has demonstrated that people may be likely to hold positive or *negative* uniqueness perceptions (Chambers, 2008). However, in situations where the *False Consensus* and *False Uniqueness* effects have been concurrently investigated in a single sample, desirable behaviours are underestimated (*False Uniqueness*) whereas undesirable behaviours are overestimated (*False Consensus*) (Suls et al., 1988).

7. *Perkins’ Theoretical Model on Misperceptions*

It is noteworthy that one of the co-developers of social norms theory (H. Wesley Perkins) has argued for an additional theoretical model that explains misperceived norms (Perkins, 1997; Perkins, 2002; Perkins, 2014). In this model, Perkins incorporates both psychological and sociological phenomena, and he purports the following three levels of processes to interact in a way that mutually reinforces misperceptions: (1) an attribution error where individuals mistakenly attribute less common behaviours to someone’s individual disposition rather than to

the unique environment that led to the less common behaviour, (2) a memory bias where individuals demonstrate an increased memory for more vivid or extreme behaviours, often because these behaviours are discussed disproportionately in social conversations, and (3) a cultural phenomenon where individuals' risk behaviours are disproportionately communicated to them through media and news outlets, appearing to demonstrate that such behaviours are commonplace. Overall, the model proposed by Perkins (1997, 2002, 2014) offers a more comprehensive framework to explain social norms overestimations.

Social Norms and Common Behaviours in Emerging Adulthood

Social relationships, particularly relationships with peers, have been found to play an influential role during EA (Mason et al., 2014; O'Connor et al., 2011). As such, research has investigated numerous facets pertaining to social norms and behaviours among students and their peers. For example, post-secondary students appear to overestimate sexual health behaviours (Chia & Gunther, 2006; Lynch et al., 2004; Scholly et al., 2005) and intimate partner violence (IPV) among their peers (Witte & Mulla, 2013; Witte et al., 2017).

Consistent with social norms theory (Perkins & Berkowitz, 1986), descriptive and injunctive norms have also been shown to be predictors of students' own behaviours or behavioural intentions in areas such as voting (Glynn et al., 2009), obtaining vaccinations (Abdallah & Lee, 2021; Stout et al., 2020), disordered eating (Forney & Ward, 2013; Giles et al., 2007), and dietary behaviours such as fast-food intake (Pelletier et al., 2014). Again, consistent with social norms theory (Perkins & Berkowitz, 1986), social norms have been found to directly impact student-focused behaviours such as interactions with social media websites/applications (Boehm, 2019; Park et al., 2011) and behaviours in academic settings specifically (such as non-attentive behaviours or cheating; Segrist et al., 2018; Whitley, 1998).

Social Norms and Substance Use

Social norms have additionally been shown to have a significant impact on substance use behaviours among post-secondary students and EAs more broadly. Initial research on social norms theory in relation to substance use was applied to alcohol (Perkins & Berkowitz, 1986). Following this foundational alcohol research, there was a proliferation in social norms research in relation to certain other substance use behaviours such as cannabis use and tobacco smoking (i.e., in cigarettes, e-cigarettes, and hookahs). The following sections elaborate on social norms and alcohol use research, and subsequently discuss social norms as it pertains to the use of other substances.

Seminal research on social norms and alcohol-related behaviours demonstrated that post-secondary students tend to overestimate their peers' drinking behaviours (Perkins & Berkowitz, 1986). Overestimations of peer drinking behaviours has even been demonstrated in environments where baseline problem drinking is high (Perkins, 2002). Subsequent research has replicated findings on EAs overestimation of their peers' alcohol use with several behaviours such as drinking frequency/quantity, average number of drinks, maximum number of drinks, instances of drunkenness or heavy episodic drinking, and alcohol-related negative consequences (Arbour-Nicitopoulos et al., 2010; França et al., 2010; Lee et al., 2010a; McAlaney et al., 2015; Monk & Heim, 2014; Neighbors et al., 2006; Neighbors et al., 2007). Higher levels of perceived peer norms have been found to predict greater levels of own drinking behaviour (e.g., Ward & Guo, 2020), consistent with social norms theory predictions (Perkins & Berkowitz, 1986).

Compared to norms perceptions for other groups, perceived *peer* norms have been found to play a particularly large influence on own substance use behaviours (Perkins, 2002). Students are more likely to drink heavily and experience a higher rate of alcohol-related negative

consequences when they view their peer or campus drinking behaviours and evaluations of behaviours as being similar to their own attitudes (Lee et al., 2010a; Perkins & Berkowitz, 1986). In general, both higher descriptive norms and higher injunctive norms have been associated with higher levels of own drinking (Borsari & Carey, 2001; Borsari & Carey, 2003), though descriptive norms have been found to be a stronger and more consistent predictor of own alcohol-related behaviours (e.g., Sheppard et al., 2016). Injunctive norms appear to have a more complex relationship with behaviours, such as having a larger influence in certain geographic regions or assuming an important role as a moderator for behaviour (e.g., Krieger et al., 2016; McAlaney et al., 2015; Neighbors et al., 2008). Proximity of the ‘reference group’ (i.e., the group membership of the perceived other) has also been shown to play a role in social norm influences on drinking behaviours, with perceived descriptive and injunctive norms regarding more proximal referents (e.g., friends, same-sex students, same-race students, or students with the same Greek status) generally appearing to be more influential on one’s own drinking behaviour and drinking-related negative consequences than more distal referents (e.g., ‘typical’ students) (Borsari & Carey, 2003; LaBrie et al., 2010; Lewis & Neighbors, 2004; Lewis et al., 2010; Yanovitzky et al., 2006).

In particular, sex has been found to be a primary moderator in the perceptions-behaviour link for alcohol social norms, wherein perceived same-sex norms (i.e., norms regarding the behaviour of those with the same sex as oneself) are prone to misperceptions (e.g., Lewis et al., 2011), and are more strongly associated with own alcohol use and problematic drinking behaviours than opposite-sex or sex-neutral norms (Korcuska & Thombs, 2003; Lewis & Neighbors, 2004; Lewis, 2007; Neighbors et al., 2010a). Overall, post-secondary students significantly overestimate their peers’ drinking behaviours which, in-turn creates a motivation to

increase one's own drinking behaviours to match the perceived norm. This relationship of higher social norms perceptions leading to increased drinking appears to be particularly true among students with increased confidence in their normative perceptions (Neighbors et al., 2011), students who report social motives for drinking (Halim et al., 2012), and students who obtain exposure to alcohol-related social media content (Boyle et al., 2016; Roberson et al., 2018).

In more recent decades, social norms research in the substance use field has extended beyond alcohol to other substances used by undergraduates. Similar to alcohol use, research on cannabis-related behaviours has shown a consistent overestimation by EAs of peer cannabis behaviours, and this overestimation has been positively associated with one's own cannabis behaviours (Arbour-Nicitopoulos et al., 2010; Dempsey et al., 2016; Kilmer et al., 2006). Even among post-secondary students not engaging in recent cannabis-related behaviours themselves, overestimations of peer behaviours are still common (Dempsey et al., 2016).

However, the association between perceived peer cannabis behaviour norms and own behaviour may depend on intensity of behaviours and the type of norms being investigated. For example, students engaging in problematic cannabis use have actually been found to demonstrate a smaller descriptive norm overestimation than students not engaging in problematic use (Loverock et al., 2021), though students engaging in problematic cannabis use have simultaneously been found to be more responsive to injunctive norms than non-problematic cannabis users in terms of impacts on own cannabis use behaviour (Loverock et al., 2021). While these particular findings appear to deviate somewhat from social norms theory predictions (Perkins & Berkowitz, 1986), they still shed light on which types of social norms may be most impactful on cannabis behaviours, namely different levels of cannabis use.

This perceived norm-personal use association for cannabis behaviours may also be influenced by identified sex/gender or race, as the association has been shown, in some research, be stronger for male and Latino/Latina students compared to students identifying with other sex/gender or racial backgrounds (Edwards et al., 2019). More generally, both perceived peer descriptive and injunctive norms have been associated with personal cannabis use (e.g., Montes et al., 2021), and perceived descriptive norms have most consistently predicted personal use behaviours (Buckner, 2013; Dempsey et al., 2016), akin to findings for social norms for alcohol use (e.g., Foster et al., 2015). However, norms have been found to better predict cannabis use levels and adverse consequences of cannabis use among certain populations, such as individuals with higher as opposed to lower levels of social anxiety (Ecker & Buckner, 2014).

Perceived norms for proximal referents have, again, been found to be better predictors of cannabis behaviours and cannabis-related problems than distal referents (Buckner, 2013). Similar to alcohol (e.g., Neighbors et al., 2010a), a unique role of sex in the perception-behaviour link has been identified for cannabis, wherein sex-specific normative perceptions (i.e., male participants perceiving a male referent and female participants perceiving a female referent) account for a relatively high proportion of variance in cannabis use (Lewis & Clemens, 2008).

EAs have demonstrated a similar overestimation of peer behaviours for tobacco smoking (Arbour-Nicitopoulos et al., 2010; Pischke et al., 2015; Terry & Terry, 2012). Significant associations have been demonstrated between peer norms perceptions and personal behaviours with cigarettes (Arbour-Nicitopoulos et al., 2010; Bertholet et al., 2013; Oh et al., 2022; Pischke et al., 2015). Similar overestimations of peer use among students have been found to extend to other forms of nicotine and tobacco use such as e-cigarettes and hookah (Leavens et al., 2018;

Nabil et al., 2021; Noland et al., 2016), with a corresponding association between perceptions and behaviours (Doxbeck & Osberg, 2021; Oh et al., 2022).

For e-cigarettes in particular, injunctive norms surrounding the social acceptability of use compared to traditional tobacco products have been a strong predictor of personal use of e-cigarettes among students (Amin et al., 2020; Leavens et al., 2019; Trumbo & Harper, 2013); however, descriptive norms rather than injunctive norms appear to be a more consistent predictor of personal behaviours for traditional cigarette smoking (East et al., 2021) as has been discussed earlier for other forms of substance use. Sex has been shown to be an important consideration in social norms for cigarettes and e-cigarettes, similar to alcohol (e.g., Neighbors et al., 2010a) and cannabis (e.g., Lewis & Clemens, 2008), and it has specifically been found that females show the largest discrepancy between perceived behaviours and actual behaviours (Javier et al., 2013), highlighting that females appear to show the greatest overestimation bias.

Social Norms and PDU/NMPDU

The influence of social norms on substance-related behaviours among EAs has been shown to extend to PDU and NMPDU. Similar to alcohol, injunctive norms of PDU/NMPDU appear to play a more complex and less direct role on PDU/NMPDU behaviours than descriptive norms (e.g., Jain & Humienny, 2020), though this relationship also appears to vary with different samples and types of PDs being used, as highlighted in subsequent sections of this chapter. The following sections will more generally provide a review of the connection between social norms and PDU/NMPDU, beginning with stimulants.

Post-secondary students have been found to significantly overestimate rates of non-medical stimulant use among their peers and of approval of non-medical stimulant use by their peers (Helmer et al., 2016; McCabe, 2008). Consistent with social norms theory (Perkins &

Berkowitz, 1986), these stimulant-related social norm perceptions and overestimations have been associated with personal approval and personal use behaviours (Helmer et al., 2016; Kilmer et al., 2015; Kollath-Cattano et al., 2020; Reisinger et al., 2016), with behaviour being better predicted by social norms for proximal than distal referents (Bavarian et al., 2013; Bavarian et al., 2015; Yomogida et al., 2018). Additional cross-sectional research has established associations between perceptions and personal use of stimulants without specifying directionality between the two constructs (Blevins et al., 2017; Judson & Langdon, 2009; McCabe, 2008; Sanders et al., 2014). Thus, while most of this existing research has not established the peer perception to personal use relationship predicted by social norms theory (Perkins & Berkowitz, 1986) due to a lack of longitudinal data, it still highlights a significant association between peer perceptions and personal use.

The peer perception-personal use relationship for stimulants has also been shown to extend to students engaging in prescription stimulant diversion (i.e., sharing or selling of the PD), wherein ‘diverters’ (relative to ‘non-diverters’) significantly overestimate the approval of NMPDU for stimulants among both proximal and distal referent groups (Schultz et al., 2017). In addition to the link between higher NMPDU normative perceptions and higher personal stimulant NMPDU, higher NMPDU normative perceptions for stimulants have also been linked to other personal increased substance use behaviours such as hazardous drinking (Kilmer et al., 2015), perhaps suggesting that stimulant overestimations and corresponding behaviours may generalize to other substances. For S&Ts, students similarly significantly overestimate peer use and peer approval for S&T use compared to actual S&T use and approval rates by peers, and increased overestimations have been associated with personal S&T use and approval of use (Kollath-Cattano et al., 2020; Lehne et al., 2018; Sanders et al., 2014).

For opioids, EAs again significantly overestimate PDU and NMPDU among their peers compared to true use rates (McCabe, 2008), and a relationship has been established between opioid use perceptions and personal opioid PDU/NMPDU wherein individuals who perceive higher rates of usage are also more likely to report personal PDU/NMPDU behaviours (McCabe, 2008; Romberg et al., 2019). While the research to date has primarily been correlational, the observed associations between social norm perceptions and personal behaviours for opioids are consistent with tenets of social norms theory (Perkins & Berkowitz, 1986). Perceived peer norms for NMPDU of opioids have also demonstrated an association with behavioural intentions to use (Davis et al., 2019), and intentions have been implicated as a strong predictor of actual behaviour (Ajzen, 1991). Some recent findings have additionally shown that injunctive norms are more predictive of personal NMPDU for opioids compared with descriptive norms (e.g., Kollath-Cattano et al., 2020); this contrasts with the relative importance of descriptive and injunctive norms found in most other studies of social norm influences for other forms of substance use (e.g., Dempsey et al., 2016).

Following the recognition of sex as an important characteristic in the relationship between substance use social norms perceptions and substance use personal behaviours among EAs, preliminary research has emerged on the role of sex in the relationship between social norms perceptions and PDU/NMPDU. This initial research has demonstrated that females perceive a higher rate of peer stimulant and opioid PDU/NMPDU than males (Kilmer et al., 2015; McCabe, 2008). Regarding the sex of peer referent, post-secondary students appear to perceive opioid use to be higher among male than female peers (Ricketts & Higgins, 2007). While existing research has investigated main effects of perceivers and perceived peers separately, it has yet to examine any interactions between sex of perceivers and sex of perceived

peers, thus failing to provide information about whether sex-matching effects exist (i.e., if the relationship between perceptions and personal use is higher for male students perceiving their male peers and for female students perceiving their female peers than for students who are perceiving opposite-sex or sex-neutral peers). Sex-matching effects have been demonstrated for social norms and alcohol use (e.g., Lewis & Neighbors, 2004), but have yet to be investigated for PDU/NMPDU. Sex-matching would be predicted by Social Comparison Theory (Festinger, 1954), Social Identity Theory (Tajfel & Turner, 1979), and Social Impact Theory (Latané, 1981), which each independently highlight the greater influence of perceptions of more proximal (vs. more distal) referents on one's own behaviours.

Qualitative studies on student PDU/NMPDU have provided additional insight into the relationship between social norms and PDU/NMPDU. Existing qualitative research has investigated topics such as PD motives (e.g., academic motives; Hildt et al., 2014), subjective positive experiences with PDs (e.g., improved performance; DeSantis et al., 2008), and subjective negative experiences/side effects with PDs (e.g., side effects; Aikins, 2011). Most of these studies have focused on individual experiences and behaviours, yet multiple of these areas (such as motives for use) likely exist in the context of social dynamics, implicating a central role for social norms research to further uncover how PDU/NMPDU behaviours emerge and exist from a social lens. Qualitative studies have provided preliminary explorations of EAs' normative perceptions pertaining to PDU/NMPDU. These initial findings have suggested that PDU/NMDPU appears to be common, and they have implicated a central role of social networks in norms and behaviours (e.g., Garcia et al., 2021; Green & Moore, 2009), though the existing research has almost exclusively focused on stimulants and NMPDU as compared to other types

of PDs or forms of use. These findings will be articulated and discussed further in the Transition from Study 1 to Study 2 section.

Summary of Social Norms and PDU/NMPDU

Overall, prior research demonstrates that social norms play a notable role in EAs' perceptions about their peers and their own behaviours in various domains. This social norms-own behaviour association has been strongly established for substance use more generally. While an association has been demonstrated between normative perceptions and personal behaviour for PDU and NMPDU more specifically, relatively less research exists for these categories of substance use and misuse, particularly regarding the impact of factors such as sex on social norms and behaviours. Thus, further studies (using both quantitative and qualitative methods) are required to fully understand the nuances and implications of the social norms-own behaviour relationship for EAs' PDU/NMPDU across multiple types of psychoactive prescription drugs.

Social Norms Interventions

Given social norms represent an important factor in risky behaviours during EA, research has investigated individual interventions and group-level campaigns that target social norms to mitigate these risky behaviours and associated consequences. These interventions have largely been predicated on theoretical models that underscore the influence of social norms in personal behaviours (as described in previous sections of this chapter). However, interventions with EAs, and post-secondary students more specifically, have not capitalized on the involvement of EAs in their development and delivery, in addition to not allowing for comprehensive qualitative reflections on research approaches regarding social norms (as will be shown in subsequent sections). Involvement of EAs has been low, despite research highlighting that a 'youth voice' in

intervention programming and effectiveness can be a primary catalyst for change (Hawke et al., 2019).

Social Norms Interventions for EAs

The large influence of social norms misperceptions (namely, overestimations) on EAs behaviour has led to the creation of interventions that have aimed to target and correct norms-related misperceptions (Legros & Cislighi, 2020) as a way of influencing EAs' risk behaviours. While broadly categorized as *social norms interventions*, these interventions can be more discretely be parsed into two separate types of approaches: *Individual/personalized normative feedback* (PNF) and *social marketing campaigns* (Moreira et al., 2009).

PNF interventions provide each student with individualized corrective information about norms (Moreira et al., 2009). Specifically, three pieces of information are provided on an individual level: information about one's own behaviours, information about one's own perceptions of that same behaviour among others, and information about true rates of that same behaviour among others in a way that explicitly reveals a discrepancy between personal and perceived behaviours (Lewis & Neighbors, 2006a). While these individualized interventions provide more salient feedback, are usually provided to higher risk students, and tend to be more explicit in revealing discrepancies between perceived and actual behaviours (Lewis & Neighbors, 2006a), they fail to capitalize on advantages inherent in approaches that reach a larger audience at lower costs.

Social marketing campaigns offer another approach which compensates for the prior disadvantages highlighted for PNF interventions. Specifically, the social marketing approach typically involves universal mass communications (e.g., advertisements, flyers, or posters) or group-based campaigns to correct misperceptions, such as overestimations pertaining to peer

drinking (Lewis & Neighbors, 2006a; Moreira et al., 2009). While social marketing approaches are typically less individualized and less targeted than PNF, they do have noticeable benefits of reaching larger audiences, for a lower cost, by using a more universal form of information sharing.

Several normative interventions to correct misperceptions have also been found to utilize aspects from both social marketing campaigns and PNF, such as those which provide more generalized corrective feedback to multiple group members in structured small-group settings. These ‘small-group’ social norms interventions (Far & Miller, 2003) have been used to investigate a wide range of topics ranging from sexism (Kilmartin et al., 2008) to drinking (Reilly & Wood, 2008). Review papers have effectively summarized different approaches to norms interventions, with a dominant focus on PNF and social norms campaigns (Legros & Cislighi, 2020; Miller & Prentice, 2016; Yamin et al., 2019). Interventions using each type of social norms approach have been somewhat efficacious at changing some health behaviours (as detailed below), though the efficacy of these approaches to date is still mixed given the heterogeneity of study designs, outcomes, and the ways in which social norms constructs have been operationalized (e.g., Yamin et al., 2019).

PNF interventions have been applied to a wide range of misperceptions among EAs that are relevant to EA health behaviours. Interventions utilizing PNF have been shown to impact misperceptions and behaviours surrounding sexual intimacy (e.g., Testa et al., 2020) and disordered eating (e.g., Mutterperl & Sanderson, 2002), and perceptions pertaining to voting (Glynn et al., 2009).

Social marketing campaigns and group-based normative interventions have similarly been used to correct EAs misperceptions pertaining to a wide range of behaviours such as risky

sexual behaviours (e.g., Scholly et al., 2005) and unhealthy eating/exercise patterns (e.g., Campo et al. 2004; Robinson et al., 2014). Some campaigns have been more effective than others. For example, Scholly et al. (2005) utilized a series of four posters designed to reflect healthy sexual behaviour norms among post-secondary students in order to correct overestimations of risky sexual behaviours. The nine-month campaign resulted in no significant change to perceptions or behaviours. However, more promising results were demonstrated by a longer, five-year, social marketing campaign developed to target male students' attitudes/beliefs/behaviours surrounding sexual violence (Mennicke et al., 2021). The campaign resulted in a significant correction to attitudes and beliefs, while additionally reducing sexual-violence related behaviours. Similar types of social norms marketing campaigns across post-secondary campuses focusing on sexual assault/violence misperceptions have resulted in significant corrections to misperceptions (and sometimes behaviours) regarding consent, sexual language, sexual intimacy, and being a bystander to sexual violence (e.g., Bruce, 2002; Potter, 2012; White et al., 2003).

Social marketing campaigns and group-based interventions have been similarly utilized in health campaigns to correct EAs misperceptions and corresponding behaviours. For example, group-related messaging has been found to result in significant changes to misperceptions for exercise (Campo et al., 2004), and to increases in fruit and vegetable intake (Robinson et al., 2014; Stok et al., 2012; Stok et al., 2014). However, the influence of social normative programs on such behaviours has generally been inconsistent overall (Robinson, 2015). Another application of social marketing has involved the use of normative messages for post-secondary students pertaining to handwashing, where normative messaging has been associated with an increase in positive attitudes surrounding handwashing as well as actual behavioural changes such as handwashing frequency (Lapinski et al., 2013).

Social Norms Interventions for Substance Use

Given the impact of social norms on EAs beliefs and behaviours combined with the high prevalence of substance use and substance-related consequences during EA, several social norms campaigns and PNF programs have focused on substance use (e.g., Gordon et al., 2006; Saxton et al., 2021; Stead et al., 2007). A notable focus of these interventions has been on alcohol-related perceptions and behaviours (e.g., Dotson et al., 2015; Kubacki et al., 2015).

Comprehensive reviews of social norms interventions on alcohol-related outcomes have generated mixed findings (Dotson et al., 2015; Foxcroft et al., 2015; Kubacki et al., 2015; Moreira et al., 2009); however, beneficial outcomes have likely been diluted due to heterogeneity in quality assurance and intervention fidelity of the included trials (Dempsey et al., 2018).

PNF interventions have been used to curb a wide range of peer substance use misperceptions and own substance use behaviours among EAs and have very often focused on post-secondary students. As stated previously, a large number of PNF interventions to date have targeted alcohol-related perceptions and behaviours. Web-based PNF interventions for alcohol have generally been found to result in reductions to overestimated perceptions, as well as reductions to drinking frequency, drinking quantity, peak drinking, and adverse drinking-related consequences (Collins et al., 2014; Doumas et al., 2010; Doumas et al., 2011; LaBrie et al., 2013; Lewis & Neighbors, 2007; Neighbors et al., 2004). PNF interventions for alcohol have also involved the provision of individualized feedback (relative to actual norms) via mail or print, and such interventions have been shown to result in a reduction in alcohol quantity, increase in abstinence rates, and a reduction in heavy episodic drinking (e.g., Larimer et al., 2007). Additionally, given the potential influence of social media on drinking among EAs (McAlaney et al., 2011), novel online methods of feedback delivery utilizing social media have

been implemented to creatively share corrective information with EAs. These methods have similarly generated significant reductions in alcohol-related social norm misperceptions and students' own alcohol use behaviours (Ridout & Campbell, 2014).

Results from PNF interventions for alcohol have demonstrated the importance of normative reference groups by highlighting certain proximal referents, such as same-sex peers, influence alcohol-related perceptions and behaviours most strongly (Lewis & Neighbors, 2007; Neighbors et al., 2010a; Neighbors et al., 2010b). However, a comparison of eight different reference groups for student alcohol use found that corrective feedback using distal referents (i.e., 'typical students') was most effective in influencing alcohol use outcomes (LaBrie et al., 2013). This appears to leave remaining questions about the effectiveness of different reference groups across different substance use populations and contexts.

In addition to PNF's application to targeted alcohol outcomes, PNF has also been successfully applied to alcohol-related risky behaviours, such as alcohol-related sexual behaviour (Lewis et al., 2014). While PNF has a long history of success in changing alcohol-related perceptions and behaviours, results have been more consistent for curbing perceptions, and changes to perceptions have not always been found to translate to behaviour change (e.g., Patrick et al., 2014).

Social norms interventions (primarily PNF) with cannabis use have generated less consistent results. For example, a PNF intervention for cannabis use among college students did not significantly change cannabis use behaviours or cannabis-related consequences (Lee et al., 2010b). However, some social norms-based approaches have appeared to have more success at reducing cannabis use when using proximal referents (Pischke et al., 2021), and when delivering

the program as part of a more comprehensive substance use intervention for cannabis use (e.g., including additional psychoeducation or skills building; Lee et al., 2013a).

Similar to PNF interventions, social marketing campaigns have also been utilized to target a wide range of normative beliefs in an attempt to indirectly influence related substance use behaviours. These campaigns have typically been diverse in delivery and appear to commonly target alcohol use (e.g., Kubacki et al., 2015). For example, campaigns have used posters, web postings, and newspaper information to deliver accurate normative information, and have demonstrated success in reducing alcohol-related perceptions, behaviours, and adverse consequences of alcohol use (Turner et al., 2008). In addition to targeting alcohol use, social marketing campaigns for EAs have been harnessed to successfully target other alcohol-related behaviours such as drinking and driving (Perkins et al., 2010). While most group-based marketing feedback interventions have targeted descriptive norms, additional group campaigns have demonstrated that group-based feedback including injunctive norms may have an additive effect and increase the efficacy of traditional descriptive norm-based interventions (Prince & Carey, 2010).

Social norms interventions (primarily social norms marketing campaigns) have also been applied to behaviours for both cigarettes/e-cigarettes and cannabis among EAs. Three multimedia social norms marketing campaigns across various college campuses have broadly been shown to reduce overestimations of peer norms, and to have additional effects on smoking behaviours including increasing rates of smoking cessation and delaying smoking initiation, with results still significant at one-year follow-up (Hancock et al., 2002). A briefer social norms messaging campaign relating to cigarette smoking has been shown to have minimal effects on attitude change towards smoking (Campo et al., 2004), though this study did not provide

information about behaviour change. A more recent PNF intervention did not find any significant change to smoking behaviours after corrective feedback with proximal referents was provided (Pischke et al., 2021).

While normative interventions for certain substances (such as alcohol) among EAs have been abundant, normative interventions for PDU/NMPDU have been scant. Only two social norms interventions (a PNF intervention on an individual level and a social marketing campaign on a universal level) have been trialed for impacts on PDU/NMPDU among EAs. The individual-level intervention (Arabyat et al., 2019) provided normative messaging somewhat akin to messaging provided during social marketing campaigns but did not adhere to the traditional structure of social marketing, as it shared didactic and educational information about social norms on an individualized rather than a group scale. The program focused on didactically correcting social norms misperceptions, and is thus more closely adheres to a PNF intervention. The program was found to significantly increase negative attitudes towards NMPDU, though it did not significantly change behavioural intentions to engage in NMPDU (Arabyat et al., 2019).

The universal social marketing campaign pertaining to PDU/NMPDU was a university-based, student-driven campaign focused on stimulant NMPDU which included a combination of print messaging, social media messaging, and in-person events across two university campuses (LaBelle et al., 2020). The intervention resulted in less favourable attitudes toward and reduced overestimations of peer use norms, though no reductions to behavioural intentions to use or actual use behaviours were observed. While this study introduced the relevance of universal social norms campaigns to NMPDU, it is noteworthy than the campaign *only* focused on *stimulant* NMPDU.

Both of the existing PDU/NMPDU social norms interventions demonstrate initial effects on beliefs and perceptions though they leave unanswered questions about the factors influencing behaviour following social norms interventions, due to the lack of observed behaviour change in both of the existing interventions. These gaps between changes in perceptions and changes in behaviours suggest that additional research involving qualitative participant feedback may be needed to understand reasons why a ‘perception-behaviour gap’ may be present for social norms interventions that target PDU/NMPDU. Prior research has similarly noted that participant feedback in social norms research is lacking (Dempsey et al., 2018).

‘Youth Voice’ in Interventions for EAs

Recent research has begun to incorporate the perspectives and input of the target markets proposed for substance use interventions (and mental health interventions more generally) as collaboration and engagement with participants has been shown to increase intervention uptake and effectiveness. In clinical substance use research (as well as other clinical areas), the term ‘people with lived and living experience’ (PWLLE) has been used to underscore the crucial role of facilitating the inclusion of these groups directly impacted by the research (e.g., Greer et al., 2021; Nosyk et al., 2021). In particular, EAs have indicated that collaboration in substance use intervention/service development and implementation helps them retain their agency and power (Hawke et al., 2019), and EAs are generally considered to be the best judges of the ‘friendliness’ of services targeted towards their own demographic (e.g., James, 2007). The importance of ongoing involvement of EAs has been established (Hawke et al., 2019). Thus, it is now commonly suggested for EAs/youth to share their perspectives to promote the development and implementation of programs and services designed for EAs/youth (Abo-Zena & Pavalow, 2016; Armstrong, 2009; Rickwood et al., 2014). Within the context of clinical research studies in

particular, several guidelines have been proposed for the best ways in which to involve EAs and youth in sharing their perspectives during study design and implementation such as creating meaningful opportunities for participation, creating clearly defined roles for youth, holding meetings with youth, explaining research with jargon-free terms, and creating youth-friendly spaces (Hawke et al., 2018).

When PWLLE are more deliberately included in the creation and development of clinical research that impacts their target demographic, they may assume a role more akin to co-investigators in a broader model known as *participatory action research* (PAR; Kemmis et al., 2014). Within the context of PAR, the involvement of EAs/youth in substance use interventions and research has been shown to be critical for the development and implementation of the interventions (Dunne et al., 2017; Valdez et al., 2020; Valdez et al., 2021). Advisory boards or consultation groups have been demonstrated to be two avenues within which EAs can effectively integrate themselves in the creation/implementation process (e.g., Rickwood et al., 2014). EAs/youth participants have generally been included as active research agents in a PAR framework for several substance use topics and concerns such as harm reduction (e.g., Jenkins et al., 2017), environmental aspects of substance use (e.g., Lee et al., 2013b), and substance use prevention (Diamond et al., 2009). Among EA/youth substance use, including PWLLE in research topics that impact them has been shown to increase the effectiveness of substance use interventions and more generally enhance clinical researchers' understanding of the perspectives and contexts associated with substance use among these groups (e.g., Jenkins et al., 2017).

Recent research has applied PAR to PDU/NMPDU with a focus on involving healthcare providers as active stakeholders (e.g., Groot Kormelinck et al., 2019). Only one study has utilized PAR for PDU/NMPDU (specifically, stimulant PDU/NMPDU) with a focus on direct

student involvement in the creation of messaging for a social marketing campaign (LaBelle et al., 2020). This campaign afforded undergraduate students' the opportunity to directly create norms messaging that would resonate with other students, and the messaging ultimately led to less favourable attitudes toward and reduced overestimations of peer use stimulant norms. However, it is notable that the intervention focused on incorporating general students (without respect to their personal experience with stimulant use) into a PAR framework, without deliberately including PWLLE who would have had a more pertinent perspective to offer surrounding stimulant use.

Other preliminary substance use research has also begun to look toward employing PAR methods and incorporating PWLLE when investigating social norms. For example, an online social media campaign to reduce smoking behaviours among undergraduate university students found that the intervention resulted in increased information gathering and corrected perceived smoking norms when the participants themselves were involved in developing and disseminating messages (Namkoong et al., 2017). In this study, campaign materials were originally researcher-developed, though participants in a treatment group were free to add on to the existing materials by posting their own relevant messages about smoking and were free to engage in relevant online discussions about the campaign (e.g., by commenting or 'liking' posts). Overall, including PWLLE, both as 'co-researchers' in a PAR framework and in qualitative research as participants, has firmly rooted itself within the EA substance use field as a way of enhancing the voices of PWLLE overall. However, the inclusion of individuals in both roles/categories has yet to be applied to EA PDU/NMPDU or to social norms research within the context of PDU/NMPDU more broadly.

Summary

Social norms (i.e., perceptions of peer behaviours and approval of behaviours) have demonstrated consistent associations with personal risky substance use and related adverse consequences, which peak during the EA developmental phase (Vasilenko et al., 2017). The impact of social norms misperceptions on personal health behaviours has led to the development of social norms interventions, which aim to correct overestimations of peers' behaviours by allowing individuals to identify the discrepancy between their perceptions and reality, ultimately lessening their own behaviours through a reduction in social pressure or social motivations to engage in such behaviours (McAlaney et al., 2011).

PDs have taken 'centre stage' as a group of substances associated with risky patterns of use and associated negative consequences following the proliferation of prescription dispensing and PD use beginning in the 1990s (Davison & Perron, 2013). EAs have demonstrated the highest rates of risky PD use relative to those in other developmental phases (Arkes & Iguchi, 2008). Despite the effectiveness that social norms interventions have offered with curbing behaviours for other substances, relatively few studies have investigated social norms and social norms interventions for PDU/NMPDU among EAs. EAs in post-secondary programs face unique risk factors for substance use/misuse (e.g., Kirst et al., 2014), and post-secondary students therefore represent an important group warranting additional research pertaining to PDU/NMPDU social norms perceptions and personal use behaviours.

Four notable gaps continue to permeate social norms and PDM/NMPDU research among post-secondary students: (1) The impact of sex and related student-specific characteristics in the relationship between PDU/NMPDU social norms perceptions and personal use behaviours; (2) A more comprehensive understanding, using qualitative methods, of the role of social norms and

PDU/NMPDU in post-secondary settings from the perspective of student PD users themselves; (3) Testing the efficacy of a group-based social norms intervention targeting several common PDs among post-secondary students; and (4) Integrating a ‘student voice’ (both from PWLLE in research creation and from participant involvement) in social norms inventions to curb harmful student PDU/NMPDU.

Dissertation Aims

The primary goal of this dissertation was to utilize a mixed-method approach to highlight both individual factors (e.g., sex) and group-level factors (e.g., social networks) relevant to PDM/NMPDU social norms among post-secondary students. A subsequent, yet intricately connected goal, was to collect social norms information by incorporating participant voices (i.e., utilizing a PAR framework and including student PWLLEs) in a way that could optimally inform social norms interventions for PDU/NMPDU in post-secondary settings. Taken together, the three studies included in this dissertation intended to accomplish these two interconnected goals, and to fill the gaps outlined in the prior section of this paper. More specifically, each study sought to accomplish the following:

Study 1

Entitled “*Social norms of college students engaging in non-medical prescription drug use to get high: What’s sex got to do with it?*”, Study 1 extended research documenting the impact of sex on social norms for alcohol and other substances to PDU/NMPDU. The study utilized linear mixed modeling (LMM) and a correlational design to investigate the role of participant sex and perceived peer sex in NMPDU social norms among EA students. Corresponding to findings with other substances such as alcohol, it was hypothesized that (1) male participants would demonstrate higher rates of NMPDU than female participants, (2) participants would perceive a

higher frequency of NMPDU when reporting on perceptions for same-sex than opposite-sex peers, and (3) perceived frequency of peer NMPDU would significantly predict participants' own use, particularly when sex-matching existed for participants with the peers whom they were rating. These hypotheses were largely predicated on longstanding research with alcohol demonstrating that (a) both male and female post-secondary students tend to engage in higher drinking themselves when they harbour higher estimations of their peers' drinking behaviours (e.g., Borsari & Carey, 2001; Borsari & Carey, 2003), and (b) a 'sex-matching' effect exists wherein perceived norms for same-sex peers as opposed to sex-unspecified peers have a larger impact on alcohol-related behaviours (Lewis & Neighbors, 2004; Lewis & Neighbors, 2006a). Overall, our study aimed to extend findings on the role of sex in social norms for NMPDU in EA students.

Study 2

Entitled "*Social norms for prescription drug use among university students: A qualitative analysis*", Study 2 incorporated 'youth voices' into the development of focus group questions and implementation pertaining to post-secondary students' perceptions and experiences of social norms and PDU/NMPDU. The study involved six focus groups with post-secondary students, and the qualitative data provided by participants ultimately formed the basis for an inductive thematic analysis (Braun & Clarke, 2006). To gain a comprehensive understanding of social norms surrounding different types and forms of PD use, each focus group included participants who had primarily indicated recent use of one particular PD. Three common classes of PD were investigated (opioids, stimulants, and S&Ts). Focus groups were further sub-divided based on whether participants indicated their PD use being only PDU or involving any form of NMPDU. It was anticipated that qualitative findings from the focus groups would contribute to a richer

understanding of social norms and corresponding behaviours relating to PDU/NMPDU for the three classes of PDs that were investigated, which would ultimately provide useful information to optimize social norms-based intervention approaches.

Study 3

Entitled “*The impact of normative feedback on undergraduates’ prescription drug use knowledge and behaviour: A mixed methods study*”, Study 3 further incorporated ‘youth voices’ into the creation of a ‘youth summit’ during which a group-based social norms intervention was delivered to post-secondary students who endorsed recent PDU/NMPDU. The primary goal involved determining if the social norms intervention of providing corrective social norms information would be able to correct student misperceptions of PDU/NMPDU as well as change their behavioural intentions to engage in PDU/NMPDU. Analysis of variance (ANOVA) models were used to assess quantitative study objectives. Based on research investigating social norms and the impact of group-based norms interventions with other substances (e.g., Turner et al., 2008), it was hypothesized that (1) students would significantly overestimate their peers’ PDU/NMPDU at pre-intervention, (2) corrective information provided in the social norms group session would reduce overestimations of peer PDU/NMPDU, and (3) the corrective information would reduce behavioural intentions to engage in PDU/NMPDU. A qualitative component was included to garner participants’ reflections about the usefulness of a group-based social norms intervention for PDU/NMPDU among post-secondary students. Thus, a secondary objective of Study 3 was to gain a richer understanding of participants’ experience with a single session PDU/NMPDU social norms intervention that could be used to improve social norms interventions in future trials. Qualitative information was analyzed with a content analysis (Hsieh & Shannon, 2005).

Outline

In the following chapters, each of the three studies are presented sequentially. Chapter 2 contains Study 1, Chapter 4 contains Study 2, and Chapter 6 contains Study 3. Transitions between each of the studies are provided in Chapter 3 and Chapter 5. Following the presentation of the third study, Chapter 7 presents an integrative discussion of the complete dissertation's findings, wherein the studies are integrated with each other as well as with the extant literature. In Chapter 7, theoretical and clinical implications emerging from the dissertation are also included, as well as limitations, future directions, and final conclusions.

CHAPTER 2. STUDY 1: SOCIAL NORMS OF COLLEGE STUDENTS ENGAGING IN
NON-MEDICAL PRESCRIPTION DRUG USE TO GET HIGH: WHAT'S SEX GOT TO DO
WITH IT?

An updated version of the published manuscript prepared for this study is presented below. The published version of the manuscript has been updated to incorporate some additional feedback from thesis committee members pertaining to the organization of information, presentation of results, and wording (e.g., use of first-person language). Readers are advised that Jason Isaacs, under the supervision of Dr. Sherry Stewart, was responsible for developing the research questions and hypotheses, preparing the dataset for analyses, conducting analyses, and interpreting study findings. Jason wrote the initial draft of the manuscript; he then received and incorporated feedback from his co-authors. The manuscript underwent peer review. Jason led the response to each round of revision put forth by expert reviewers. The initial version of the manuscript was accepted to *Journal of American College Health* on September 3, 2021. It was subsequently published online on September 23, 2021. See Appendix A for copyright permission from the publisher (Taylor & Francis) to include a version of the published manuscript.

The full reference is as follows:

Isaacs, J.Y., Thompson, K., Yakovenko, I., Dobson, K., Chen, S-P., Hudson, A., Mahu, I. T., & Stewart, S.H. (2021). College students' prescription drug misuse social norms: What's sex got to do with it? *Journal of American College Health*, 1-8.
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Abstract

Relationships exist between perceived peer and own use of alcohol, cannabis, and tobacco, particularly when peers and participants are sex-matched. This study investigated sex influences on social norms effects for college students' non-medical prescription drug use (NMPDU). $N=1986$ college students reported on their perceptions of male and female peers' NMPDU frequency and their own past-month NMPDU. Approximately 3% of students self-reported past month NMPDU, with no sex differences. In a linear mixed model, participants who engaged in NMPDU perceived significantly more frequent peer use. Female participants perceived more frequent peer NMPDU than did male participants, particularly when perceiving male peers' NMPDU. Significant positive correlations were found between perceived peer NMPDU frequency and participants' own NMPDU for all peer-participant sex combinations, with no evidence for stronger correlations with sex-matched pairs. While social norm interventions may be effective for college student NMPDU, sex-matching of these interventions is likely unnecessary.

Keywords: Non-medical prescription drug use, emerging adults, college students, social norms, sex.

Introduction

Background

Emerging adults (defined as 18-25 years in this paper) show elevated rates of substance use relative to other age groups (Arnett, 2000). Almost 80% of emerging adults have engaged in past-month alcohol use (Simons-Morton et al., 2016) and approximately 7% have a substance use disorder (Qadeer et al., 2019). In the context of the current *prescription drug crisis* (Davison & Perron, 2013), approximately 14.4% of emerging adults report past-year (Johnston et al., 2018) and 4.8% report past-month (SAMHSA, 2014) non-medical prescription drug use (NMPDU). NMPDU rates among college students are particularly concerning. Stimulants, opioids, and sedatives/tranquilizers are the most common types of prescriptions taken non-medically among college students, and their past-year prevalence rates of NMPDU for each type of prescription drug has been reported to be 19.6% for stimulants, 17.3% for opioids, and 11.8% for sedatives/tranquilizers (Silvestri et al., 2015). NMPDU has been associated with numerous adverse consequences among college students such as physical reactions (e.g., stomach pain or vomiting), functional or cognitive impairment (e.g., academic problems, feeling detached from reality, difficulties speaking), relationship issues (e.g., causing emotional harm to loved ones), financial repercussions, dependence, or overdose (Holloway et al., 2014; Siste et al., 2019). The concerning rates of NMPDU and the severity and breadth of associated harms among college students highlight that this phenomenon warrants further investigation.

Social norms models posit that one's own substance use is influenced by perceived peer substance use. College students' perceptions of peer substance use are higher than actual levels of peer use and this misperception is thought to drive increased use to fit in with perceived norms (Perkins & Berkowitz, 1986). This social norms effect is well-established with alcohol, tobacco,

and cannabis (Arbour-Nicitopoulos et al., 2010) and may also exist for NMPDU (Barman-Adhikari et al., 2017). For example, both men and women overestimate the quantity and frequency of drinking of their same-sex peers (Lewis & Neighbors, 2004; Lewis & Neighbors, 2006a) with young men particularly overestimating drinking among peers (Bertholet et al., 2013). Additionally, a significant *sex-matching* effect has been established for alcohol where college students' own alcohol use is more influenced by perceived norms for same-sex than sex-unspecified peers (Lewis & Neighbors, 2004). Social comparison theory (Festinger, 1954) and social impact theory (Latané, 1981) posit that perceptions of more proximal reference groups have a stronger impact on an individual's behaviour than do more distal reference groups. This proximity effect may help explain alcohol sex-matching findings (Lewis & Neighbors, 2004).

Some research has indicated NMPDU may be higher for young males than young females (Kelly et al., 2013). While such research has demonstrated some sex differences in rates of NMPDU among college-aged individuals (Kelly et al., 2013; Government of Canada, 2019), there has only been limited research on sex differences in NMPDU social norms. One study (McCabe, 2008) found a main effect of sex of participant on the mean rate of perceived percentage of students engaging in NMPDU over the past 12 months for stimulants and opioids where female participants perceived a higher rate than male participants, despite a similar rate of usage being documented for both sexes. Another study (Kilmer et al., 2015) similarly demonstrated that female undergraduates perceived higher stimulant NMPDU than male undergraduates. In this study, participants were asked how many times they believed their peers had engaged in stimulant NMPDU across their lifetimes. A third study (Ricketts & Higgins, 2007) found a main effect of sex of college peer referent where college participants perceived

NMPDU of opioids to be higher in male than female peers. The outcome was measured as number of perceived non-medical uses of opioids per month.

The Present Study

The extant research is limited in that it has failed to consider NMPDU more broadly (e.g., focusing on opioids or opioids and stimulants but excluding sedatives/tranquilizers) and it has failed to examine whether perceptions of peers' NMPDU are particularly elevated for same-sex peers. Additionally, there has been no research on sex influences on NMPDU social norms effects on own behaviour among college students to determine whether the sex-matching findings observed for alcohol social norms (Lewis & Neighbors, 2004) extend to NMPDU. Exploring such sex differences in a college sample could advance the literature by clarifying which peer perceptions (e.g., same-sex peers) most influence students' own use, which would have important implications for intervention planning.

The study objectives included: investigating the rates of past-month NMPDU for one of the most common types of NMPDU (i.e., NMPDU to get high, referred to hereafter as simply 'NMPDU') among college students as a function of participant sex; examining perceived frequency of NMPDU in college peers as a function of participant and peer sex; and determining whether peer-participant sex-matching influences the relationship between social norm perceptions and college students' own NMPDU. Consistent with prior findings showing a sex difference (Kelly et al., 2013; Government of Canada, 2019), it was hypothesized that rates of NMPDU would be higher among male than female participants. It was also hypothesized that perceived frequency of peer NMPDU would be higher for same- than opposite-sex peers; and that perceived frequency of NMPDU in peers would predict own past-month NMPDU, particularly when peers and participants were sex-matched.

Methods

Participants

Data for the current project was collected online in fall 2014 at three Canadian universities. Ethics approval was obtained from the Institutional Review Board at each site. $N=1,876$ college students (55% female; $M(SD)$ age = 18.5 (1.3) years) completed online measures as part of the Caring Campus project (Stuart et al., 2019); $n=818$ were from Dalhousie University, $n=464$ from Queen's University, and $n=594$ from University of Calgary. The current study involved secondary data analysis of data from the Caring Campus Project.

Since data collection for the original Caring Campus project focused primarily on the experience of first-year undergraduates, the majority of participants (88.9%) in the present study were first-year students. For sex, participants were asked to select “female”, “male”, or “other”. The $n=10$ who selected “other” were excluded from the analyses due to the small cell size. Given that a binary perspective (male vs. female) was adopted for this study, which also matched with how the peer perception questions were phrased, this variable is referred to as *sex* as opposed to *gender* throughout.

Measures

All measures for the current study were drawn from the original Caring Campus survey (Stuart et al., 2019).

Demographics Questions. Participants provided demographic information including their age, sex, year in college, international student status, living situation [residence or other], work status, frequency of alcohol use, and frequency of cannabis use.

Prescription Drug Social Norms Perceptions. Given findings that social norms effects are magnified the more similar that referents are to oneself (Larimer et al., 2011), participants

were asked NMPDU social norms questions about their perceptions of peer referents of each sex. Specifically, each participant was asked one question regarding their perceptions of male peers' and another regarding their perceptions of female peers' NMPDU frequency: "How often do you think the average first-year male [female] student at [name of participant's college] uses prescription drugs to get high (painkillers, uppers, downers)?" Participants responded on a 5-point Likert scale with the following options: "never"; "monthly or less"; "2-4 times per month"; "2-3 times per week"; and "4 or more times per week". This 5-point scaling has been used for other studies investigating substance use social norms among university students (Brunelle & Hopley, 2017).

Personal Prescription Drug Use. A single item assessed own past-month NMPDU: "Have you used prescription drugs to get high in the last 30 days?" Participants responded dichotomously with either "no" (coded as 0) or "yes" (coded as 1).

Data Analyses

A linear mixed model (LMM) analysis was performed in Jamovi (version 1.8.1) to investigate the impact of relevant factors on perceptions of peer NMPDU frequency. While residuals were not normally distributed, prior research has highlighted problems in transforming skewed data and has instead suggested opting for models which are less dependent on the distribution of data (Changyong et al., 2014). LMM was selected for the current analysis as it has, in fact, been found to be robust to violations of distributional assumptions (Schielzeth et al., 2020). Non-parametric alternatives for the data would have offered reduced power, precision, and overall flexibility in the analyses (Conover & Iman, 1981; Singh et al., 2013) and were thus avoided. Multicollinearity of the variables was investigated and was found not to be present (all variance inflation factors [VIF's] were close to a value of 1) (Mansfield & Helms, 1982). A

restricted maximum likelihood approach (REML) was used for model estimation, and 95% confidence intervals (CIs) were applied. Participant NMPDU, participant sex, and peer sex were treated as predictors, and perceptions of peers' frequency of use was entered as the outcome variable. Frequencies for the outcome variable were assigned values of 1-5 which were used in analysis. First year student status, age, and international student status were included in the model as covariates. The covariates were chosen due to their prior relationship with NMPDU in college-aged samples (e.g., Arria et al., 2017). Random intercepts and fixed slopes were modeled for participants. Interactions were probed with tests of simple main effects.

Results

Demographics

1030 female students and 846 male students ($N=1876$ total) were included in the final analysis. Participants' average age, first-year student status, international student status, living arrangement, and work status, as well as their average alcohol and cannabis use, are also presented in Table 1.1 for sample description purposes.

Personal Past-Month NMPDU

Thirty-two females (3.1%) and 28 males (3.3%) reported past-month NMPDU. No significant sex difference in this rate was found, $\chi^2(1)=0.06$, $p=0.80$.

Sex Differences in Prescription Drug NMPDU Social Norm Perceptions

For descriptive purposes, the number and percentage of participants who endorsed each perceived frequency of peer NMPDU are indicated in Table 1.2.

LMM results demonstrated that participants who engaged in NMPDU perceived their peers as engaging in NMPDU at higher frequencies than did participants who had not engaged in NMPDU themselves (Estimate=0.61; 95% CI [0.42, 0.80], $p<0.001$) (see Figure 1.1). There was

also a significant effect of participant sex, in which female participants had higher perceptions of their peers' NMPDU frequency than did male participants (Estimate=-0.21; 95% CI [-0.40, -0.01], $p < 0.05$; see Figure 1.2).

There was also a significant interaction between participant sex and peer sex (Estimate=0.23; 95% CI [0.08, 0.38], $p < 0.005$; see Figure 1.2). Tests of simple main effects of peer sex for each participant sex separately revealed that while female participants perceived more frequent NMPDU among male than female peers ($F(1,1872)=9.96$, $p < 0.005$), there was no simple effect of peer sex for male participants ($F(1,1859)=1.19$, $p=0.28$). Tests of simple main effects of participant sex for each peer sex separately showed that for perceptions of male peers, female participants perceived more frequent peer NMPDU than did male participants ($F(1,2424)=9.24$, $p < 0.005$). In contrast, there was no statistically significant simple effect of participant sex for perceptions of female peers' NMPDU frequency ($F(1,2446)=0.76$, $p=0.39$). Note that all degrees of freedom were approximated with the Satterthwaite method (Satterthwaite, 1946).

None of the covariates included in the model (first year status, age, or international student status) had a significant effect on perceived NMPDU in peers. See Table 1.3 for a summary of the LMM results.

It is worth noting that the marginal R^2 was 0.026, indicating that only a very small amount of variance (2.6%) was accounted for by our within-subjects factor (peer sex). The intra-class correlation (ICC) was 0.634, indicating a sizeable proportion (63.4%) of variance could be attributed to the between-subjects factors (participants' sex and participants' own NMPDU).

Relationship between Social Norm Perceptions and Own NMPDU

Four point-biserial correlations were calculated to investigate the relationship between perceived prescription drug NMPDU frequency in college peers and own past-month NMPDU, one for each peer sex-participant sex combination. All four correlations were significant ($p < .001$), ranging from $R = 0.09$ (male peer-male participant) to $R = 0.14$ (male peer-female participant). Magnitudes of the correlations were compared using Steiger's equation (Steiger, 1980), which involves a 3-part formula that utilizes Fischer's Z transformations to indicate significance. There were no significant differences between the magnitude of any of these correlations ($p > 0.05$).

Discussion

Summary and Discussion of Findings

The current study represents one of the first investigations of the role of sex in NMPDU social norms perceptions (Kilmer et al., 2015; McCabe, 2008) and the first to examine the role of sex in social norms influences on own NMPDU in college students. The rate of self-reported past-month NMPDU to get high in our sample was ~3%, which translates into a concerning number of affected students ($N = 60$). This rate is similar to a prior study which used a slightly broader definition of NMPDU (SAMHSA, 2014). Their broader definition included both prescription drug use to get high (as in the present study) but also use without a prescription belonging to the respondent, potentially explaining their slightly higher past month use rate of 4.8%. The present studies' results are also relatively similar to previous estimates of NMPDU among college students in various Canadian provinces. For example, in Nova Scotia, past semester rates of NMPDU have been found to be 1.9% for sedatives and tranquilizers (S&Ts), 2.8% for opioids, and 5.4% for stimulants (Chinneck et al., 2018).

Contrary to our hypotheses based on data from the Government of Canada (Government of Canada, 2019), a sex difference in NMPDU rates was not observed in the present study. However, not all prior work has found sex differences in NMPDU rates (McCabe, 2008). In fact, some research has suggested that the male > female sex differences may be specific to certain types of prescription drugs like prescription stimulants and prescription pain relievers (Kelly et al., 2013). Since NMPDU was not separated out by prescription drug type in the present study, it is perhaps not surprising that the previous findings suggesting a sex difference in NMPDU rates were not replicated. Additional research has shown that the sex difference in prescription drug use may be limited to certain subgroups of college students. For example, female athletes engage in less NMPDU than both males and female nonathletes (Ford, 2008). Future research should examine sex differences in NMPDU rates in other subgroups of college students (e.g., fraternities and sororities) to determine how such group affiliations may impact sex differences in usage.

Participants in the current study were also asked to estimate normative NMPDU frequency of their college peers. Students were asked to think about peers at their own college because proximal referents have a larger impact on attitudes and perceptions than more distal referents (Barman-Adhikari et al., 2017; Larimer et al., 2011; Lewis & Neighbors, 2004). Previous findings were replicated on the significant relationship between NMPDU social norms perceptions and own NMPDU (Arbour-Niciopoulos et al., 2010; McCabe, 2008). Perceptions of peer substance use have also been found to be associated with students' own use for alcohol, tobacco, and cannabis (Lewis & Neighbors, 2006a; Perkins & Berkowitz, 1986). However, the degree of association varies by substance (i.e., highest for alcohol, lowest for tobacco) (Perkins & Berkowitz, 1986). Although significant, the magnitude of the perceived peer - own NMPDU

relation was not strong; future studies are needed to make direct comparisons between NMPDU and other substances in this regard.

Additionally, female participants perceived their peers to engage in NMPDU more frequently than did male participants. This effect of participant sex is consistent with the limited previous research suggesting that females have a relatively inflated perception of the degree to which their peers are using prescription stimulants and opioids (Kilmer et al., 2015; McCabe, 2008). To our knowledge, only two studies have investigated this research question previously and with reference to prescription stimulant and opioid use among university students; no studies have investigated the question with other types of prescription drugs or prescription drugs more generally. The present study demonstrates that an inflated female perception persists, even when prescription drugs are conceptualized more broadly (i.e., to include stimulants, opioids, and sedatives/tranquilizers). Given the inflated perception found in the current study as well as the significant difference found in prior research (Kilmer et al., 2015; McCabe, 2008) perhaps such an inflation stems from females' greater exposure to prescription drugs. At all ages studied, females are prescribed certain classes of prescription psychotropic drugs, such as opioids and sedatives, at higher rates than males (Huerta et al., 2016; Loikas et al., 2013; Schieber, 2020).

Overall, students perceived their male peers and female peers to engage in NMPDU at similar frequencies, which corresponded to female and male participants actually endorsing similar rates of past-month NMPDU. In contrast, some prior research has indicated that male peers are perceived to engage in a higher frequency of opioid use than female peers (Ricketts & Higgins, 2007). Perhaps differences by peer sex in perceptions of peer NMPDU are more likely to be perceived for specific prescription drugs than for NMPDU more generally. More research is warranted here to clarify this discrepancy. Additionally, an interaction between participant and

peer sex was uncovered in this study. Specifically, prior research showing that male peers are perceived to be engaging in more frequent NMPDU than female peers (Ricketts & Higgins, 2007) was partially replicated, but the present results showed this was true only for female participants. It was also found that female participants perceived more frequent NMPDU in peers than male participants, but only for male peers. These findings differ from those observed for other substances such as alcohol where students have been found to particularly overestimate usage of same-sex peers (Lewis & Neighbors, 2004; Lewis & Neighbors, 2006a). It is well-established that males typically engage in more frequent drug use than females with certain other substances such as alcohol (Chen & Jacobson, 2012); thus, participants (particularly female participants) may have generalized from other substances to their perceptions of peers' NMPDU.

Additionally, prior work was extended by examining sex-matching in the perceived peer-own NMPDU relationship. A sex matching effect has been established for the relationship between perceived social norms and personal use for alcohol where perceptions of peers influence own behaviour more so when the peer is sex-matched with the perceiver (Lewis & Neighbors, 2004; Lewis & Neighbors, 2006a). A similar sex-matching effect was not found for NMPDU in the present study. This may be due to the more frequent use of alcohol than prescription drugs in social situations (Buckner, 2013; Kwan et al., 2013), which makes alcohol more available to consider for close same-sex friends, rather than *general* student reference groups. This would allow sex-specific social norms to influence an individual's own behaviour more readily for alcohol. There may also be more non-sex-specific motives for sharing prescription drugs versus sharing alcohol, such as selling a prescription to a peer for profit (Holloway et al., 2014), regardless of peer sex. Additionally, since the research about sex-matching for alcohol was conducted over a decade ago (Lewis & Neighbors, 2004; Lewis &

Neighbors, 2006a), these results may be changing over time given sex differences in use of substances like alcohol are shrinking (i.e., convergence) (Hemsing & Greaves, 2020; McCaul et al., 2019). Future studies could examine if sex-matching of own substance use behaviour to perceived norms is also changing over time.

Prior work has shown that, for alcohol, perceived same-sex drinking norms are a stronger predictor of own drinking for women than for men (Lewis & Neighbors, 2006a). A similar effect of participant sex was not found in the present study for the magnitude of social norm perceptions to own use relationships, suggesting that social norm perceptions influence behaviour similarly for male students as they do for female students in the case of NMPDU. And while perceptions of peer NMPDU frequency were particularly elevated for the male peer-female participant combination in our study, there was no correlational evidence that norm perceptions of male peers were particularly likely to influence female participants' own NMPDU. Instead, perceptions of peers' frequency of NMPDU significantly influenced students' own NMPDU regardless of the sex of the participant or the sex of the peer referent.

Limitations and Future Directions

The present study had certain limitations that warrant mention. First, only descriptive norms (i.e., the perception of how peers behave) were investigated. Future studies should investigate the role of sex in NMPDU injunctive norms (i.e., perceptions about social approval of NMPDU by peers) (Lewis & Neighbors, 2006a). Second, a narrow definition of NMPDU was used (i.e., to get high), and subsequent studies may benefit from broadening this definition (Barrett et al., 2008). For example, research that highlights other forms of risky use of prescription drugs, such as use for therapeutic purposes but without a prescription, use in higher doses than prescribed, or use via alternative routes, may elucidate different patterns of sex effects

on social norms perceptions and social norm influences. However, while future studies may benefit from investigating these additional types of NMPDU, “to get high” has been cited as one of the most common reasons for emerging adults to engage in NMPDU (Holloway & Bennett, 2012).

A third limitation is that the interpretability of the present study’s results; they were limited by the different ways in which personal NMPDU was assessed (a yes/no dichotomous response) versus the way in which perceived peer NMPDU was assessed (a scaled frequency). This is one of the limitations of secondary data analysis: one must make use of the data available. However, this meant that direct comparisons could not be made between actual and perceived frequency of NMPDU. Thus, it would be beneficial to replicate this study using the same measure for the assessment of self and peer NMPDU – preferably a frequency measure. Additionally, prescription drugs (PDs) were examined as a group; future research could examine social norms perceptions for specific prescription drug classes (i.e., stimulants, sedatives/tranquilizers, and opioids). Furthermore, while similar rates of NMPDU were seen in the current sample as compared to those tested in prior studies with college students (Chinneck et al., 2018), the subsample who engaged in past month NMPDU was relatively small ($n=60$) and the study design may have ultimately been underpowered, so results require replication. Moreover, gender roles were not investigated, and thus the study was unable to determine if identification with masculine and/or feminine traits (for example) would moderate findings. Another potential limitation of the study was that study participants were included beyond the first year of college when reporting on perceptions of first-year peers. Prior work has suggested that social norms overestimations are particularly likely when a proximal reference group is used (Neighbors et al., 2010a; Neighbors et al., 2010b). Therefore, first-year student status was

included as a covariate in the statistical model to control for the fact that by reporting on first-year peers, some students (i.e., first-year participants) were reporting on a proximal peer group, while others (i.e., participants in later years of university) were not. However, no effect of first-year participant status was observed. Perhaps unique characteristics of prescription drugs compared to other substances (e.g., different perceived risks of use [Slovic et al., 2007] or motivations for use [Rigg & Ibañez, 2010]) resulted in peer NMPDU being misperceived at a similar rate irrespective of proximity in participant's stage of study to that of the peer; further research here is warranted. Finally, future studies could benefit from investigating whether participants had observed NMPDU among same- and other-sex reference groups involving different degrees of relatedness or closeness such as friends, acquaintances, or classmates. College students' and emerging adults' social networks have been previously investigated in the context of sex and substance use (Bartel et al., 2020; McPherson, et al, 2001), and preliminary research has investigated social networks in the context of NMPDU (Meisel & Goodie, 2015). More nuanced analyses focused on sex and other relevant characteristics in future can help substantiate the role of social networks in NMPDU social norms.

Implications and Conclusions

Social norm interventions involve providing normative information about actual peer substance use behaviours to change norm misperceptions and, ultimately, substance use behaviours (Moreira et al., 2009). These interventions include social marketing interventions that provide broad norms to students through advertisements and those that offer normative feedback comparing an individual's own use to the actual use of relevant peer groups (Lewis & Neighbors, 2004). Given the observed links of NMPDU social norms perceptions to personal NMPDU, the present results suggest that such social norms interventions might help reduce

students' NMPDU. Future research should take into account differing strengths of association between social norm perceptions and own use across substances (Arbour-Nictopolous et al., 2010) to determine likely clinical significance of social norms interventions for NMPDU.

It has been recommended that social norms interventions should be framed differently for females than males (Lewis & Neighbors, 2004) and that sex-specific feedback would be particularly impactful for females (Lewis & Neighbors, 2006a). Sex-specific feedback would likely be more impactful for females in the case of alcohol because average drinking norms are typically higher when males are included in the average (Lewis & Neighbors, 2006a). Thus, if sex-specific feedback was not provided, females would be comparing their own drinking behaviours to a norm higher than that of their most proximal reference group.

While the present study found that females perceive NMPDU as being more frequent in their peers, especially their male peers, no evidence was found to suggest that perceptions of male norms are particularly influential on females' own NMPDU. While sex-matching of social norms interventions appears unnecessary for NMPDU (at least for NMPDU to get high), it may be useful to investigate the utility of tailoring more information about male peers as opposed to female peers for female intervention participants, as the discrepancy between actual and perceived NMPDU appears to be largest for female students when they are perceiving their male peers' NMPDU frequency. This is not to suggest that male students could not also receive benefits from social norms interventions, given that both female and male students showed relations between their perceptions of other students' NMPDU frequency and their own past month NMPDU. Rather, if resources are limited, the people and perceptions that may obtain the most benefit would be females with respect to their perceptions of their male peers' NMPDU.

Tables and Figures from Study 1

Table 1.1

Participant Demographics by Sex for Study 1 (N=1876).

	Female <i>n</i> =1030 <i>n</i> (%) or <i>M</i> [<i>SD</i>]	Male <i>n</i> =846 <i>n</i> (%) or <i>M</i> [<i>SD</i>]
Age (in years)*	18.67 [1.44]	18.39 [1.19]
Year of University Program*		
First year	877 (85.3%)	786 (93.3%)
Other	151 (14.7%)	56 (6.7%)
International Student		
Yes	70 (6.8%)	61 (7.2%)
No	959 (93.2%)	781 (92.8%)
Living Arrangement*		
In residence	571 (55.4%)	612 (72.4%)
Not in residence	459 (44.6%)	233 (27.6%)
Work During School Year		
Yes	351 (34.1%)	196 (23.2%)
No	678 (65.8%)	649 (76.7%)
Frequency of Alcohol Use*		
Never	296 (29.1%)	190 (22.9%)
Monthly or Less	182 (17.9%)	84 (10.1%)
2-4 Times Per Month	342 (33.6%)	245 (29.5%)
2-3 Times Per Week	167 (16.4%)	238 (28.6%)
Daily or Almost Daily	31 (3.0%)	74 (8.9%)

Frequency of Cannabis Use*		
Never	792 (78.4%)	483 (62.9%)
Monthly or Less	112 (11.1%)	108 (14.1%)
2-4 Times Per Month	67 (6.6%)	95 (12.4%)
2-3 Times Per Week	25 (2.5%)	41 (5.3%)
4 or More Times Per Week	14 (1.4%)	41 (5.3%)

*Significant difference across sex ($p < 0.001$).

Note. Six students did not indicate their Year at University ($N=1870$), five students did not indicate their International Student status ($N=1871$), one student did not indicate their Living Arrangement ($N=1875$), two students did not indicate whether they Work During the School Year ($N=1874$), 27 students did not indicate their frequency of alcohol use ($N=1849$), and 98 students did not indicate their frequency of cannabis use ($N=1778$).

Table 1.2

Participants' Perceptions of NMPDU Among Male and Female Peers for Study 1.

	Female Participants		Male Participants	
	Female Peers	Male Peers	Female Peers	Male Peers
Frequency				
Never	340 (33.0%)	260 (25.2%)	385 (45.5%)	367 (43.4%)
Monthly or Less	518 (50.3%)	529 (51.3%)	351 (41.5%)	374 (44.2%)
2-4 Times Per Month	131 (12.7%)	185 (18.0%)	83 (9.8%)	77 (9.1%)
2-3 Times Per Week	36 (3.5%)	44 (4.3%)	15 (1.8%)	18 (2.1%)
4 or More Times Per Week	5 (0.5%)	12 (1.2%)	12 (1.4%)	10 (1.2%)

Note. Participants are shown as N (%) and are separated by sex. Percentages are column percentages.

Table 1.3

Linear Mixed Model Results – Fixed Effect Omnibus Test and Parameter Estimates for Study 1.

	<i>F</i>	Num df	Denom df	<i>p</i>	Estimate	Std Error	Lower (95% CI)	Upper (95% CI)
Participant Sex	4.407	1	1869	0.036*	0.099	0.276	-0.400	-0.014
Peer Sex	1.837	1	1865	0.176	-0.053	0.039	-0.129	0.024
Participant NMPDU	38.222	1	1869	< .001***	0.099	0.276	0.416	0.803
Age	1.400	1	1863	0.237	0.001	0.001	-0.001	0.002
First Year Status	0.639	1	1869	0.424	-0.045	0.056	-0.154	0.065
International Student Status	1.112	1	1869	0.292	0.072	0.068	-0.062	0.205
Participant Sex * Participant NMPDU	0.193	1	1869	0.661	0.087	0.197	-0.300	0.473
Participant Sex * Peer Sex	8.705	1	1865	0.003**	0.229	0.078	0.077	0.382
Participant NMPDU * Peer Sex	1.059	1	1865	0.303	0.080	0.078	-0.072	0.232
Participant Sex * Participant NMPDU * Peer Sex	1.106	1	1865	0.293	0.164	0.156	-0.141	0.468

Note. *** $p < 0.001$, ** $p < 0.005$, * $p < 0.05$

Figure 1.1

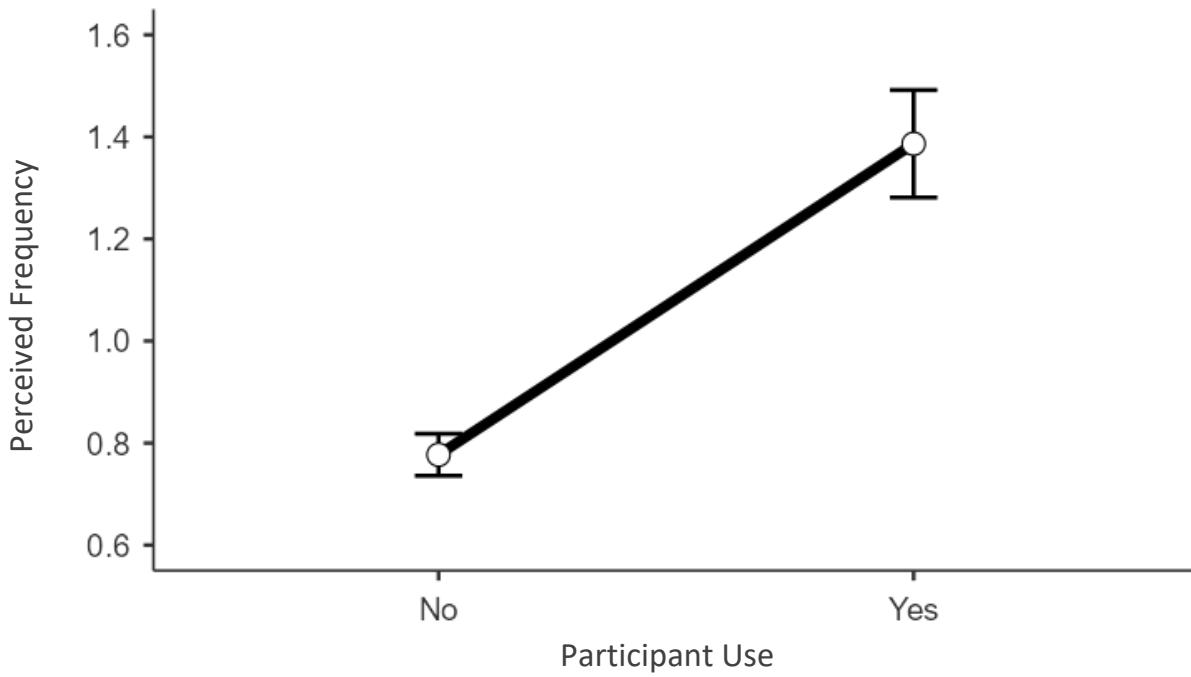


Figure 1.1. Perceived frequency of peer NMPDU for Study 1, as a function of personal NMPDU.

Notes. Perceived frequency (y-axis) is displayed as estimated marginal means. Standard error bars are shown.

Figure 1.2

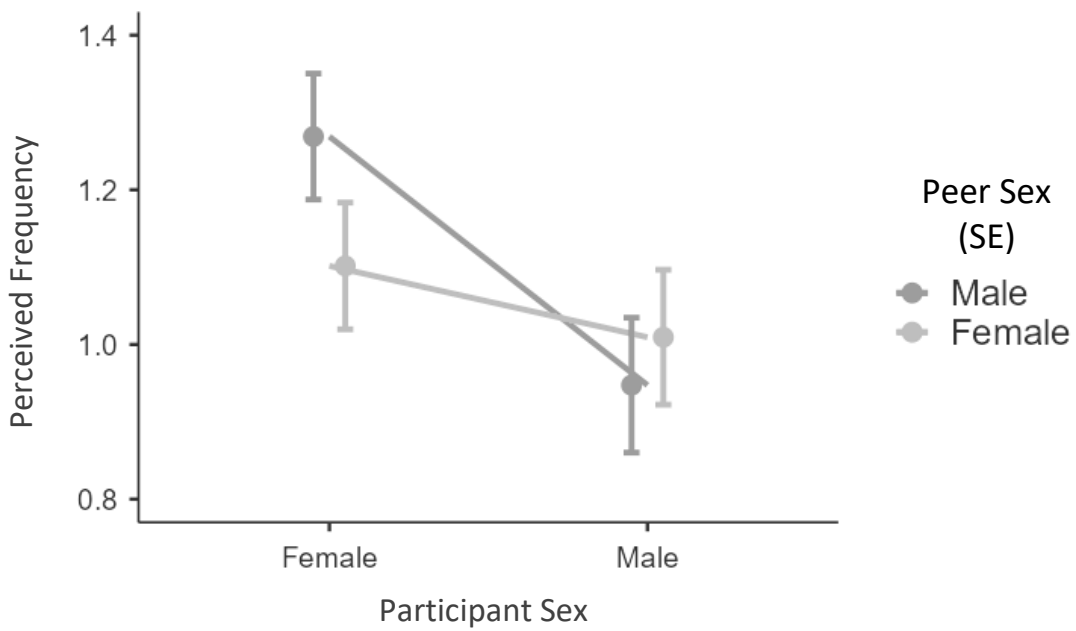


Figure 1.2. Perceived frequency of peer NMPDU for Study 1, as a function of participant sex and peer sex.

Notes. Perceived frequency (y-axis) is displayed as estimated marginal means. Standard error bars are shown.

CHAPTER 3. TRANSITION FROM STUDY 1 TO STUDY 2

As highlighted in the introduction and Study 1, EA is a transitional period of life during which EAs are likely to engage in new experiences and risk-taking behaviours (Arnett, 2000; Arnett et al., 2014), predisposing EAs to be at a particularly high risk of substance use during this period. Substance use rates are notable among post-secondary students (Skidmore et al., 2016), with more than 4% of students engaging in daily use of alcohol and approximately 6% and 10% of students engaging in daily use of cannabis and e-cigarettes, respectively (Skidmore et al., 2016). Prevalence rates of past-year substance use are noticeably higher than these daily use rates, with over 76% of students endorsing past-year alcohol use and almost 40% of students endorsing past-year use of any illicit drug (Skidmore et al., 2016).

Compounding the remarkable rate of substance use is the high rate of perceived substance use among peers. Social norms theory (Perkins & Berkowitz, 1986) was developed in the 1980s and demonstrated that (a) overestimations of peer substance use are common and (b) overestimations of substance use behaviours are likely to lead to a higher rate of one's own substance use (Perkins & Berkowitz, 1986). As noted in both the Introduction and Study 1, misperceptions of substance use among EAs in post-secondary settings are particularly commonplace, with post-secondary students noticeably overestimating peer use of several substances such as alcohol, cannabis, tobacco smoking, and e-cigarettes (American College Health Association, 2019).

Misperceptions of PDU/NMPDU are similarly commonplace among post-secondary students (e.g., Sanders et al., 2014). While students overestimate PDU/NMPDU among their peers (compared to actual use rates), it is noteworthy that the actual rate of NMPDU in particular is still concerning (e.g., Holloway & Bennett, 2012; McCabe et al., 2009; Rozenbroek et al.,

2011; Schepis et al., 2020). Generally, NMPDU of stimulants, opioids, and S&Ts has been found to be highest for EAs (18-25 years) compared to adolescents and adults (Substance Abuse and Mental Health Services Administration, 2020). As highlighted previously, several harms have been associated with PDU/NMPDU, and both PDU/NMPDU and the harms associated with use have been found to be highest in North America compared to other regions (e.g., Fischer et al., 2014).

Taken together, years of research have accumulated to demonstrate that North American EAs in post-secondary settings face unique risk factors associated with PDU/NMPDU, and their perceptions of others' PDU/NMPDU has been established as an important predictor of their own behaviour. Thus, a more comprehensive understanding of social norms and PDU/NMPDU among post-secondary students continues to be paramount. Study 1 generally provided a further understanding of the PDU/NMPDU and social norms link by (1) replicating and confirming findings that students' overestimate their peers' NMPDU (e.g., Sanders et al., 2014), (2) replicating findings that overestimations of their peers' NMPDU are related to students' own NMPDU (e.g., McCabe, 2008), (3) demonstrating that the sex of both students and their perceived peers play an important role in their NMPDU perceptions (notably for female students), and (4) indicating that overestimations predicting personal student behaviour was not affected by sex matching, suggesting that there is no need to sex match in normative interventions.

The research presented up to the current point in this dissertation has largely focused on quantitative methods and analyses as they pertain to social norms and PDU/NMPDU. However, *qualitative* methods and analyses have been identified as an epistemologically distinct way of understanding social norms and other substance use related topics that can offer a more

comprehensive understanding of substance use overall (e.g., Rhodes & Coomber, 2010). From the perspective of social norms and PDU/NMPDU research, qualitative research offers an opportunity to understand social norms around PD use from students' own perspectives, adding student voice to the picture being painted about the importance of social norms in this area of work. Qualitative research in this area can also identify new areas for enquiry that may have been missed in the quantitative research on this topic to date.

The importance of qualitative research in developing a comprehensive understanding of EAs, their experiences with PDs, and social norms has become apparent with a proliferation of qualitative research on PDU/NMPDU among EAs. It is notable, however, that little PDU/NMPDU research has focused on social norms in particular (as described further below), and that most of the research to date has focused specifically on stimulant use as compared to use of other PDs. A thorough investigation of the role of social norms in PDU/NMPDU that incorporates a PAR framework and PWLLE, utilizing qualitative methods, is ultimately needed to gain a comprehensive understanding of the social norms related to social norms for several types of PDs. In the following sections, relevant qualitative research conducted with EAs on PDU/NMPDU to date will be reviewed, notably highlighting how a more comprehensive understanding of social norms obtained using qualitative methods that incorporates PAR and PWLLE is still warranted.

Most of the existing qualitative research on PDU/NMPDU among post-secondary students to date has investigated prescription stimulants. Existing qualitative research on stimulant PDU/NMPDU among EAs and post-secondary students has investigated stimulant use motives, and has found common motives to include (a) academic motives such as enhancing academic performance, productivity, or engagement with school material, along with reducing

school-related stress (Aikins, 2011; DeSantis et al., 2008; DeSantis et al., 2010; Hildt et al., 2014; Kerley et al., 2015; Petersen et al., 2015a; Robitaille & Collin, 2016), (b) non-academic motives such as enhancement of performance/pleasure (e.g., getting high), increasing energy/staying awake, and becoming more sociable or reducing stress in non-academic contexts (Hildt et al., 2014; Petersen et al., 2015a; Robitaille & Colin, 2016), and (c) medical motives (such as medically mitigating cognitive symptoms present in ADHD or other mental health diagnoses; Kerley et al., 2015). Social contexts have generally been found to be important for prescription stimulant use, as students have reported using stimulants following prompting from friends, while navigating a romantic encounter, or in larger social groups (whether for academic or recreational purposes) (de Souza et a., 2015; Green & Moore, 2009).

Qualitative research on stimulant PDU/NMPDU has also investigated personal experiences with stimulant use. In particular, EAs and post-secondary students have shared their experiences with (a) benefits of engaging in stimulant PDU/NMPDU such as increases in perceived interest and enjoyment (DeSantis et al., 2008; Hildt et al., 2014; Partridge et al., 2013; Vrecko, 2013), (b) negative consequences associated with stimulant PDU/NMPDU such as unpleasant side effects (e.g., Aikins, 2011), (c) engaging in PDU/NMPDU in the context of polysubstance use (Garcia et al., 2021; Green & Moore, 2009), and (d) the healthcare system in the context of stimulant use (such as frequent reports of lack of contact with HCPs prior to initiating their first experiences with stimulants) (DeSantis et al., 2008; DeSantis et al., 2010; Petersen et al., 2015b). Qualitative studies have also elucidated students' understanding and perception of stimulants in comparison to other substances, with students generally believing stimulants to be relatively more normative and accepted than other substances (Aikins, 2011; Green & Moore, 2009), and various forms of moral ambivalence have been described to emerge

when thinking about, or engaging in, stimulant PDU/NMPDU (such as a recognition that use may be helpful for concentration while navigating an internalized sense of ‘cheating’) (Aikins, 2011; Kerley et al., 2015; Loe & Cuttino, 2008; Partridge et al., 2013; Petersen et al., 2015a; Petersen et al., 2015b). Additionally, findings have highlighted students’ thoughts surrounding first-time and ongoing use of stimulants, namely perceived contexts that led to first-time use (such as highly stressful periods during the school year) as well as perceptions about one’s own morality and identity in the context of continued use (DeSantis et al., 2008; DeSantis et al., 2010; Loe & Cuttino, 2008; Petersen et al., 2015a; Petersen et al., 2015b; Robitaille, & Collin, 2016). While most of these findings have focused on individual experiences and behaviours, several of these areas (such as motives for use or ambivalence around use) are likely to regularly exist in the context of social dynamics, thus highlighting a central role for research on social norms to further understand how PDU/NMPDU behaviours emerge and exist from a social lens.

Within the domain of qualitative investigations that have reported on PDU/NMPDU and social norms, preliminary research has investigated students’ and EAs normative perceptions about the perceived motivations (Partridge et al., 2013) or social contexts (Green & Moore, 2009) that may lead peers to engage in stimulant PDU or NMPDU. However, this research sampled students more generally (i.e., students not necessarily engaging in PDU/NMPDU themselves), or EAs rather than post-secondary students, and thus could not provide targeted information on social norms relevant to students’ own PDU/NMPDU behaviours. Further qualitative research has shown a perceived high rate of stimulant prescriptions and usage among students using stimulants (Garcia et al., 2021), thus adding meaningful insights about the perceived normative nature of stimulant use that have been captured in quantitative research, though it is notable that this sample only included students engaging in NMPDU specifically.

Additional qualitative research has investigated social contexts of use such as ease of obtaining/diverting stimulants (DeSantis et al., 2008; DeSantis et al., 2010; de Souza et al., 2015; Garcia et al., 2021; Green & Moore, 2009), with common themes arising such as a medication surplus that facilitates diversion, academic settings and student residences being primary hubs for diversion, and the ease and casual nature of diverting prescriptions (Aikins, 2011; Garcia et al., 2021). Similar qualitative research has elucidated how students interact with stimulants within their social networks, such as how participants' use tends to be more common if their social network is also using (de Souza et al., 2015; Garcia et al., 2021; Green & Moore, 2009). Also highlighting the importance of social networks, students have shared that their main sources of obtaining stimulants have typically been friends, friends-of-friends, romantic partners, family members, and healthcare providers (DeSantis et al., 2008; DeSantis et al., 2010; Vrecko, 2015). However, each of these findings have provided limited information on social norms directly, as they have primarily attended to students' personal experiences rather than their perceptions of others' use and/or approval of use.

In addition to qualitative research on stimulant use among EAs/students, preliminary qualitative research has investigated opioid use among EAs/post-secondary students. The two existing studies in this area have focused specifically on opioid NMPDU. Given that impact of the opioid crisis in the lives of students and EAs more generally, additional research is warranted to determine how this groups' higher risk opioid use is shaped by perceptions of others. Lord et al. (2011) provided initial insights into injunctive norms pertaining to NMPDU among EA students (aged 18-25), highlighting varying degrees of both personal and social acceptability of opioid NMPDU among their participants, along with reflections on perceived accessibility (Lord et al., 2011). They found that participants most commonly evaluated use negatively but viewed

opioid use to be more acceptable than use of illicit drugs. Participants also believed that legal consequences for NMPDU would be less severe than for illicit drugs or cannabis (and it is important to note that cannabis had not been legalized for recreational use in the United States prior to this United States-based publication). Finally, participants believed that PDs were less harmful than illicit drugs.

Yedinak et al. (2016) further elucidated EAs perceptions of opioid accessibility, though participants in their sample were, again, not necessarily students. From this qualitative data, they generated a model focusing on personal opioid experiences (namely, social contexts of use, and attributions tied to overdoses). Participants described easy access to opioids, discussed several social contexts facilitating use, raised individual-level factors for overdose (e.g., attributing overdose to users who “couldn’t handle it”), and highlighted a sense of stigma/negative reactions associated with use.

Preliminary qualitative research has also investigated multiple PDs together, though all of these studies appear to focus on NMPDU in particular, and most studies appear to have included EAs more generally rather than student-specific samples. Overall, several of these qualitative studies have highlighted that motives of use among EAs across all categories often seem to be for self-medication purposes (Mui et al., 2014; Quintero et al. 2006), recreational purposes (Kelly et al., 2017; LeClair et al., 2015; Mui et al., 2014; Quintero et al., 2006), experimentation (LeClair et al., 2015; Mui et al., 2014; Quintero et al., 2006), academic reasons (Mui et al., 2014; Quintero et al., 2006), or because perceived descriptive norms of usage behaviours are high (Mui et al., 2014).

When investigating multiple PDs, student/EA perceptions of factors relevant to the initiation and frequency of PDU/NMPDU have also been identified such as accessibility to drug

sources (typically peers, family members, or healthcare providers), a desire to enhance social experiences, early exposure to PDs, positive experiences with other substances, and peer norms (Kelly et al., 2017; Mui et al., 2014; Quintero et al., 2006). Students have also provided qualitative insights about their sources of knowledge regarding prescription drugs more generally, with the mostly commonly reported sources being direct experience with PDs/prescribers, textbooks and scientific sources, the Internet, family members, prescription drug labels, and peer networks (Quintero et al., 2006). While each of these findings have been mostly focused on individual experiences with PDs, the thematic areas derived within each study consistently highlight that PD use often occurs in social environments (and is perceived to be influenced by social factors), thus underscoring the importance of conducting additional research to explore social norms and perspectives associated with use.

Social norms have been somewhat explored for NMPDU more generally (across multiple PDs) with preliminary research demonstrating high normative perceptions of use (Kelly et al., 2017), as well as a high perceived acceptability of NMPDU compared to other substances (with the exception of certain opioids; Quintero et al., 2006). The qualitative study design allowed for a more nuanced understanding of NMPDU acceptability compared to other substances, for example by highlighting participants' perceived increased acceptability because of PDs being more regulated than most other substances. Finally, Quintero (2012), provided further insights into EAs' cognitions and perceptions pertaining to NMPDU by discussing EAs discordant definitions of "drug abuse" and "hard drugs", alongside how the impacts of the "pharmaceuticalization" of PDs on NMPDU has shaped their perceptions and definitions.

Taken together, qualitative findings have provided preliminary insights into the social norms of PDU and NMPDU. However, most of this research has focused on NMPDU

specifically, or EAs a general population (rather than student-specific samples). Thus, potential concerns arise with generalizing existing findings to post-secondary students engaging in either PDU or NMPDU. Limited research has investigated PD opioid use among post-secondary students and, more noticeably, no social norms research appears to have been conducted on both PDU and NMPDU for either opioids or S&Ts among post-secondary students. The lack of opioid-focused research in this area is particularly surprising given the prescription opioid crisis and the need for early intervention (as mentioned previously). In sum, the existing qualitative literature on PDU/NMPDU social norms for common types of PDs, across different types of use, is still very limited and warrants additional attention.

As highlighted in the Introduction, direct participant involvement throughout the research process (participatory action research; PAR) has also been found to be extremely important in the substance use field (e.g., Dunne et al., 2017, Hawke et al., 2019; Valdez et al., 2020; Valdez et al., 2021). Only one study focused on PDU/NMPDU among post-secondary students has incorporated aspects of PAR into its design (LaBelle et al., 2020); however, the study only focused on stimulants and was quantitative in scope. Additionally, perspectives from the general student body were integrated into the research process, rather than perspectives directly from student PWLLEs. PAR and the inclusion of PWLLE have yet to be integrated into qualitative research on PDU/NMPDU among EAs, despite the important role that they have been known to play when combined with other qualitative research approaches (MacDonald, 2012). Integrating PAR and the experiences of PWLLE into qualitative research on PDU/NMPDU and social norms would ultimately be able to provide a richer understanding of this connection from the perspective of what the most directly impacted groups themselves deem to be important.

Thus, Study 2 aimed to expand on Study 1 by enhancing understanding of the social norms - PDU/NMPDU link via a qualitative approach that incorporates a stronger ‘participant voice’ into its design. In particular, Study 2 used focus groups and an interview guide containing questions developed in consultation with an advisory committee (i.e., a committee that includes students themselves, both with and without living experience). The purpose was to explore the social norms perceptions of students who have engaged in recent PDU/NMPDU. This qualitative study also recruited PWLLE as participants (i.e., students engaging in PDU or NMPDU). Overall, Study 2 intended to gain a more comprehensive understanding of social norms and PDU/NMPDU, obtained using qualitative methods, for three types of PDs by incorporating a ‘student voice’ to further explore the perceived role of sex and other pertinent characteristics in the PDU/NMPDU and social norms relationship among post-secondary students.

CHAPTER 4. STUDY 2: SOCIAL NORMS FOR PRESCRIPTION DRUG USE AMONG UNIVERSITY STUDENTS: A QUALITATIVE ANALYSIS

An updated version of the submitted manuscript prepared for this study is presented below. The submitted manuscript was updated to provide some additional details about the results and to incorporate other comments noted by reviewers after the submission. Readers are advised that Jason Isaacs, under the supervision of Dr. Sherry Stewart, was responsible for developing the research questions and hypotheses, preparing the qualitative data for analyses, conducting qualitative analyses, and interpreting study findings. Jason wrote the initial draft of the manuscript; he then received and incorporated feedback from his co-authors. The manuscript was submitted to a peer-reviewed journal on June 8, 2022.

The full reference is as follows:

Isaacs, J. Y., Yakovenko, I., Thompson, K., Stewart-Kirk, K., Loung, R., Shelton, R., & Stewart, S. H. [Manuscript submitted for publication]. Social norms for prescription drug use among university students: A qualitative analysis.

Abstract

Harmful use of prescription drugs is prevalent among university students. Social norm perceptions provide a useful avenue to understand motivations and behaviours surrounding medically sanctioned and non-medically sanctioned prescription drug use (PDU and NMPDU, respectively). Qualitative research could provide a richer and more detailed understanding of such perceptions and how they might be similar or distinct among university students using different prescription drug types or engaging in different forms of use (i.e., PDU and NMPDU). The objective of this study was to conduct a qualitative investigation of social normative perceptions/beliefs regarding PDU and NMPDU in a university sample with lived experience. Six focus groups were conducted with a total of $N=39$ students (62% female). Focus groups were conducted for three types of prescription drugs (opioids, stimulants, and sedatives/tranquilizers), with the focus groups for each prescription drug type further separated by primary form of use (PDU or NMPDU). Results were analyzed with an inductive thematic analysis. Three primary themes emerged: (1) PDU and NMPDU are Common, (2) Contexts of PDU and NMPDU, and (3) Individual Differences Impacting PDU and NMPDU. Three subthemes emerged for each primary theme. Generally, results highlighted high rates of perceived use, with contexts for use seen to vary by prescription drug type, and with several factors such as age, social networks, and program of study perceived to impact rates of use. These qualitative findings give priority to student voice regarding their perspectives on the nature of social norm perceptions and their impact on students' PDU/NMPDU behaviors. The paper discusses clinical implications for creating and optimizing interventions that target social norms perceptions from a student-informed perspective.

Keywords: Qualitative analysis, prescription drugs, university students, social norms

Introduction

By the late 1990s, there had been a marked increase in the use and distribution of psychotropic prescription drugs (PDs). Prescription drug use not sanctioned by physicians has been associated with harmful consequences such as cognitive changes, functional impairment, overdose, and death (Davison & Perron, 2013). Physician-sanctioned prescription drug use has also been associated with harmful consequences such as physical side effects (e.g., Advokat, 2010; Ivanova et al., 2013). The high rate of harmful use has been termed the “Prescription Drug Crisis” (Davison & Perron, 2013; Kahle, 2020; Zhang et al., 2021).

Emerging adults (EAs), currently defined as individuals aged 18-29 years (Arnett et al., 2014), demonstrate the highest rates of medically sanctioned and non-medically sanctioned prescription drug use (PDU and NMPDU)¹ and associated adverse consequences of any age group (e.g., SAMHSA, 2014). Elevated use and adverse consequence rates of some common prescription drugs appear particularly true of EAs in university (e.g., McCabe et al., 2018). Over the course of one school term, 9.9% of students reported taking prescription opioids, 6.8% reported taking prescription stimulants, and 4.4% reported taking prescription sedatives/tranquilizers (S&Ts; Chinneck et al., 2018).

Social norms theory (Perkins & Berkowitz, 1986) purports a strong association between perceived peer substance use and one’s own substance use, resulting from individuals trying to match their own behaviours to the perceived norm. This association has been demonstrated for both descriptive and injunctive norms (i.e., perceptions about what is done vs. what ‘ought’ to be

¹ In this paper, PDU was defined as taking prescription drugs as prescribed/indicated by a physician. NMPDU was defined as taking prescription drugs any way other than prescribed/indicated, which included using without a prescription for medical reasons, using without a prescription for recreational reasons (e.g., to get high), using in a manner other than that prescribed (e.g., taking a different dose, via a different route [e.g., intranasal]), using with alcohol, and/or using as a study aid.

done, respectively; Cialdini et al., 1990) with descriptive norms receiving the most research attention. Indeed, perceived social norms surrounding substance use are a major factor in university students' own use. Specifically, perceived peer norms for alcohol, cannabis, and tobacco significantly predict own use (Arbour-Nicitopoulos et al., 2010). Similar relationships exist for PDs: students who perceive higher peer PDU/NMPDU are more likely to engage in PDU/NMPDU themselves (McCabe, 2008; also see Study 1, Chapter 2, this thesis).

Social norms interventions for substance use typically involve providing corrective feedback about overestimated peer substance use behaviours to decrease personal behaviours (Moreira et al., 2009). There are two general types of social norms interventions: (1) Personalized normative feedback (PNF), which is typically an indicated intervention for higher-risk or heavier users where participants are provided feedback on their own perceptions (or behaviours) relative to actual substance use norms, and (2) social marketing campaigns, where didactic information about actual rates of student use is shared, usually on a universal or group level (Lewis & Neighbors, 2006; Moreira et al., 2009). Some social norms interventions have effectively changed students' misperceptions and, in turn, personal use behaviours for alcohol, tobacco, and cannabis (Dempsey et al., 2018). Recent studies have tested two social norms interventions for PDU/NMPDU, one of which appeared to incorporate aspects of PNF interventions (Arabyat et al., 2019), and the other which utilized a social marketing campaign approach (LaBelle et al., 2020). Unfortunately, neither of these interventions have successfully impacted students' PDU/NMPDU behaviours.

The Present Study

The lack of success of existing social norms interventions in decreasing students' potentially harmful PDU/NMPDU indicates that additional research is required to determine how

to improve intervention efficacy. Qualitative research has enhanced understanding of substance use by providing an in-depth investigation of human experiences that may promote improvements in substance use interventions (e.g., Nichter et al., 2004). Such meaningful lived experiences and detailed personal perceptions often cannot be captured with quantitative methods. Thus, a qualitative study of perceived PDU/NMPDU norms among university students for multiple common PDs could provide rich information to help improve the efficacy of social norms interventions for PDU/NMPDU. There is currently limited qualitative research on social norms for PDU/NMPDU. The existing social norms findings, such as NMPDU being perceived to be relatively common among students (e.g., Garcia et al., 2021), have primarily been included in broader qualitative studies not specifically focused on social norms, and have mostly been limited to stimulant use and/or NMPDU. Extant qualitative research has yet to investigate social norms for both PDU and NMPDU across several types of PDs commonly used by students.

The objective of this study was to conduct a qualitative analysis of the normative perceptions of groups of students engaging in PDU or NMPDU of opioids, stimulants, or S&Ts. This investigation could inform interventions that could broadly target student PD use, regardless of form or type of use. Alternatively, this investigation could elucidate if there are important differences in normative perceptions across form or type of use, allowing such differences to be accommodated/incorporated into interventions to facilitate effectiveness.

Method

Participants

Focus groups were hosted at Dalhousie University with students who reported use (PDU or NMPDU) of prescription opioids, stimulants, or S&Ts in the last four months. Six focus

groups were held in October-November 2019. Separate groups were held for primary PDU and primary NMPDU across the three types of PDs.

Fugard and Potts' (2015) model on qualitative data saturation was used to generate the sample size estimation for our study. The model purports that a sufficient sample size for qualitative studies should be predicated on (a) the expected population theme prevalence of the least prevalent theme, (b) the number of desired occurrences of that theme, and (c) study power. We chose an a priori estimate of 10% of the sample mentioning a theme to represent what we would consider a meaningful theme overall. We desired at least two instances to retain each theme. We set power at 90%, which in this case would represent an 90% chance of observing the desired number of theme instances. Given this information, a sample size of $N=38$ was required.

Initially, $N=96$ students expressed interest in the study. Of these students, $N=51$ were not assigned to a focus group due to ineligibility ($n=8$), lack of interest ($n=4$), failure to complete pre-study forms ($n=17$), or inability to attend the relevant focus group date ($n=22$). Additionally, $n=6$ students consented but did not attend their focus groups. As a result, a final sample of $N=39$ students participated across the six focus groups. In addition to our power analysis demonstrating that $N=39$ met our required sample size, fewer than 5% of novel subthemes emerged during the final focus group, which provided a further indication that data saturation was reached for the overall sample (Guest et al., 2020). Each focus group included 3 to 9 students ($M = 6.3$). See Table 2.1 for sample demographic and substance use characteristics.

Procedure

The study was approved by Dalhousie University's research ethics board. Recruitment involved advertising on social media and an undergraduate psychology study pool website, posterage within the host university's campus and the surrounding community, and having

physicians in the area circulate study information to patients. The following criteria were required for eligibility: Prior four-month PDU or NMPDU, registered as a university student, and aged 17-29. Interested students were asked to contact study personnel by email or phone.

A screening phone call was scheduled with each interested student in which basic study information was provided and eligibility criteria were verified. Interested students were then sent a link to an online consent form, followed by questionnaires that inquired about demographic information and substance use behaviours. The consent form and questionnaires were housed on Opinio, a secure online survey program. Consenting students were sent a follow-up email (and subsequent reminder) with information about their focus group (e.g., location/directions).

Participants attended one of six 1.5-2-hour focus groups at an eastern Canadian university. Each focus group began with introductions/confidentiality, followed by a facilitated focus group discussion that included 10 primary questions about PD social norms, and PD use more generally, for their primary PD (opioids, stimulants, or S&Ts). Social norms findings are reported in this paper. See Appendix C for the full focus group guide. Each focus group was facilitated by the first author and co-facilitated by trained research assistants. Each focus group was audio recorded and transcribed by trained research team members. Participants were provided with their choice of \$20 or two psychology credit points as compensation.

Measures

Demographics Questionnaire. The Demographics Questionnaire was a researcher-compiled online measure used to describe the sample age, program of study, living arrangements, gender, and ethnicity. See Table 2.1 for characteristics of the final sample.

Substance Use Screening Questionnaire (SUSQ). The SUSQ was an author-compiled online measure about participants' use of PDs (opioids, stimulants, S&Ts) over the past four

months which was used as a screening tool to confirm participant eligibility. The SUSQ also collected descriptive information about participants' PDU/NMPDU and other substance use behaviours (i.e., alcohol, tobacco, and cannabis). Participants were asked how often they had used each substance over the past four months. When specifically asked about the use of each type of PD, if participants responded with "never", they were automatically directed to the next substance use category using branching logic; however, if they indicated any prior use (i.e., "monthly or less", "2-4 times per month", "2-3 times per week", or "4 or more times per week"), they received a follow-up question pertaining to the way in which they had used that PD (i.e., PDU vs. NMPDU). The structure of the survey was adapted from the Detection of Alcohol and Drug Problems in Adolescents (DEP-ADO; Germain et al., 2007), a validated self-report screening questionnaire that investigates the frequency of recent substance use.

Data Analysis

Our project was part of a larger cross-Canada initiative investigating opioid use and related high-risk behaviours among youth.² A general focus group guide was developed across all study sites (for example, general probes were included about participants' personal experiences with opioid PDU/NMPDU and the healthcare system), and then the guide was adapted and supplemented at our site to generate a focused discussion about social norms for PDU/NMPDU among university students (see Appendix C). Data from the focus groups at our site were qualitatively analyzed using an inductive thematic analysis (Braun & Clarke, 2006); thus, data from our focus groups was coded without fitting them into a pre-existing coding frame. Text was coded into meaningful units (phrases and sentences) that were then grouped

² Separate focus groups were developed and held at each Canadian site, but only results from our site are reported herein. Our site was the only study site to examine university students. Each site's research findings are reported in separate papers, several of which will appear in an in press special issue of the *The Canadian Journal of Addiction*.

together into emergent themes and subthemes. Two raters collaboratively discussed initial codes emerging from the data. The first rater developed the final themes/subthemes, and the second rater subsequently reviewed the first raters' placement of codes sorted into each theme to establish interrater agreement. The first rater was a PhD Clinical Psychology student with prior thematic analysis experience and the second rater was an undergraduate psychology program graduate who was trained in thematic analysis. Qualitative data was organized and analyzed descriptively using NVivo 12 (QSR International Pty Ltd., 2020).

Results

A thematic analysis generated three themes across all types of PDs and both forms of PD use: (1) *PDU and NMPDU are Common*, (2) *Contexts of PDU and NMPDU*, and (3) *Individual Differences Impacting PDU and NMPDU*. Each parent theme generated three subthemes as described below. Some themes and subthemes emerged in the context of prior prompting (e.g., for sex differences), but other themes/subthemes emerged naturally (e.g., sexual orientation). Each theme was identified across both forms of use (i.e., PDU and NMPDU), meaning that separate themes did not emerge for form of use. Some variation was observed in the subtheme content for each PD type. Interrater agreement of codes sorted into themes using Gwet's (2008) first-order agreement coefficient (AC1 statistic) was .81 (95% CI [.75, .86]), which indicates 'substantial' to 'almost perfect' agreement (Landis & Koch, 1977). Discrepancies were discussed to consensus. See Table 2.2 for a summary of themes with quotes, and see Table 2.3 for frequency count distributions of subthemes within each parent theme.

Theme 1: PDU and NMPDU are Common

This theme highlighted how participants perceive PDU/NMPDU to be high among their peers for individual use of PDs, diversion (sharing/selling) of PDs, and taking PDs alongside other substances (i.e., substance co-use and poly-substance use).

Individual Use of PDs is Very Common

Generally, participants perceived opioid, stimulant, and S&T use to be very common among other students. High perceived use was most commonly noted for stimulants and was least commonly noted for S&Ts. For all three types of PDs, participants primarily perceived acute or short-term use to be more common than chronic or extended use. Additionally, participants in the opioids and S&T groups largely perceived NMPDU use to be more common than PDU.

Diversion of PDs is Mainstream

Participants perceived that it is generally commonplace and easy for students to both obtain PDs and share them with others. Physicians, friends, other peers, and family members were perceived to be primary sources for obtaining PDs; friends, classmates, and romantic partners were perceived to be the most common recipients of diverted PDs. Diversion was perceived to be especially common for stimulants. Participants in the S&Ts groups perceived proximity to play a role in diversion (i.e., more likely among closer social network connections).

Co-Use/Poly Substance Use with PDs is Typical

Participants across all groups perceived substance co-use and polysubstance use with PDs to be quite common among university students. They reported that common combinations involved alcohol, cannabis, or nicotine with PDs. Participants noted that co-/polysubstance use

was most likely to occur in social contexts such as parties. Co-/polysubstance use was most commonly mentioned for opioids and stimulants.

Theme 2: Contexts of PDU and NMPDU

This theme highlighted perceived norms of PDU/NMPDU across different contexts. Namely, participants described unique norms in two main contexts: Academic and social.

School and Achievement Contexts

Participants perceived stimulant and S&T PDU/NMPDU to be common in contexts involving schoolwork or other academic commitments; this subtheme did not emerge for opioids. Participants perceived stimulants to increase motivation and academic performance and that, as a consequence, stimulants are frequently taken prior to large tests/evaluations (e.g., midterms) or during high stress periods involving academic achievement (e.g., essay writing). Stimulants and S&Ts were both perceived to be commonly used when students lack confidence in their academic abilities.

Social Contexts and Networks

Participants across all groups perceived that PDs are commonly used by students in social contexts. In particular, they perceived opioids as commonly used in social situations in forms other than prescribed (e.g., crushed into a drink to make ‘lean’)³. They generally perceived prescription stimulant use to be normative at social events or parties, and they perceived these contexts of use to be similar to contexts for use of other non-prescription stimulants like cocaine. S&Ts were perceived to be frequently used in school-based social situations (e.g., during groupwork to mitigate social anxiety). Generally, participants across all groups perceived PDs to

³ ‘Lean’, also known as ‘purple drank’ or ‘syrup’ is a drink which most commonly includes the combination of codeine-based cough syrup, soft drinks, and candy (Agnich et al., 2013). In our study, participants identified ‘lean’ as including drinks mixed with any opioids.

be commonly used in social situations within the context of peers who also use (e.g., student residences, rural universities, and networks of friends with higher PD use/approval).

Use When Alone⁴

Some participants perceived reasons why students may engage in PDU/NMPDU when alone versus in social situations, though this context was mentioned less often than social contexts. Use of opioids and S&Ts alone was perceived to be motivated by boredom, curiosity, or to mitigate mental health concerns. In contrast, using stimulants alone was most commonly perceived to be motivated by academic performance/achievement concerns.

Theme 3: Individual Differences Impacting PDU and NMPDU

This theme pertained to perceived individual- and group-level factors that would impact PDU/NMPDU. Participants highlighted three relevant factors that emerged independently across multiple groups: gender and sexual orientation, culture, and program/year of academic study.

Gender and Sexual Orientation Norms

Participants across all types of PDs perceived that peer gender may play a role in PDU/NMPDU-related behaviours. For opioids, participants perceived that men were more likely to use because of a higher tendency to engage in risky behaviours. For stimulants, participants perceived use to be higher among men overall because of increased identification of attention problems, though participants perceived that women may be more likely to engage in stimulant NMPDU for weight control. With respect to S&Ts, women were perceived to engage in higher use for several reasons (e.g., exposure to more situations that would foster anxiety, and a bias predisposing physicians to identify anxiety symptoms in women). Some participants minimized

⁴ While the 'Use When Alone' subtheme is similar to the previous subtheme ('Social Contexts and Networks') as both subthemes concern the presence/absence of others, it was retained as a separate subtheme due to (1) its focus on the absence aspect, (2) being described less often, and (3) associated perceived motives being different than when in social contexts.

the impact of gender overall, however, noting that ‘other factors’ (such as social context) may play larger roles in PDU/NMPDU social norms.

Participants in the opioid and S&T groups (but not the stimulant groups) also perceived PDU/NMPDU to be higher in the LGBTQ+ community, noting unique stressors faced by LGBTQ+ students that are not experienced by heterosexual or cisgender students. Participants noted LGBTQ+-specific risk factors such as prejudice and social stress.

Cultural Differences

Across all three types of PDs, cultural factors were perceived to play a role in normative behaviours around use. For example, participants reported that engaging in PDU/NMPDU was taboo or punishable in certain countries, while acceptable or promoted in others. Some participants discussed how their personal cultural experiences shaped their perceptions of what is normative in peers. Participants also perceived unique factors in the lives of international students which may either increase or decrease PDU/NMPDU. For example, the stress of adjusting to new cultural norms was often perceived to be a risk factor for increased PD use.

Influence of Program of Study and Year of Study

Across each type of PD, participants highlighted the potential importance of program as a factor in use. Among the opioid groups, participants perceived students in commerce-type programs as typically more likely to try several substances, including opioids, but viewed psychology/neuroscience students as being less likely to use opioids or other drugs due to knowing more about potential harmful consequences of use. However, the S&T groups noted that while psychology/neuroscience students may be protected due to their greater knowledge about harms of use, their greater knowledge of benefits might also place them at increased risk of

use. Among the stimulant groups, many students perceived that stimulant use was more likely in programs with a competitive climate like law.

Participants across all three types of PDs perceived patterns in PDU and NMPDU related to year of study. Many participants perceived that overall use decreases over the course of students' time in university, but some noted that it may increase for people who find PDs that "work".

Discussion

The current study involved a thematic analysis of focus group data to elucidate normative perceptions of university students' PDU and NMPDU held by student users of opioids, stimulants, or S&T's. This study represents the first in-depth qualitative investigation of social norm perceptions pertaining to both PDU and NMPDU for these three different types of PDs among EA university students. Six focus groups were held with students who were engaging in PDU or NMPDU themselves, for one of the three types of PDs. Our analysis identified three parent themes, each with three subthemes that provided insight into normative perceptions of peer behaviours relating to PDs.

The first theme, *PDU and NMPDU are Common*, highlighted students' perceived rates of PDU and NMPDU to be high across all types of prescriptions. While we did not quantitatively investigate overestimations, participants' use of descriptors such as "more than half" would indicate that their perceptions are notably higher than actual use rates. Previous quantitative research has indeed demonstrated overestimations of PDU/NMPDU among students, particularly among those engaging in use themselves (McCabe, 2008). Additional prior research has established a relationship between PDU/NMPDU perceptions and personal behaviours (Helmer et al., 2016; Lehne et al., 2018; also see Study 1, Chapter 2, this thesis); thus, it is possible that

the recent PDU/NMPDU of our participants had potentially been shifted towards the perceived norm by their overestimations of others' PDU/NMPDU.

This theme also highlighted the perceived 'everyday' nature of PD diversion among students. This perception is somewhat consistent with previous quantitative research on actual rates of PD diversion among students (DeSantis et al., 2013; Gallucci et al., 2015). Even with relatively high rates of diversion, participants' perceptions still appeared to be higher than actual rates, as they used terms such as "most" and "everywhere" to describe the perceived ubiquity of diversion among students. Overestimations of diversion are important to study in the future, as students may engage in diversion behaviours themselves if they believe it is normative to do so.

Participants also discussed the perceived high frequency of substance co-use and poly-use with PDs. They suggested that a main reason for poly-use of PDs involves attempts to modulate the effects of other substances (e.g., using stimulants to offset alcohol intoxication). PD polysubstance use with other substances among university students has a past-year prevalence rate of approximately 12% (McCabe et al., 2006). Moreover, there are unique dangers/consequences associated with polysubstance use involving PDs such as an increased risk of overdose (e.g., Egan et al., 2013; McCabe et al., 2006). Further research should investigate how normative perceptions of peer polysubstance use involving PDs may influence personal polysubstance use.

The second parent theme, *Contexts of Peer PDU and NMPDU*, shed light on contextual factors perceived to impact students' PD use. Achievement-related motives as contexts for use were perceived to be important, particularly for stimulants. Stimulants are often used to improve academic achievement because they are thought to enhance attention, concentration, and other cognitive abilities; however, prior research has found a minimal and sometimes negative impact

of stimulant PDU/NMPDU on several cognitive and academic outcomes (Advokat, 2010; Faraone et al., 2020). Thus, social norms interventions may benefit from incorporating the notable discrepancy between perceived and actual academic outcomes of PDU/NMPDU. As part of this theme, participants also shared their perceptions on situations wherein students may be more likely to take PDs when alone. Prior research has indicated that getting high is a commonly reported reason for PD use among university students (e.g., Brandt et al., 2014), and our study helped demonstrate why this high may be perceived as reinforcing when alone (e.g., to escape from impactful mental health symptoms by numbing emotions with PDs).

Participants across all groups also believed that social networks and social contexts play a central role in students' PDU/NMPDU, noting the particular influence of peers and romantic partners in determining PD behaviours. Prior research with other substances has found that peers (Borsari & Carey, 2001) and romantic partners (Bartel et al., 2020) are the most impactful sources of social influence for EAs' own substance use. As highlighted by our participants' normative perceptions, such sources may be particularly influential in a university setting. Prior research has yielded heterogeneous findings regarding rates of PDU/NMPDU in different university settings. Relatively lower use has been reported for residence halls while elevated use has been reported for other social living arrangements such as living off-campus with peers/friends or in fraternity/sorority houses (e.g., Clegg-Kraynok et al., 2011; McCabe et al., 2005). Our study highlights important factors that may influence students' heightened perceptions regarding use in these university environments (such as the closeness or number of social connections). For example, one's number of friends engaging in NMPDU has been found to be a significant predictor of personal NMPDU among undergraduates (Meisel & Goodie, 2015). Indeed, there is usually a relatively high base rate of PDU/NMPDU among friends in the

same social network as a user (e.g., Meisel & Goodie, 2015). Thus, there may be lower clinical utility of using ‘friend(s)’ as a reference group for social norms interventions with users, as overestimations are less likely in relation to their own social network (Meisel et al., 2021).

Our third and final theme, *Individual Differences Impacting PDU and NMPDU*, highlighted participants’ perceptions about how individual factors can either promote or disincentivize use. Within this theme, participants perceived that their peers’ gender identity and sexual orientation influence both use and the acceptability of use (i.e., both descriptive and injunctive norms). While certain perceived gender differences have been supported by prior research (e.g., S&T prescriptions and use are higher for women [Kaufmann et al., 2016]; stimulant prescriptions/use are generally higher for men [Hachtel & Armstrong, 2019; Young et al., 2020]), misperceptions also arose in our sample (e.g., our participants’ perceiving that the stimulant gender difference holds across different ages, while research suggests that gender differences in use actually changes across different ages; Board et al., 2020⁵).

Participants perceived both PDU and NMPDU to be higher among LGBTQ+ students as compared to cisgender and heterosexual students. LGBTQ+ students have been found to face unique stressors (e.g., minority stress) and sociocultural influences (e.g., more permissive substance use norms) each of which increase the risk of problematic substance use (Felner et al., 2020). Indeed, preliminary research suggests greater NMPDU among sexual minority students (Duryea et al., 2015). Additional research is needed to learn more about social norms perceptions for PDU/NMPDU among LGBTQ+-identifying students as compared to other students to determine the degree to which elevated social norms may play a role in their elevated use.

⁵ The difference is particularly related to PD dispensation, and demonstrates a notable increase in dispensing rates for women ≥ 20 years of age.

Participants also highlighted cultural/ethnic differences as a relevant factor that they perceived influenced peer prescription use. Participants generally perceived potential cultural risk and protective factors that may increase or decrease students' problematic use, respectively. For example, some participants perceived that religious affiliation may be a protective factor, while some culturally-rooted parenting approaches (e.g., higher academic expectations) may be a risk factor. Little research has investigated PDU and NMPDU among ethnic minorities (Peteet, 2019), especially in university contexts. Prior quantitative findings suggest that stimulant use may be more prominent and stimulants more accessible to White students (e.g., Aikins, 2019) which contrasts with our participants' perceptions that acculturation pressures may lead to greater PDU/NMPDU among international students. Our participants' perceptions could be followed up with quantitative work examining links of acculturation stress with PD use among international students, given links observed for other substances (e.g., Hunt et al., 2017).

Finally, participants perceived year of study and university program to be two potentially relevant factors in determining PD behaviours. They generally thought that use would decrease over the course of students' duration in university or increase and then plateau at an "optimal" (i.e., helpful) amount/dose. These perceptions were partially supported by past research, which has suggested that PDU/NMPDU reaches a peak by year three of university, but then gradually decreases through the mid-twenties (Arria et al., 2017). Regarding university program, programs in which higher use was perceived to occur varied by PD type. Research with other substances has highlighted how age trends may interact with different programs of study (Chen & Chen, 2020). In particular, alcohol use has been found to decrease with age among students in the social sciences or business, while cannabis use has been found to decrease with age among students in health or social science programs (Chen & Chen, 2020). Epidemiological research

can help to establish program and age/year of study effects on PDU/NMPDU behaviours, and subsequent quantitative methods can examine whether peer age, year of study, or program influence normative perceptions. These influences may implicate an important role for using referents of the same age, year of study, or program in social norms interventions, especially given that less existing research has investigated using such referent groups (Lewis & Neighbors, 2006).

Limitations

Our study faced certain limitations that are important to acknowledge. First, the findings from our sample of students in eastern Canada may not be representative of students in other regions. Secondly, our study highlighted the overlapping definitions between PDU and NMPDU. For example, while separate focus groups were held for PDU and NMPDU, many participants described a less recent personal history involving varying forms of PD use (e.g., a history of engaging in NMPDU before receiving a prescription from a physician). We did not observe many differences in themes across the two forms of use, potentially due to this overlap between groups. While the resulting group overlap can be considered a useful finding in and of itself, further research may benefit from clarifying and optimizing the definition of misuse (Barrett et al., 2008), perhaps by incorporating both past and present use into the operationalization.

Additionally, participant remarks within our focus groups may have been influenced by factors such as conformity with louder or more persuasive voices. While these factors are known to be common in focus groups (e.g., MacDougall & Baum, 1997), our group facilitators strove to encourage diverse opinions and perceptions. A similar limitation pertained to our inability to link participant individual differences to specific perceptions (i.e., inability to identify who made each remark from the transcript) due to the nature of focus group data. Furthermore, we might

not have reached within-group saturation (Onwuegbuzie et al., 2009), and the small sample size within each group may have obscured the ability to detect differences in themes across groups. We were adequately powered for the full sample but not necessarily for making comparisons across form or type of PD use. Thus, observations across different types of PD use need to be interpreted cautiously given the small samples across PD types. Moreover, our qualitative design impeded our ability to determine whether participants' perceptions of social norms influenced their personal PDU/NMPDU as suggested in the social norms framework (Perkins & Berkowitz, 1986), and/or the causal direction of this influence. Finally, students were only asked about their own PD, and we thus obtained limited information about their social norms perceptions for PDs that they themselves were not using.

Implications

The high perceived norms highlighted by participants demonstrate that social norm interventions and social norm messaging may be promising avenues for curbing potentially harmful PDU/NMPDU among EA students. Participants' perceptions regarding individual differences indicate that a 'one-size-fits-all' intervention approach may be less effective than approaches which account for factors/contexts that may contribute to individual differences in perceptions and use. Attending to such factors can ultimately help guide individualized and tailored social norms interventions for higher risk students. For example, normative feedback may benefit from including base rates of students who use PDs for social motivations, as such motives were perceived to be common for each type of PD. Feedback may similarly benefit from using non-friend referents among students engaging in PDU/NMPDU, as higher base rates of use in students' closer social networks may result in a small discrepancy between perceived and actual use behaviours (e.g., Meisel et al., 2021).

Given several overlaps in PD perceptions across separate types of PDs, social norms interventions providing general feedback may ultimately not need to be PD-specific. Yet, some perception differences for different types of PDs suggests that more focused social norms interventions (such as a focus on perceived-actual discrepancies in school achievement with stimulants) may benefit from a PD-specific approach.

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Declaration of Interest Statement

None of the authors have any financial or non-financial conflicts of interest to declare.

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Tables and Figures from Study 2

Table 2.1

Demographics for Participants in Study 2 (N=39).

	N (%) or M (SD)
Focus Group	
Opioids – PDU	5 (12.8%)
Opioids – NMPDU	3 (7.7%)
Stimulants – PDU	7 (17.9%)
Stimulants – NMPDU	9 (23.1%)
S&Ts – PDU	8 (20.5%)
S&Ts – NMPDU	7 (17.9%)
Age [in years]	20.2 (2.4)
Gender	
Woman	23 (62.2%)
Man	14 (37.8%)
Ethnicity	
White	23 (65.8%)
South Asian/Southeast Asian	4 (11.4%)
First Nations	2 (5.7%)
West Asian	2 (5.7%)
Other	4 (11.4%)
International Student	
Yes	9 (24.3%)
No	28 (75.7%)
Program of Study	
Science	15 (40.5%)
Arts & Social Sciences	11 (29.7%)
Health Professions	3 (8.1%)
Engineering	2 (5.4%)
Management/Computer Science	2 (5.4%)
Other	4 (10.8%)
Alcohol Use Frequency	
Never	5 (13.5%)
Monthly or Less	8 (21.6%)
2-4 Times Per Month	19 (51.4%)
2-3 Times Per Week	4 (10.8%)
4 or More Times Per Week	1 (2.8%)
Tobacco Use Frequency	
Never	23 (62.1%)
Monthly or Less	3 (8.1%)
2-4 Times Per Month	1 (2.8%)
2-3 Times Per Week	1 (2.8%)

4 or More Times Per Week	9 (24.3%)
Cannabis Use Frequency	
Never	14 (37.8%)
Monthly or Less	10 (27.0%)
2-4 Times Per Month	2 (5.4%)
2-3 Times Per Week	5 (13.5%)
4 or More Times Per Week	6 (16.2%)

Note. Four participants did not report their Ethnicity (i.e., $N=35$); two participants did not report their Gender (i.e., $N=37$); two participants did not report their International Student status (i.e., $N=37$); two participants did not report their Program of Study (i.e., $N=37$); two participants did not report their Alcohol Use Frequency (i.e., $N=37$); two participants did not report their Tobacco Use Frequency (i.e., $N=37$); two participants did not report their Cannabis Use Frequency (i.e., $N=37$).

Table 2.2

Overview of themes and subthemes included in the thematic analysis.

Theme	Subthemes	Relevant Examples
Theme 1: PDU and NMPDU are Common	<p>(1) Individual Use of PDs is Very Common</p> <p>(2) Diversion of PDs is Mainstream</p> <p>(3) Co/Poly Substance Use with PDs is Typical</p>	<p>“I think like a lot more people would take it than you think, because it’s reached a lot of demographics.”</p> <p>“I think for a lot of people, just knowing someone that has a prescription and then if they’re willing to sell it, then people take it.”</p> <p>“Cigarettes with opioids are super common.” “I swear people who have prescriptions or whatever... and they go and take like whatever... and then like smoke weed and then take a really weird mix, like yeah, I guess people mix a lot.”</p>
Theme 2: Contexts of PDU and NMPDU	<p>(1) School and Achievement Contexts</p> <p>(2) Social Contexts and Networks</p> <p>(3) Use When Alone</p>	<p>“...that’s how a lot of people get started on it, they’re like oh it helps me this much I probably need it.”</p> <p>“It all depends on the group you’re around...” “I think, being in res you have easier access to not just stimulants in general, but like all drugs.”</p> <p>“I don’t see sedatives at a lot of parties. I know people pop ‘xanies’ and stuff, but honestly, when I’m at parties, everyone’s doing blow, or like, molly or something. Like, they’re doing uppers.”</p>
Theme 3: Individual Differences Impacting PDU and NMPDU	<p>(1) Gender and Sexual Orientation Norms</p> <p>(2) Cultural Differences</p> <p>(3) Influence of Program of Study and Year of Study</p>	<p>“...males would probably use them more, then women would probably use them more how they’re prescribed and not abuse them.”</p> <p>“I’m from [*country*]... there’s just a lot more drugs being prescribed to like everyone [here] which is kind of... interesting.”</p> <p>“...as you get through your program, you’re definitely gonna know more, so not only are you older now but you also just know more. It’s like ‘nope that’s a bad idea and I’m not gonna do it’.”</p>

Table 2.3

Frequency count distributions of the subthemes within each parent themes.

Theme	Subthemes
PDU and NMPDU are Common (111 total references)	Individual Use of PDs is Very Common (15.4%) Diversion of PDs is Mainstream (45.9%) Co/Poly Substance Use with PDs is Typical (38.7%)
Contexts of PDU and NMPDU (110 total references)	School and Achievement-Related Contexts (35.5%) Social Contexts and Networks (36.4%) Use When Alone (28.1%)
Individual Differences Impacting PDU and NMPDU (85 total references)	Gender and Sexual Orientation Norms (38.8%) Cultural Differences (30.6%) Influence of Program and Year of Study (30.6%)

Note. Numbers in parentheses indicate the percentage of total frequency count of the parent theme that the subtheme reflected.

CHAPTER 5. TRANSITION FROM STUDY 2 TO STUDY 3

Study 2 provided an enhanced understanding of the social norms - PDU/NMPDU link in EA university students through rich qualitative data that elucidated participants thoughts and insights about their peers' PDU/NMPDU. In particular, participants discussed three main areas of PDU/NMPDU that directly pertain to social norms and PDs: The perceived commonplace nature of PDU/NMPDU among post-secondary students, perceived contexts in which their peers would be more likely to engage in PDU/NMPDU, and perceived individual-level factors that can ultimately increase or decrease the tendency to engage in either PDU or NMPDU (e.g., university program or sexual orientation).

As highlighted in the Introduction, the known impact of social norms on post-secondary students' own substance use behaviours has led to the creation of 'social norms interventions' intended to alert students to their overestimations of peer behaviour in order to curb their own behaviours so that they more accurately match actual usage rates of their peers (Legros & Cislighi, 2020). These interventions have generally taken the form of programs that either provide individualized feedback to higher risk students based on their initial misperceptions and behaviours compared to actual normative behaviours (i.e., PNF interventions), or programs that involve larger group or mass media approaches to provide corrective, universal information about misperceptions to larger audiences (i.e., social marketing campaigns) (Moreira et al., 2009). While PNF interventions have the benefit (compared to social marketing campaigns) of providing more individualized feedback to participants, social marketing campaigns have an added benefit of being able to reach many students and they quickly gained popularity on university/college campuses, with almost half the post-secondary institutions in the US having implemented some version of a social norms campaign on campus by the early 2000s (Wechsler

et al., 2003). Meta-analyses have since been conducted on social norms campaigns, and have shown that most of these campaigns are designed for post-secondary students (e.g., Kubacki et al., 2015). Given the impact that social marketing campaigns can have on a large scale, I adopted a social norms campaign as part of Study 3, though the program was delivered in a structured group environment corresponding to ‘small-group’ approach discussed by Far and Miller (2003).

The majority of existing social norms interventions (both PNF and social marketing campaigns) among post-secondary students have focused on alcohol (e.g., Foxcroft et al., 2015). While several of these interventions have generated beneficial outcomes, large-scale reviews highlight that the results have generally been mixed (Foxcroft et al., 2015; Moreira et al., 2009). Indeed, some studies have even created a ‘boomerang effect’ where usage rates have *increased* possibly due to the increased salience of substance use information (Schultz et al., 2007). Social norms intervention effects for other substances have also been somewhat inconsistent, such as interventions for cannabis use which have generated both significant beneficial (e.g., Lee et al., 2013a) and non-significant (e.g., Lee et al., 2010b) outcomes. The mixed results of social norms interventions highlight that more research is needed on the helpful versus less helpful aspects of these programs, in order to determine how to optimize such programs for post-secondary students in a way that can maximize clinical benefits.

While post-secondary students have long been shown to overestimate their peers’ PDU/NMPDU (e.g., McCabe, 2008), it seems that only two interventions utilizing social norms theory (Perkins & Berkowitz, 1986) have been trialed for post-secondary students in the context of PDU/NMPDU (Arabyat et al., 2019; LaBelle et al., 2020). These two studies have been broadly described in the Introduction. In the following sections, I will further describe each existing intervention while highlighting the ongoing gaps, particularly gaps pertaining to the

scope/content of the interventions, discrepant outcomes, and a lack of information about helpful versus less helpful aspects of the interventions.

Arabyat et al. (2019) conducted a randomized control trial (RCT) with 391 post-secondary students which involved a brief, multi-session, web-based intervention with individualized educational/didactic components about NMPDU beliefs and perceived norms (among other educational components about substance use). The control group received general health information, and the pre-post outcomes for the intervention and control groups were compared with t-tests for three primary outcomes: perceived norms, attitudes, and behavioural intention. The intervention was successful in increasing negative attitudes towards NMPDU, though it was not successful in modifying NMPDU norms or behavioural intentions. This intervention was facilitated on an individual-level and provided didactic information about substance use and actual usage rates, and would thus appear to most closely resemble a PNF intervention.

Aside from including other didactic elements not pertaining to social norms, Arabyat et al.'s study had several potential concerns that decrease interpretability of the social norms results including: the majority of participants not engaging in NMPDU themselves, the study being underpowered based on its design, no effect size reported for most outcomes, and the little time that participants actually spent attending to the online intervention information (i.e., low engagement with the material, as measured by Google Analytics). The low participant engagement is an important independent finding, as social norms interventions for students have been found to have a larger impact on substance use behaviours when the quality of participants' attention is higher (Lewis & Neighbors, 2015). Overall, Arabyat et al.'s study leaves several remaining questions about the potential effectiveness of social norms interventions for

PDU/NMPDU, such as how to structure a PDU/NMPDU norms intervention in alternate formats that may facilitate higher participant engagement, and in formats where participants can provide direct feedback about what may be helpful versus less helpful during such an intervention.

LaBelle et al. (2020) subsequently implemented the *Rethink* campaign, a universal social marketing initiative to curb stimulant NMPDU among post-secondary students. The campaign utilized a pre-post design with 251 undergraduate students across two private post-secondary campuses, and involved the creation and use of print messaging, social media messaging, and in-person events. Undergraduate students in a strategic communications course assumed a central role in developing the *Rethink* materials which were intended to provide corrective normative information about stimulant NMPDU; thus, the campaign managed to capitalize on the importance of a ‘student voice’ in its design. The campaign led to significant changes in stimulant NMPDU attitudes and a significant but small change in perceived descriptive norms. However, there was no change reported for perceived injunctive norms or actual stimulant NMPDU behaviours, with a ‘boomerang effect’ actually noted for stimulant use intentions (LaBelle et al., 2020).

While Labelle et al.’s study made a significant contribution to the PDU/NMPDU literature as the first documented social norms campaign for post-secondary students in a way that incorporated a ‘student voice’ in the research design, it is important to note several of the study’s core limitations. These included: (a) A sole focus on stimulant NMPDU, (b) questionable generalizability given the student population at private post-secondary institutions, (c) a student population that was primarily completing a Communications degree who may not have been representative of the whole student body, and (d) a ‘participant voice’ that was limited to the development and implementation of the intervention but was not included for post-intervention

feedback. It has been shown that including post-intervention feedback from students following substance use interventions can be helpful in uncovering the more helpful or less helpful aspects of the intervention (e.g., Kazemi et al., 2013) in order to guide subsequent iterations of the program. In LaBelle's (2020) study, there was also not a particular focus on including PWLLE in the creation of the campaign materials, thus potentially reducing the relevance of the student-informed materials to their target market (i.e., students involved in PDU or NMPDU).

Overall, both of the existing social norms interventions targeting PDU/NMPDU among post-secondary students suffer from not including PWLLE in their research design, and not obtaining direct feedback from participants about their experiences and impressions of the programs. These limitations leave the researchers to ultimately make educated guesses about the contributors and mechanisms underlying the lack of change in the behavioural outcomes. Direct participant feedback has long been deemed important in substance use interventions for EAs, and feedback has been most commonly integrated during earlier study phases such as usability, feasibility, pilot, and small-scale studies (e.g., Hallett et al., 2009; Schwebel & Larimer, 2020), highlighting the importance of incorporating participant feedback during early phase studies.

Preliminary research has also begun to investigate feedback for substance use-related social norms interventions (such as those which have targeted alcohol). For example, one intervention on problematic drinking among post-secondary students included normative perceptions as part of the intervention, and participants completed a subsequent satisfaction questionnaire that generally demonstrated higher levels of satisfaction with the in-person versions of the intervention as compared to the web-based versions of the intervention (Neighbors et al., 2012). Another web-based social norm intervention for problematic drinking (Hallett et al., 2009) underwent usability testing with students who were asked to complete a

questionnaire on their experiences with the program. Most students indicated that they found the program easy to complete, they found the drinking feedback useful, and they would recommend the program to a friend.

The first comprehensive understanding of participant feedback from social norms feedback, obtained using qualitative methods, was generated by Marley et al. (2016), during a web-based intervention for undergraduate drinking behaviours. Participant reflections on the normative components of the intervention indicated feelings of shock/surprise when faced with the normative feedback, underpinned by a lack of belief surrounding the normative percentages (i.e., participants reported thinking that the true percentages presented were an underestimation). Participant feedback further indicated that participants compared their drinking with referent groups of varying proximity, and there were mixed opinions regarding whether same-sex feedback was more helpful (Marley et al., 2016).

While participant feedback has only been collected for alcohol-focused social norms interventions among EAs, it is noteworthy that one additional study has investigated participant feedback among *adolescents* for a social norm intervention focused on alcohol, tobacco, and cannabis prevention/harm reduction (Stock et al., 2020). Similar to the qualitative findings from Marley et al. (2016) with undergraduates, participant reflections from Stock et al.'s study highlighted feelings of shock and disbelief about the norms presented, though the authors found that participants still largely reported positive perceptions of the intervention overall.

Participant feedback has yet to be collected for PDU/NMPDU social norms interventions, leaving several remaining questions about how the few existing programs have facilitated changes to attitudes and perceptions with a concurrent lack of change to actual behavioural outcomes or behavioural intentions. Reviews of social norms interventions confirm that

additional participant feedback on social norms interventions is needed (Dempsey et al., 2018). Study 3 aims to investigate the effectiveness of a group-based PDU/NMPDU norms intervention for students engaging in several types of PDU/NMPDU (stimulants, opioids, or S&Ts), and expands on Study 2 by similarly incorporating a ‘student voice’ into the study design and outcomes. To maintain a participant-centred focus throughout the study, Study 3 utilized an integration of (a) an advisory committee to develop and implement the session (i.e., a committee that included post-secondary students with and without PDU/NMPDU experience), and (b) post-session participant feedback to enhance our understanding pertaining to the value/effectiveness of the social norms session from the student participants own perspectives.

CHAPTER 6. STUDY 3: THE IMPACT OF NORMATIVE FEEDBACK ON
UNDERGRADUATES' PRESCRIPTION DRUG USE KNOWLEDGE AND BEHAVIOUR: A
MIXED METHODS STUDY

The manuscript prepared for this study is presented below. Readers are advised that Jason Isaacs, under the supervision of Dr. Sherry Stewart, was responsible for developing the research questions and hypotheses, preparing the dataset for analyses, conducting analyses, and interpreting study findings. Jason wrote the initial draft of the manuscript; he then received and incorporated feedback from his co-authors. The manuscript underwent peer review. Jason led the response to each round of revisions requested by the editor and expert reviewers. The initial version of the manuscript was accepted to the *Canadian Journal of Addiction* on May 27, 2022. It was subsequently published online as part of a special issue in June 2022. See Appendix B for copyright permission from the publisher (Wolters Kluwer).

The full reference is as follows:

Isaacs, J. Y., Thompson, K., Yakoveko, I., Stewart-Kirk, K., Strickland, N. J., & Stewart, S. H. (2022). The impact of normative feedback on undergraduates' prescription drug use knowledge and behaviour: A mixed methods study. *Canadian Journal of Addiction*, *13*(2S), S48-S61.

Abstract

Social norms feedback interventions are effective in correcting overestimations of peer alcohol use and changing undergraduates' drinking behaviours. Undergraduates represent a high-risk group for harmful prescription drug use (PDU), yet a group-based social norms intervention has yet to be investigated for undergraduate PDU. Our objectives involved utilizing a mixed methods research design to investigate the impact of a social norms feedback session on norms perceptions and intentions to engage in PDU, and to obtain students' qualitative feedback on this intervention approach. Thirty-six undergraduates ($M_{age} = 20.17$; 63.89% women) with PDU use within the prior four months were provided accurate information regarding peer PDU rates. Participants reported on their perceptions of rates of peer PDU for each prescription drug type, and their behavioural intentions to engage in PDU, pre- and post-intervention. Subsequently, they participated in a focus group on their perceptions of the PDU intervention. Participants significantly overestimated all types of PDU at pre-intervention. While the intervention led to significant reductions in perceptions of peer PDU rates, significant overestimations remained. Behavioural intentions to use were not reduced from pre- to post-intervention. Content analysis of the focus group data generated four themes that elucidated participants' thinking about the intervention: (1) Coming to Terms with Overestimation, (2) Reflections on Social Networks, (3) Stigma and Norms, and (4) Benefits of a Social Norms Approach. Results highlight that an intervention which changes knowledge of social norms may not be sufficient to curb PDU. Qualitative findings provide insight into ways to potentially improve the utility of PDU social norms interventions for undergraduates.

Keywords: prescription drugs, qualitative analysis, university students, social norms.

Introduction

Background

Over the past two decades, the use of psychoactive prescription drugs such as opioids, stimulants, and sedatives/tranquilizers (S&Ts) has increased (Davison & Perron, 2013). When prescribed and overseen by a physician, opioids (e.g., oxycodone and morphine) have been found to be clinically effective for acute pain management (Terrie, 2011), stimulants (e.g., Adderall and Vyvanse) have been effectively utilized for treating conditions such as attention-deficit hyperactivity disorder (ADHD), narcolepsy, and obesity (Kroutil et al., 2006), and S&Ts (e.g., alprazolam and diazepam) have been shown to effectively induce anti-anxiety, sleep-enhancing, anticonvulsant, and muscle-relaxant effects (Votaw et al., 2019).

However, alongside potential clinical benefits, each of these prescription drug categories has been associated with potential adverse consequences or harms. For example, adverse consequences associated with both medically sanctioned prescription drug use (PDU; use as prescribed or recommended by a medical professional) and non-medical prescription drug use (NMPDU; any use that differs from that indicated by a medical professional) can include dependence, overdose, and even death (Davison & Perron, 2013). Rates of NMPDU are particularly high during emerging adulthood, a transitional period between late adolescence and early adulthood typically defined as 18 years old until the mid to late-20s (Arnett et al., 2014). Among emerging adults, up to 9.2% engaged in opioid NMPDU, 7.5% in stimulant NMPDU, and 5.5% in S&T NMPDU over the past year (SAMHSA, 2014). PDU/NMPDU is particularly common among emerging adults in university/college, with past-year prevalence rates ranging from 11.8 to 19.6% (Silvestri et al., 2015). More than 10% of students engaging in NMPDU report adverse consequences, such as physical health (e.g., nausea/vomiting), relationship,

financial, and academic problems (Holloway et al., 2014). Individuals engaging in medically sanctioned PDU also report adverse side effects related to their prescriptions (e.g., nausea/vomiting or cognitive impairment), in addition to fears about dependence, moral ambiguities surrounding medication use, and attempts to inquire about other forms of symptom management (Advokat, 2010; Gajria et al., 2014; Ivanova et al., 2013; McDonnell & Harmon, 2020; Sirdifield et al., 2013).

An important factor implicated in substance use among post-secondary students is the degree to which students believe their peers use (i.e., descriptive norms). A main tenet of social norms theory purports that students overestimate substance use among peers and then try to emulate the perceived norm, thereby increasing their own substance use (Perkins & Berkowitz, 1986). Perceived peer use has been found to influence individuals' own use of alcohol, nicotine, and cannabis (Arbour-Nicitopoulos et al., 2010; Dempsey et al., 2016). More recently, a link has been found between perceptions of peers' PDU/NMPDU and own PDU/NMPDU (e.g., Lehne et al., 2018).

Given the notable impact of descriptive norms on students' own use, substance use interventions targeting these perceived norms have been investigated. These interventions aim to reduce personal risky behaviours by rectifying overestimations of the frequency/intensity of peer behaviour (Moreira et al., 2009). Often, norm interventions involve a social marketing campaign that provides broad corrective feedback on a group level (Moreira et al., 2009). These social norm corrective feedback interventions/campaigns have generally demonstrated effectiveness in changing misperceptions and behaviours pertaining to drinking and smoking among students (Burchell et al., 2012). Thus far, no group social norm campaigns targeting PDU/NMPDU have been investigated among university students.

It is important to note that while social norms campaigns to date have been relatively effective at changing misperceptions about peer behaviours, these findings have not been as consistently successful in generalizing to behaviour change, highlighting a potential gap between knowledge acquisition and behavioural change (Nagy- Péntzes et al., 2020). Thus, there is notable clinical value in evaluating the impact of social norms interventions on perceptions of peer behaviours *and* on indicators of behaviour change.

The Theory of Planned Behaviour (TPB) proports that central factors influencing behaviour are the intentions to engage in that behaviour (i.e., *behavioural intention*) and general attitudes surrounding the behaviour (Ajzen, 1991). Despite the importance of this theory in predicting behaviour, only one study has investigated how this theory can be used to predict PDU/NMPDU (Arabyat et al., 2019). The authors' individualized social norm intervention resulted in significantly more negative attitudes towards NMPDU, yet no change in intentions to use. This intervention highlighted that attitude changes did not translate to changes in behavioural intentions. The reasons for such attitude-behaviour discrepancies are still poorly understood, potentially because participant feedback on social norm programs is generally lacking (Dempsey et al., 2018). Thus, incorporating student feedback may help to further uncover mechanisms that can better promote behaviour change.

The Present Study

Overall, prior research has yet to examine the quantitative or qualitative impact of a *group*-level social norms intervention on social norms misperceptions and behavioural intentions surrounding PDU/NMPDU. Our study used the theoretical tenets inherent in the TPB to fill this gap in the literature. The current mixed methods study evaluated a single session group social norms intervention for university students engaging in PDU/NMPDU. The program had three

primary objectives: (1) to compare pre-intervention perceptions of PDU/NMPDU in peers to true rates of PDU/NMPDU in students from the same university (Chinneck et al., 2018); (2) to determine whether corrective feedback in the form of a group social norm intervention would reduce perceived rates of peer PDU/NMPDU; and (3) investigate if the intervention would decrease behavioural intentions to use. It was hypothesized that (1) students would overestimate true rates of PDU/NMPDU among their peers at pre-intervention; (2) corrective feedback would reduce inaccuracies in estimated rates of peer usage; and (3) corrective feedback would reduce behavioural intentions to engage in PDU/NMPDU. Our secondary objective was to obtain student users' qualitative feedback on the group social norms intervention for PDU/NMPDU in university students.

Method

Participants

Participants were students from an eastern Canadian university. Sample size estimation for our mixed methods study was predicated on qualitative data saturation and was guided by a model proposed by Fugard and Potts (2015). As stated in this model, a sufficient sample size for qualitative studies is based on (a) the expected population theme prevalence of the least prevalent theme, (b) the number of desired instances of the theme, and (c) the power of the study. We chose an a priori estimate of 10% of the sample mentioning a theme to represent what we would consider a meaningful theme overall. We initially desired at least two instances of each theme for the theme to be retained in our final qualitative model. We set power at 80% chance of observing the desired number of instances of our themes. Given this information (i.e., a prevalence rate of 10%, power of 80%, and two instances of each theme), a sample size of $N = 29$ was required for the qualitative portion of our study. Subsequently, a post-hoc quantitative analysis was calculated

with G*Power 3.1 (Faul et al., 2007) to determine what effect size we were powered to detect with the chosen sample size in the quantitative portion of our study. For our primary proposed analyses involving repeated-measures ANOVAs with one group, a sample size of $N = 29$ would power our analysis to detect a small-medium effect size ($d = 0.27$) at 80% power.

Eligibility for inclusion in the study required self-reported PDU or NMPDU of opioids, stimulants, and/or S&Ts over the previous four months. We selected a four-month time frame to allow for direct comparison with previous data collected from students over a similar timeframe at our site (Chinneck et al., 2018). For our study, PDU was defined as taking prescription drugs as prescribed by a physician, whether regularly scheduled/daily or pro re nata (PRN)/‘as needed’; those classified in the PDU category were those who only reported medically sanctioned use. NMPDU was defined as taking prescription drugs any way other than prescribed by a doctor, which could have included taking without a prescription for medical reasons, taking without a prescription for fun or recreational motives (e.g., to get high), not using as prescribed (e.g., taking a different amount, or via a non-prescribed route), taking with alcohol, or using as a study aid; those classified in the NMPDU category were those who reported any such use even if they also reported medically sanctioned PDU (Chinneck et al., 2018). As highlighted previously, both PDU and NMPDU were included in our study, because both forms of use have been associated with adverse side effects and additional concerns surrounding ongoing use (Advokat, 2010; Holloway et al., 2014; Ivanova et al., 2013).

Materials

Substance Use Screening Questionnaire (SUSQ). The SUSQ (see Appendix F) was an author-compiled online measure about participants’ use of prescription drugs (opioids, stimulants, S&Ts) over the past four months which was used as a screening tool to confirm

participant eligibility (i.e., whether participants had engaged in PDU or NMPDU over the past four months). The SUSQ also collected related descriptive information about participants' PDU/NMPDU and other substance use behaviours (i.e., alcohol, tobacco, and cannabis). Participants were asked how often they had used each substance over the past four months. When specifically asked about the use of each type of prescription drug, if participants responding with “never”, they were automatically directed to the next substance use category using branching logic; however, if they indicated any prior usage (i.e., “monthly or less”, “2-4 times per month”, “2-3 times per week”, or “4 or more times per week”), they received a follow-up question pertaining to the way in which they had used that prescription drug (i.e., PDU vs. NMPDU). The structure of the survey was based on, and adapted from, the Detection of Alcohol and Drug Problems in Adolescents (DEP-ADO; Germain et al., 2007), a self-report screening questionnaire that investigates the frequency of recent substance use.

Prescription Norms and Intentions Questionnaire (PNIQ). The author-compiled PNIQ (Appendix D) was administered pre- and post-intervention in paper-and-pencil format. Six items assessed behavioural intentions related to the prescription drug the participant used most frequently. Behavioural intention items were adapted from a survey investigating undergraduate stimulant use (Gallucci et al., 2015a) and demonstrated high internal consistency at both pre- and post-intervention ($\alpha = .91$ and $.94$, respectively). Responses ranged from 1 (low avoidance intentions) to 7 (high avoidance intentions). For example: “I intend to take the prescription drug” (1 = Likely; 7 = Unlikely). Inversely keyed items were reverse scored and then the items were averaged. Lower scores indicate greater behavioural intentions to use.

Nine questions asked participants to estimate the percentage of their peers who had used (a) opioids, (b) stimulants, and (c) S&Ts over the past semester (i) as prescribed, (ii) not as

prescribed, or (iii) in any way (e.g., “What percent of university students do you think have taken prescription opioids over the last term for any reason?”).

Procedure

This study received research ethics board approval. Participants were recruited to the intervention via posters/flyers, social media, word-of-mouth, and a university-hosted recruitment platform for psychology students. A phone screen was conducted to assess initial eligibility and provide further study information. Once participants consented to participate in the intervention, they were sent the SUSQ to confirm eligibility and collect relevant descriptive information. The SUSQ was housed on Opinio, a secure online survey program hosted at the university where our study took place. Participants subsequently attended an in-person intervention during which they completed paper-and-pencil measures. The intervention is further described below.

Intervention

The intervention was held during a four-hour on-campus summit held in January 2020. Subscribing to the Youth Participatory Action Research framework (Valdez et al., 2020) in which students are active participants in the research process, our summit was student-led, and facilitators included one graduate and five undergraduate students. Participants completed a consent form and the PNIQ prior to the start of the summit.

The summit content was created by an advisory committee comprised of health professionals, researchers, and students with diverse backgrounds (including lived experience of PDU/NMPDU). The social norms intervention consisted of an overview of social norms theory (Perkins & Berkowitz, 1986) followed by a review of how social norm interventions have been applied for other types of substances and behaviours. As part of the intervention, participants were provided with actual (true) reported percentages of PDU and NMPDU for each type of

prescription drug among peers at their university generated from self-reports of 1755 undergraduate students at the same university as our study (Chinneck et al., 2018). Following the intervention, participants completed the PNIQ for a second time, once again rating social norm knowledge and behavioural intentions. Subsequently, a focus group was facilitated by the first author to obtain participant feedback on social norm interventions generally and group social norm interventions for PDU/NMPDU specifically (see Appendix E). The social norm intervention was the first intervention to be presented/discussed during the summit to ensure results would not be influenced by other activities during the summit. Participants were provided with a lunch and snacks during the summit. At the end of the summit, participants were compensated with their choice of a \$50 gift card or a \$30 gift card plus two psychology course credit points.

Analysis

The current study involved mixed methods research (MMR), utilizing both quantitative and qualitative methodology. This MMR was conducted in the context of a post-positivist paradigm, which attends to the importance of both quantitative components and qualitative components in research methods and analyses (Dawadi et al., 2021). We chose MMR (i.e., the combination of quantitative and qualitative methods) so the qualitative methods could add additional depth, using the students' own voices, to supplement the intervention outcome results provided through the quantitative data. We reasoned that the qualitative data could enrich our understanding of the quantitative results by providing us an understanding, from the students' own perspectives, of why the intervention did or did not have its expected effects in the quantitative analysis.

One sample t-tests were used to compare prescription drug estimates of peers' usage from our sample to true reported prescription drug use rates of undergraduates (Chinneck et al., 2018). The true rates were compared to prescription drug estimates at pre-intervention in nine specific comparisons (three types of use [PDU, NMPDU, and any prescription use] for three types of prescription drugs [opioids, stimulants, and S&Ts]). The true rates were similarly compared to prescription drug estimates at post-intervention in the same nine specific comparisons (the three types of use for the three types of prescription drugs). We did not correct for multiple tests in order to limit the possibility of type II errors in this relatively novel area.

Descriptive statistics were generated to indicate the percentage of participants overestimating PDU/NMPDU, where overestimation was defined as $>+0.5\%$ in terms of difference score (perceived use minus actual use)⁶. For pre-to-post changes in perceived peer prescription use, each of the three individual types of perceived peer use were compared pre- to post-intervention using repeated-measures ANOVA (RM-ANOVA), for each drug type. Change in behavioural intentions for PDU and NMPDU pre-to-post-intervention were similarly assessed using RM-ANOVA.

Focus groups were recorded by two live note takers⁷. Notes were compared across note takers following the focus group to ensure no information was omitted. The final combined notes were analyzed using content analysis (Hsieh & Shannon, 2005), which involves the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns. Results derived from content analyses are typically presented

⁶ The cut-point was chosen to be a difference score of $>+0.5\%$ rather than 0 to account for participant rounding, as rounding appeared to be common in our sample. For example, if a true peer use rate of 9.5% was shared with participants during the norms session, a post-session estimate of 10% was deemed not to be an overestimation of peer use.

⁷ Session information was captured by live note takers rather than audio recorded because the group was hosted in large room in which the participants were noticeably spread apart from one another. Thus, an audio recording would not have allowed for participant voices to be captured/heard throughout the room.

as conceptual maps or models. Themes generated in the current study were coded by two clinical psychology doctoral students (J.I. and N.S.). We calculated interrater agreement using the AC1 statistic (Gwet, 2008) to account for low-base rate categorizations.

Results

Of 95 participants who responded to recruitment materials, 42 were eligible. Of those, 36 participants aged 17-27 years ($M = 20.17$, $SD = 2.20$; 63.89% women) attended and participated in the intervention (see Table 3.1). While a power analysis determined that 29 participants would have been sufficient to detect a small-medium effect, we oversampled to account for possible incomplete data. However, complete data was provided by all participants. Thus, our final sample was $N = 36$, and all 36 participants were included in our analyses.

PDU/NMPDU Prevalence and Descriptives

Twenty-two (61.11%) participants reported engaging only in medically sanctioned PDU over the past semester, while 14 (38.89%) participants reported engaging, at least occasionally, in NMPDU over the past semester. Descriptively, 75-100% of participants overestimated prescription usage rates among their peers at pre-intervention, while only 19-78% overestimated at post-intervention (Table 3.2). The degree of overestimation varied with the type of prescription drug and the type of usage, as highlighted in the abovementioned ranges.

Perceived Versus Actual Usage Pre-Intervention

Paired-sample t-tests were performed to compare true peer usage rates to perceptions of peer rates at pre-intervention. Findings demonstrated that, at pre-test, participants significantly overestimated peer usage rates for all types of use (PDU, NMPDU, and overall use) for all three types of prescription drugs (opioids, stimulants, and S&Ts) compared to actual usage rates (Table 3.3).

Pre-Post Changes in Social Norm Perceptions

The RM-ANOVAs demonstrated that, for all three forms of prescription drugs, participants' perceived rates of peer use decreased significantly from pre- to post-intervention for each type of use (Table 3.4). Results remained the same when grouped by PDU ($n = 22$) and NMPDU ($n = 14$) user groups. All pre-post reductions in perceived peer norms were significant at $p < .001$, except for opioid PDU, where the difference for the NMPDU group only approached significance ($p = .06$).

Perceived Versus Actual Usage Post-Intervention

Paired-sample t-tests were generated to compare true usage rates to perceptions of peer rates at post-intervention. Findings demonstrated that participants accurately estimated peer use of medically sanctioned opioids ($p = .20$) and overall opioid use ($p = .68$) post-intervention. However, they continued to significantly overestimate peer usage of all other forms/types of prescription drugs.

Pre-Post Behavioural Intention

On the 7-point scale for behavioural intentions, M 's (SD 's) were 3.00 (1.66) and 2.81 (1.69) for pre- and post-intervention, respectively indicating likely intentions to use prescription drugs at both pre- and post-intervention. The RM-ANOVA demonstrated that there was no significant change in behavioural intentions overall: $F(1, 35) = 1.42, p = .24$. Change in behavioural intention remained non-significant when grouped by PDU and NMPDU groups ($p = .22$ and $p = .87$, respectively).

Qualitative Focus Group

Four primary themes (each with 1-3 sub-themes) emerged that elucidated participants' reflections on the social norms approach generally and for PDU/NMPDU specifically (Figure

3.1). Interrater agreement using AC1 (Gwet, 2008) was .86 (95% CI [.72, .99]). Discrepancies were discussed to consensus by the two coders (J.I. and N.S.). The following sections outline the themes and corresponding sub-themes that emerged from our analysis.

1. Coming to Terms with Overestimation

Participants expressed a general sense of surprise with their pre-intervention overestimation of PDU/NMPDU rates as compared to true rates in their university peers.

a. General Underestimation. There was a common sense of surprise and disbelief regarding the true rates of PDU/NMPDU, with most participants initially believing that rates were much higher than noted. As one participant expressed: “I definitely thought all the categories would be above 10%, especially stimulants.” One primary reason cited for high perceived PDU/NMPDU was the belief that mental health problems are common among students, and thus the perception that PDU/NMPDU would be high to treat/self-medicate mental health concerns.

b. Comfort in Shared Misperception. While most participants overestimated peer usage rates, they found solidarity learning that other students held similar misperceptions. As one participant noted: “I was *way* off, but it’s refreshing to know I wasn’t the only one.”

2. Reflections on Social Networks

Participants noted how perceptions of usage may be influenced by social networks.

a. Peers Inflating the Norm. Some participants attributed that their perceptions were higher than true rates because PDU/NMPDU is more common among their own social networks of peers than among university students at their institution more generally. One participant stated: “I just expected the percentages to be higher because most people have a prescription for *something*. Or maybe we just think that because we hang out with the same type of people.”

b. Higher Accuracy with Lower Peer Use. Some other participants described having fewer friends who engage in PDU/NMPDU and noted that the reported actual rates were consistent with their original perceptions. As one participant highlighted: “None of my friends do any prescription drugs to my knowledge, and the rates were basically what I expected.”

c. Overestimating Despite Lower Peer Use. Some participants indicated being surprised by the reported low rates, despite having fewer personal connections who engage in PDU/NMPDU. One participant highlighted this perception by stating “I don’t have too many friends who use prescription drugs, but I just assumed the percentages would be a little higher.”

3. Stigma and Norms

Participants noted that, due to an often-stigmatized portrayal of prescription drugs in the media, students may be more likely to be hesitant about reporting on their substance use (resulting in a perceived underreporting of true PDU/NMPDU rates [Chinneck et al. 2018]).

a. Media Bias on the “Crisis”. Participants described only seeing negative representations of people taking prescription drugs in media/news and noted the dearth of attention given to as-prescribed use, highlighting that such portrayals can influence reporting on usage behaviours. When describing portrayal of the overdose crisis, one participant remarked: “The talk about opioids isn’t that people are using as prescribed, so it was surprising to see that the highest rate of as-prescribed use was for these [opioid] drugs.”

b. Fears About Disclosing. Participants noted hesitation regarding “owning up” about PDU/NMPDU, due to the perceived stigma that may accompany disclosure. As one participant highlighted: “I have skepticism – that the [actual] numbers could be under reported, like sexual assault. Perhaps users are less likely to own up to this due to stigma and such.”

4. Benefits of Social Norm Corrective Feedback

This category describes attitudes towards existing management for prescription drug-related concerns, and how social norm interventions may play a beneficial role in this context.

a. Searching for Alternative Approaches. Some participants described a desire to mitigate mental health concerns and noted that prescription drugs were a primary way to do so, even if they acknowledged taking the drugs in potentially harmful ways. They expressed that not enough was being done to address student mental health concerns and acknowledged how social norms interventions could help students put harmful use of prescription drugs in perspective. One participant emphasized the importance of non-pharmacological approaches, but then noted that “it’s really hard to find shit that works if it’s not pills.”

Discussion

This was the first study to test an in-person group-based social norm correction intervention for university students’ prescription drug use. It was also the first to include the target participant group in all primary aspects of the research process, and it made use of both quantitative and qualitative methods. As expected, students who engaged in prescription drug use significantly overestimated the percentage of peers who were engaging in prescription drug use at pre-intervention. Since all our participants had engaged in PDU/NMPDU themselves, it is perhaps not surprising that we found large actual—perceived use discrepancies. Research with other substances such as alcohol, tobacco, and cannabis has demonstrated that larger actual—perceived discrepancies are predictive of higher levels of personal use (Arbour-Nicitopoulos et al., 2010).

Our second hypothesis was also supported: providing corrective feedback to university students generally resulted in a significantly lowered estimates of peer PDU/NMPDU, where

students in our sample generally shifted their misperceptions of peer prescription drug use after being provided with corrective information. Prior social norm campaigns for alcohol have successfully reduced students' overestimations of peers' alcohol use (Perkins et al., 2010). However, other health-related social norm campaigns, such as those focusing on sexual health behaviours, have demonstrated less success in shifting misperceptions (Scholly et al., 2005), indicating that certain social norms perceptions may not be as easily molded with this approach. Our data suggest that a social norms approach for prescription drug use has promise for reducing social norm misperceptions akin to its effects for alcohol social norm misperceptions (Perkins et al., 2010).

While our intervention successfully reduced participants' perceptions of high rates of peer prescription drug use, it did not shift participants' behavioural intentions to use – a direct proxy of actual behaviour change (Webb & Sheeran, 2006). Supplementary analyses showed that this lack of change in behavioural intentions was true both of PDU and NMPDU groups. However, given the smaller samples in the PDU and NMPDU subgroups, these supplemental analyses could only detect medium-sized effects and were thus potentially underpowered to detect intervention-induced changes of smaller magnitude in either subgroup. While the supplementary analyses provide preliminary support that our failure to observe change in behavioural intentions was not simply due to our inclusion of participants with a prescription for treating a medical condition, future research should utilize larger samples to better investigate any potential differences in social norm intervention impacts on behavioural intentions among those engaging in NMPDU vs. medically sanctioned PDU.

There are several possible reasons for our failure to achieve change in behavioural intentions with our intervention. Social norm campaigns for substance use have been found to be

more effective when students obtain more frequent exposure to the messaging (Farrelly et al., 2005). Thus, it is possible that our single session intervention did not change intentions to use as relevant norms information was only delivered once. Alternatively, the fact that significant overestimations still existed at post-intervention on most measures of perceived peer use (albeit reduced in magnitude relative to pre-intervention) may indicate that sufficient change in social norms perceptions had not taken place to support changes in participants' behavioural intentions to use.

Potentially, group social norm interventions by themselves are not convincing enough to change behavioural intentions (Clapp et al., 2003) due to the broad, non-personalized nature of the feedback. However, the one existing social norm intervention for NMPDU (Arabyat et al., 2019) was a PNF intervention which included aspects of a social marketing campaign (i.e., sharing information didactically), which did not find a significant change in behavioural intentions either. Finally, prescription drugs have been found to provide clinical benefits for issues such as acute pain management (Terrie, 2011), ADHD (Kroutil et al., 2006), and anxiety disorders (Votaw et al., 2019), and thus potentially participants did not intend to change their prescription drug use behaviours because they were receiving clinical value from ongoing use of their prescription drugs.

Our qualitative focus group findings shed further light on why overestimation of peer prescription drug use continued (albeit at a reduced level) and why behavioural intentions to use persisted despite the corrective information provided. Students noted reactions of surprise or even disbelief regarding the discrepancy between their social norms perceptions and the actual rates of peer use. Recent qualitative findings on social normative feedback for alcohol, smoking, and cannabis use indicated similar feelings of surprise regarding the perceived—actual use

discrepancy (Stock et al., 2020)⁸. This lack of full buy-in to the message likely contributed to residual overestimation bias, and to the failure to exert effects on behavioural intentions for continued prescription drug use.

Lack of change to behavioural intention and lack of full elimination of the overestimation bias may also be explained by the impact of students' immediate social network members. In the focus group, participants indicated that high perceived usage is likely if members of one's immediate social network engage in use. Research has supported this contention, showing that friends' NMPDU predicts one's own use (Meisel & Goodie, 2015). However, some participants indicated overestimating peer usage rates in the absence of close friends who use prescription drugs, suggesting other influences on overestimation besides the use of immediate social network members.

Our finding of reductions in social norm overestimations yet no change in behavioural intentions is consistent with prior work underlining a gap between knowledge acquisition and behaviour change for health behaviours (Nagy-Pénczes et al., 2020). The knowledge—behaviour gap highlights the role that other intrinsic and contextual factors may play in continued use of prescription drugs. First, change is unlikely if individuals perceive relatively few benefits/reinforcers inherent in the behaviour change (Rimal et al., 2005). In our case, participants may not have seen benefits to engaging in less PDU/NMPDU, particularly given its perceived utility in treating/self-medicating mental health concerns, as evidenced in the focus group feedback and in prior research (e.g., Kroutil et al., 2006; Votaw et al., 2019). Moreover, participants identified media as an important source of information that likely contributes to an

⁸ Despite Stock et al. (2020) generating noticeably similar themes to our own as they pertain to surprise and shock, these findings were published after our summit was hosted and data analyzed and, as such, they did not affect the qualitative interpretation of our data.

overestimation bias. This suggests that interventions utilizing media coverage (e.g., desirable peer models refusing NMPDU) may be needed to eliminate misperceptions of peer norms and to change behavioural intentions to use.

The source of information may be another central consideration. While our study involved the dissemination of information from a fellow student, the information was still delivered from a student who may have been perceived as an expert (i.e., a graduate student). Research has highlighted benefits stemming from peer-led versus professional-led behaviour-change interventions (MacArthur et al., 2016), suggesting that *arguments from authority* (Walton, 2010) maybe not be as influential for students in the domain of prescription drugs. Future research might increase the role of same-status peers as agents of change in social norms interventions.

Perhaps a lack of buy-in stemmed from students' distrust in the actual use statistics presented. In the focus groups, participants commented that "true" rates of PDU/NMPDU (Chinneck et al., 2018) may have been underreported due to stigma or fears about disclosing actual use. Indeed, it has been found that underreporting may be an issue in establishing accurate prescription drug use estimates, especially in the case of NMPDU (Palamar, 2018). Additional research is required to determine the degree to which underreporting may be impacting the accuracy of the corrective information used within social norm interventions. We recommend that in future, "actual" rates data for use in social norm interventions are collected using state-of-the-art methods for ensuring representativeness of the sample and for maximizing self-report accuracy such as increasing attention to anonymity (Stuart et al., 2019) and measurement of and correction for social desirability.

A lack of change may have also resulted from the “False Consensus Effect” (Ross et al., 1977). This is a phenomenon in which students believe their own behaviours are typical of others, when in fact these beliefs about this similarity of others is an overestimation. Perhaps students were distrustful of the actual norms presented, believing that more students were, like themselves, engaging in PDU/NMPDU. Finally, our study did not overtly investigate participants’ perceptions about the use of validated psychosocial treatments in lieu of engaging in PDU/NMPDU for managing mental health or physical health difficulties. For example, our study did not investigate relative attitudes towards and perceptions of cognitive-behavioural treatments for chronic pain (Knoerl et al., 2015), attention-deficit hyperactivity disorder (ADHD; Young et al., 2016), or anxiety/sleep issues (Olatunji et al., 2010; Trauer et al., 2015) in comparison to attitudes toward and perceptions of prescription use of opioids, stimulants, or S&Ts, to manage these conditions, respectively. Therefore, lack of change in behavioural intentions to use prescription drugs may have stemmed from lack of knowledge of, low motivation for, or negative experiences with non-pharmacological alternatives for symptom management. Our qualitative findings supported this potential explanation for lack of change in behavioural intentions, as some participants highlighted hopelessness and negative experiences surrounding non-pharmacological forms of symptom management.

Despite the intervention not shifting behavioural intentions to use, participants indicated in the focus group that social norms feedback has the potential to provide helpful information to students engaging in potentially harmful prescription use. Future research should determine if change in behavioural intention to use emerges from social norm interventions once student buy-in is enhanced and the overestimation bias is fully eliminated.

Several potential limitations of our study should be acknowledged. First, the intervention only inquired about descriptive norms (perceptions of what others are doing) and not injunctive norms (perceptions of peer approval/disapproval of behaviours; Cialdini et al., 1991); injunctive norms have also been noted to influence behaviour as part of social norms theory (Perkins & Berkowitz, 1986). However, studies investigating both descriptive and injunctive norms for other substances have typically found descriptive norms to be a better predictor of behaviour (Lac & Donaldson, 2018). Second, as highlighted previously, our sample was not treatment-seeking. Perhaps participants were not galvanized to change their own usage because they had little desire to change combined with various motivations to continue (e.g., the value derived from using prescription drugs for the medically sanctioned treatment or self-medication of mental health/physical health concerns (Stewart et al., 2021)). A related limitation pertains to the inclusion of all participant voices in a combined qualitative group, thus limiting our ability to evaluate whether qualitative results may have differed between PDU and NMPDU subsamples. Future research could conduct focus groups separately with PDU vs. NMPDU students to determine whether distinct themes emerge. A further limitation pertains to the inability to investigate whether changing social norms around specific reference groups may have differently impacted intention to use. We selected general university peers as a referent. Prior research (McAlaney et al., 2011) has found that misperceptions about friends may be relatively small and thus unsuitable for social norms interventions, while misperceptions of general peers may be greater, though the influence of this group on individuals' behaviour is often weaker. Thus, our choice of reference group may have contributed to the non-significant changes in behavioural intentions. Furthermore, our study lacked a randomized control group, and thus the observed

changes in perceived use by peers cannot necessarily be attributed to the social norms intervention (e.g., the changes might have been secondary to repeated assessment).

In summary, our study demonstrated that corrective information about prescription drug use rates in university peers was associated with reduction in student users' overestimations of peer use but was not associated with changes in their intentions to use. Qualitative results highlighted improvements from student users' perspectives that may help increase the likelihood of such an intervention having impact on students' prescription drug behaviour in future. Enhancing student buy-in and building rapport may be essential first steps to implementing effective social norms interventions for undergraduates' harmful PDU/NMPDU.

Conflicts of Interest

None of the authors have any financial or non-financial conflicts of interest to declare.

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Tables and Figures from Study 3

Table 3.1

Demographics for participants in Study 3, separated by type of usage (PDU or NMPDU) (N=36).

	<i>n</i> (% of column) or <i>M</i> (<i>SD</i>)		
	PDU subsample (<i>n</i> =22)	NMPDU subsample (<i>n</i> =14)	Total sample (<i>N</i> =36)
Age	20.36 (2.36)	19.86 (1.96)	20.17 (2.20)
Gender			
Female	15 (41.67%)	8 (22.22%)	23 (63.89%)
Male	7 (19.44%)	5 (13.89%)	12 (33.33%)
Other	0	1 (2.78%)	1 (2.78%)
PDU vs. NMPDU Among Participants Endorsing Use			
Opioids	10 (27.78%)	4 (11.11%)	14 (38.89%)
Stimulants	12 (33.33%)	12 (33.33%)	24 (66.67%)
S&T	10 (27.78%)	4 (11.11%)	14 (38.89%)
Primary Prescription Group			
Opioids	7 (19.44%)	1 (2.78%)	8 (22.22%)
Stimulants	8 (22.22%)	8 (22.22%)	16 (44.44%)
S&Ts	7 (19.44%)	5 (13.89%)	12 (33.33%)
Opioid Use Frequency			
Never	13 (36.11%)	8 (22.22%)	21 (58.33%)
Monthly or Less	6 (16.67%)	4 (11.11%)	10 (27.78%)
2-4 Times Per Month	2 (5.56%)	0	2 (5.56%)
2-3 Times Per Week	0	1 (2.78%)	1 (2.78%)
4 or More Times Per Week	1 (2.78%)	0	1 (2.78%)
Missing	0	1 (2.78%)	1 (2.78%)
Stimulant Use Frequency			
Never	11	0	11 (30.56%)
Monthly or Less	2 (5.56%)	2 (5.56%)	4 (11.11%)
2-4 Times Per Month	1 (2.78%)	5 (13.89%)	6 (16.67%)
2-3 Times Per Week	1 (2.78%)	1 (2.78%)	2 (5.56%)
4 or More Times Per Week	7 (19.44%)	5 (13.89%)	12 (33.33%)
Missing	0	1 (2.78%)	1 (2.78%)
S&T Use Frequency			
Never	13 (36.11%)	8 (22.22%)	21 (58.33%)
Monthly or Less	3 (8.33%)	1 (2.78%)	4 (11.11%)

2-4 Times Per Month	2 (5.56%)	1 (2.78%)	3 (8.33%)
2-3 Times Per Week	1 (2.78%)	1 (2.78%)	2 (5.56%)
4 or More Times Per Week	3 (8.33%)	2 (5.56%)	5 (13.89%)
Missing	0	1 (2.78%)	1 (2.78%)
Alcohol Use Frequency			
Never	0	2 (5.56%)	2 (5.56%)
Monthly or Less	2 (5.56%)	3 (8.33%)	5 (13.89%)
2-4 Times Per Month	15 (41.67%)	5 (13.89%)	20 (55.56%)
2-3 Times Per Week	5 (13.89%)	4 (11.11%)	9 (25.00%)
4 or More Times Per Week	0	0	0
Tobacco Use Frequency			
Never	18 (50.00%)	8 (22.22%)	26 (72.21%)
Monthly or Less	1 (2.78%)	0	1 (2.78%)
2-4 Times Per Month	1 (2.78%)	1 (2.78%)	2 (5.56%)
2-3 Times Per Week	0	1 (2.78%)	1 (2.78%)
4 or More Times Per Week	2 (5.56%)	4 (11.11%)	6 (16.67%)
Cannabis Use Frequency			
Never	10 (27.78%)	3 (8.33%)	13 (36.11%)
Monthly or Less	6 (16.67%)	5 (13.89%)	11 (30.56%)
2-4 Times Per Month	3 (8.33%)	3 (8.33%)	6 (16.67%)
2-3 Times Per Week	2 (5.56%)	0	2 (5.56%)
4 or More Times Per Week	1 (2.78%)	3 (8.33%)	4 (11.11%)
International Student			
Yes	3 (8.33%)	4 (11.11%)	7 (19.44%)
No	19 (52.78%)	10 (27.78%)	29 (80.56%)
Program of Study			
Science	13	6 (16.67%)	19 (52.78%)
Arts & Social Sciences	4 (11.11%)	6 (16.67%)	10 (27.78%)
Management	2 (5.56%)	1 (2.78%)	3 (8.33%)
Other	3 (8.33%)	1 (2.78%)	4 (11.11%)

Note. Table percentages have been calculated as a percentage of 36 total participants.

Table 3.2

Descriptive differences between actual PDU/NMPDU and pre/post perceived PDU/NMPDU over the past-school term.

	Actual Use (%)	Pre-Session Perceived Use (M% (SD%))	Post-Session Perceived Use (M% (SD%))
Opioids			
Any Use	9.9	34.3 (23.9)	11.0 (4.9)
As Prescribed	7.1	21.1 (18.3)	7.5 (5.3)
Not As Prescribed	2.8	35.2 (28.7)	6.2 (4.9)
Stimulants			
Any Use	6.8	53.3 (22.7)	12.7 (9.8)
As Prescribed	1.4	28.9 (17.6)	5.3 (5.1)
Not As Prescribed	5.4	50.6 (24.8)	9.6 (7.7)
S&Ts			
Any Use	4.4	34.8 (24.3)	8.3 (6.9)
As Prescribed	2.5	23.3 (18.8)	4.2 (2.8)
Not As Prescribed	1.9	31.5 (22.4)	5.8 (5.4)

Note. Actual rates were obtained from a sample of N=1755 students at the same Atlantic Canadian university where the current study took place (see Chinneck et al., 2018).

Table 3.3

One-sample t-test results for actual PDU/NMPDU compared to pre/post perceived PDU/NMPDU over the past-school term.

Prescription and Type of Use	<i>df</i>	<i>t</i>	<i>p</i>	Mean Difference	Lower CI (95%)	Upper CI (95%)
True Rate Compared to Pre						
Opioids						
Any Use	35	6.13	.000	24.43%	16.34%	32.53%
As Prescribed	35	4.57	.000	13.97%	7.77%	20.17%
Not As Prescribed	35	6.77	.000	32.38%	22.67%	42.09%
Stimulants						
Any Use	35	12.31	.000	46.53%	38.86%	54.21%
As Prescribed	35	9.40	.000	27.52%	21.57%	33.46%
Not As Prescribed	35	10.95	.000	45.21%	36.83%	53.59%
S&Ts						
Any Use	35	7.51	.000	30.38%	22.16%	38.59%
As Prescribed	35	6.65	.000	20.81%	14.45%	27.16%
Not As Prescribed	35	7.92	.000	29.60%	22.01%	37.19%
True Rate Compared to Post						
Opioids						
Any Use	35	1.32	.195	1.07%	-0.58%	2.72%
As Prescribed	35	0.42	.677	0.37%	-1.43%	2.17%
Not As Prescribed	35	4.18	.000	3.39%	1.75%	5.04%
Stimulants						
Any Use	35	3.63	.001	5.91%	2.60%	9.22%
As Prescribed	35	4.57	.000	3.91%	2.17%	5.64%

Not As Prescribed	35	3.26	.003	4.20%	1.58%	6.82%
S&Ts						
Any Use	35	3.36	.002	3.85%	1.52%	6.18%
As Prescribed	35	3.69	.001	1.72%	0.77%	2.67%
Not As Prescribed	35	4.29	.000	3.88%	2.04%	5.71%

Note. Positive t-values and positive mean differences indicate an overestimation bias (i.e., perceived minus actual use). Negative t-values and negative mean differences represent underestimation.

Table 3.4

Repeated-measures ANOVA results for pre-to-post intervention changes in perceived prescription drug use of peers, for three types of use across three prescription drug classes (opioids, stimulants, and S&T).

Prescription and Type of Use	<i>Pre</i> <i>M (SD)</i>	<i>Post</i> <i>M (SD)</i>	<i>df</i>	<i>F</i>	<i>P</i>	η_p^2
Opioids						
Any Type of Use	34.33 (23.93)	10.97 (4.87)	1, 35	35.68	.000***	.51
As Prescribed	21.07 (18.33)	7.47 (5.31)	1, 35	18.00	.000***	.34
Not as Prescribed	35.18 (28.71)	6.19 (4.87)	1, 35	38.13	.000***	.52
Stimulants						
Any Type of Use	53.33 (22.68)	12.71 (9.78)	1, 35	99.08	.000***	.74
As Prescribed	28.92 (17.57)	5.31 (5.12)	1, 35	63.46	.000***	.65
Not as Prescribed	50.61 (24.77)	9.60 (7.74)	1, 35	91.81	.000***	.72
S&T						
Any Type of Use	34.78 (24.28)	8.25 (6.88)	1, 35	42.77	.000***	.55
As Prescribed	23.31 (18.77)	4.22 (2.80)	1, 35	37.26	.000***	.52
Not as Prescribed	31.50 (22.43)	5.78 (5.43)	1, 35	46.42	.000***	.57

Note. *** $p < 0.001$.

Note. Table includes pre-intervention mean (standard deviation in brackets), post-intervention mean (standard deviation in brackets), degrees of freedom, F value, significance value, and effect size (partial eta squared). Partial eta squared (η_p^2) ranges from 0 to 1, with values closer to 1 representing a higher proportion of variance being explained by group membership (large effect = 0.14).

Figure 3.1

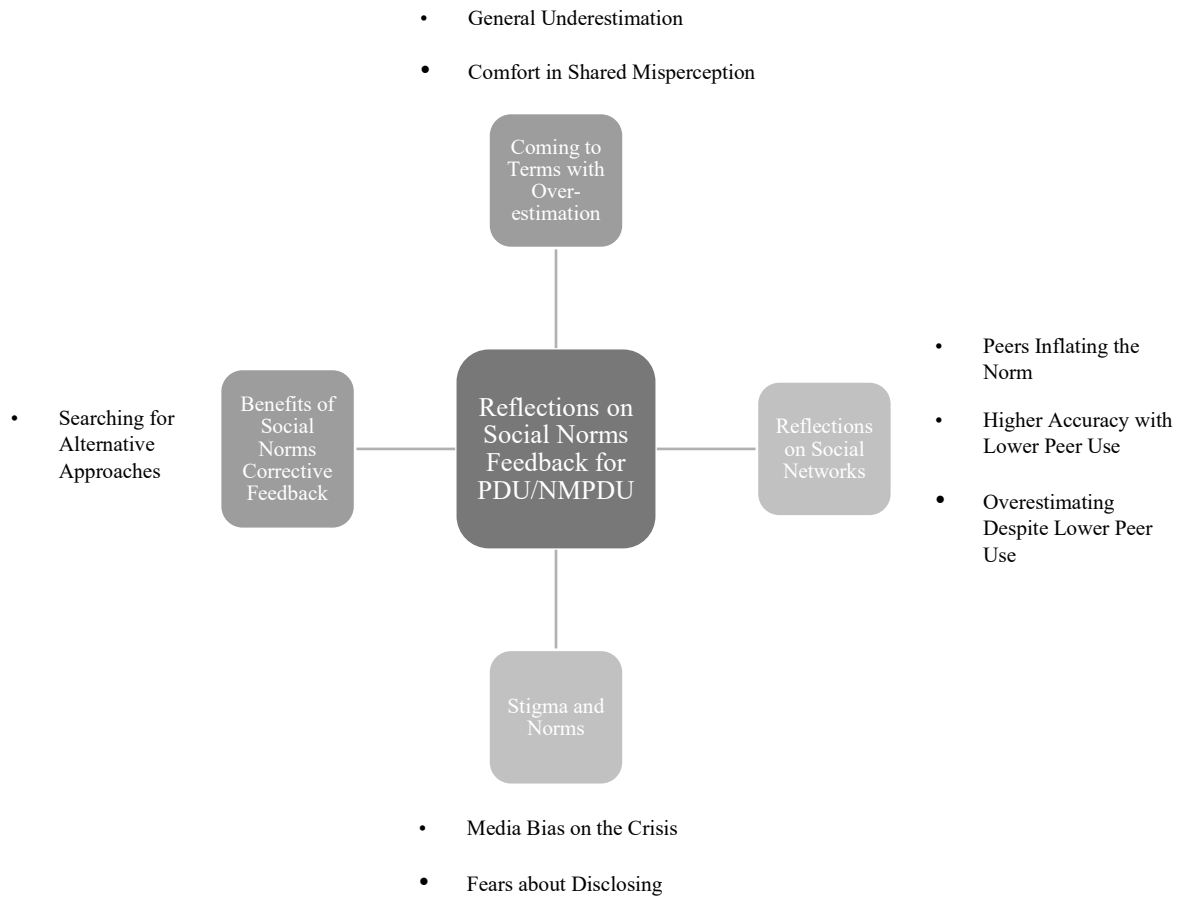


Figure 3.1. The four content analysis categories and corresponding subcategories.

Notes. The principal focus of the group discussion, “Reflections on Social Norms Feedback for PDU/NMPDU” is observable at the centre of the figure.

CHAPTER 7. GENERAL DISCUSSION

The current dissertation sought to better understand social norms pertaining to PDU and NMPDU and their impact on PDU/NMPDU behaviour among EAs in post-secondary settings. A mixed-method approach was employed to investigate the social norms of post-secondary students, guided by social norms theory (Perkins & Berkowitz, 1986) and its application to students' perceptions and behaviours in the context of PDU/NMPDU. Through a series of three studies, this dissertation used both quantitative and qualitative methods to explore students' perceptions of PDU/NMPDU in their peers. In the following chapter, a summary and integration of the three dissertation studies will be presented in relation to the originally stated goals for the dissertation. Study findings are also integrated in the context of the relevant theories and supporting literature presented throughout the dissertation. Following the summary and integration of findings, subsequent sections will involve a discussion pertaining to their implications (both theoretical and clinical), in addition to acknowledgements of the strengths and limitations of the dissertation studies, and suggested directions for future research that emerge from the dissertation findings.

Summary and Integration of Findings

Summary: Study 1

Study 1, entitled "*College students' prescription drug misuse social norms: What's sex got to do with it?*", investigated the influence of sex on NMPDU social norms for post-secondary students. As part of this large investigation with almost 2000 students, I predicted that (a) male participants would demonstrate higher rates of NMPDU than female participants, (b) participants would perceive a higher frequency of peer NMPDU for same-sex peers than opposite-sex peers, and (c) participants' personal past-month use of NMPDU would be predicted by the perceived

frequency of NMPDU among their peers, particularly when peers and participants were sex-matched. The study utilized LMM and correlational analyses, and the original hypotheses were partially supported. Contrary to the first hypothesis, no sex difference emerged for participant NMPDU rates. While this result was initially surprising, as male college students have traditionally reported higher rates of both substance use and misuse than female students (e.g., McCabe et al., 2007), sex differences in NMPDU have been found to be less consistent (McCabe, 2008), suggesting that factors such as the specific types of PD may highlight more nuanced sex differences in rates of use. For example, when common demographic variables are controlled for, females appear to demonstrate lower opioid and stimulant NMPDU (Kelly et al., 2013). Thus, while the hypothesis was initially predicated on prior research indicating a higher rate of substance misuse among male students compared to female students more generally, the dissertation findings were not markedly discrepant from prior NMPDU studies which have demonstrated a less consistent and more nuanced sex differences in NMPDU rates.

The second hypothesis was not supported, wherein participants did not endorse a higher perceived frequency of peer NMPDU for same-sex than opposite-sex peers. Instead, female participants actually reported a significantly higher perceived frequency of NMPDU among their male peers. This finding was initially more challenging to interpret, since prior research has shown that misperceptions of other forms of substance use behaviours are most common for same-sex peers (e.g., Lewis & Neighbors, 2004). However, some research has drawn this finding into question, noting that alcohol-related misperceptions are consistently larger when students are thinking about their male peers as opposed to their female peers (e.g., Lewis et al., 2009), a finding that is consistent with the results in the dissertation study. Thus, perhaps similar male-inflated perceptions were observed in the dissertation study. Given that substance misuse is most

commonly reported to be higher among males as compared to females (e.g., Chen & Jacobson, 2012), another explanation for the inflated male perception is perhaps that participants had internalized and generalized higher perceptions of male NMPDU from knowledge about higher misuse rates for other substances among males compared to females. The dissertation study's additional finding that females, in particular, reported a significantly higher frequency for males has also been somewhat supported in prior research, wherein female students have been shown to report higher norm perceptions of substance use among their peers, including NMPDU, than male students report (e.g., McCabe, 2008).

The final hypothesis was partially supported, as the perceived frequency of NMPDU among peers predicted participants' own NMPDU. This finding offered a successful replication and extension of prior research which has demonstrated a significant relationship between peer perceptions and personal use for both NMPDU (e.g., Arbour-Nicitopoulos et al., 2010) and substance use/misuse more generally (e.g., Lewis & Neighbors, 2006a).

As part of the final hypothesis, correlational analyses were used to investigate sex-matching in the perceived use/own use relationship, as I had predicted that the abovementioned link (i.e., peer perception – own behaviour) to be strongest for same-sex matchings. In other words, I investigated whether perceptions of peers have a larger influence on one's own behaviour when the peer is the same sex as the perceiver. Despite prior research highlighting a sex-matching for other substances (e.g., Lewis & Neighbors, 2004), a sex-matching effect in the current study was not found. Multiple explanations were proposed for this finding in the discussion section of Study 1, such as contexts or motives of NMPDU that are perhaps less sex-specific than use of other substances, as well as a gradual shrinking of sex differences in

substance use overall (e.g., Hemsing & Greaves, 2020), which may perhaps overshadow prior research that has found previous support for sex-matching.

The study concluded by highlighting that while female participants perceive NMPDU to be more frequent among their male peers, male participants do not seem to hold significantly different perceptions of NMPDU based on their peers' sex. It similarly concluded that, even in the absence of sex-matching effects for NMPDU perception – own behaviour associations, perceptions of peer NMPDU still appear to be closely related to one's own use. Given these findings, the study suggested that social norms interventions could be a useful approach to correcting misperceptions and in turn reducing students' own NMPDU behaviours, though it initially appears that social norms interventions would likely not benefit from sex-matching during the intervention. However, the more nuanced finding of females' higher perceptions among their male peers compared to their female peers suggests that, given adequate resources to facilitate the creation/delivery of more tailored information to different groups of students during social norms interventions, it may be beneficial to focus on providing true male rates of use for female participants, as this is where the largest discrepancy was found to exist.

Summary: Study 2

Study 2, entitled “*Social norms for prescription drug use among emerging adults: A qualitative analysis*”, qualitatively explored social norms-related perceptions, perspectives, and behaviours pertaining to social norms in the context of both PDU and NMPDU. The study included six focus groups which were held at Dalhousie University during a summit on prescription drugs in university. With regard to the scope of the six groups, a separate focus group was held for each of three primary types of PDs: opioids, stimulants, and S&Ts. The groups were further subdivided by whether participants endorsed either (a) only PDU or (b) any

form of NMPDU. This resulted in a total of six individual focus groups. The data for 39 total students across the six groups was analyzed with an inductive thematic analysis. The primary study goal was to provide a richer understanding of social norms as they pertain to PDU and NMPDU in university students, while incorporating a student voice. Questions for the focus groups were developed in consultation with an advisory committee that included students and clinicians, in line with PAR and PWLLE approaches to data collection (e.g., Gillies & Dupuis, 2013; Henderson et al., 2014).

Participants' recorded remarks from the focus groups were coded, and coding resulted in three final themes, each with three subthemes. Each theme independently highlighted a unique aspect of participants' norms-related perceptions, beliefs, and behaviours pertaining to PDU and NMPDU. It is interesting to note that independent themes did not appear to saturate within each type of PD (opioids, stimulants, and S&Ts) or within each type of primary PD use (PDU and NMPDU), but instead only saturated across groups when all the focus groups were collapsed for a combined analysis. This may have been due to only being adequately powered to examine saturation of themes among the full sample, but not among each individual focus group. However, it is noteworthy that subthemes within each primary theme often managed to highlight more nuanced differences in norms between the different types of PDs, as documented in Study 2 and as will be discussed further in subsequent sections of this chapter.

The first theme, "*PDU and NMPDU are high*" highlighted participants' perceptions of the high rates of each of the following (i.e., the three subthemes): peer use among students, diversion (i.e., sharing/selling) between students, and co-/poly-substance use in both individual and group settings. Participants perceptions regarding PDU and NMPDU being commonplace among their peers is concerning because quantitative research indicates that such heightened

perceptions can drive own use (e.g., Lehne et al., 2018). Participants also most commonly spoke about high rates of perceived diversion with *stimulants*, and the commonplace nature of stimulant diversion has indeed been demonstrated quantitatively (e.g., Gallucci et al., 2015b). Finally, while co-/poly-substance use has been found to be common among students (e.g., McCabe et al., 2006; O’Grady et al., 2008), Study 2 elucidated student perceptions about the commonplace nature of co-/poly-substance use with PDs, more specifically. Overall, ‘theme 1’ provided a richer understanding of participants’ perceptions of usage rates, generally indicating that students who use PDs view PD use as commonplace among peers, and highlighting that the participants perceived PDU/NMPDU to be noticeably more prevalent than true estimates would suggest (as demonstrated by the usage of terms such as “most students” to describe perceived PDU/NMPDU rates).

The second theme, “*Contexts of PDU and NMPDU*” highlighted two main perceived contexts where participants thought PDU/NMPDU was common among students: achievement-related and social contexts. Within this theme, some differences emerged between different types of PDs. For example, stimulant use was perceived to be more commonly used in academic settings as a means to facilitate achievement, and opioids were perceived to be more likely taken when alone (versus in social situations). While previous research has highlighted certain motivations for taking PDs in academic contexts (e.g., Benson et al., 2015) or when alone (e.g., Brandt, et al., 2014), ‘theme 2’ in the study was ultimately able to provide a deeper understanding of the nuanced perceptions associated with such motivations (such as the perception that peers would take PDs for academic reasons when their self-confidence is low).

The final theme, “*Individual differences impacting PDU and NMPDU*”, provided insights on individual-level factors that were perceived by participants to impact student use. The primary

individual factors perceived to impact use included: gender and sexual orientation, culture, and academic-specific factors (i.e., one's program or year of study within their program). While the focus group guide included prompts to generate discussion about some relevant factors that have been associated with social norms perceptions in the past (e.g., gender), several factors also emerged organically (e.g., sexual orientation and social networks). Highlighting their own experiences and the experiences of their peers, participants more commonly perceived use to be higher within the LGBTQ+ community, while suggesting that various cultural and academic factors could either increase or decrease use. For example, acculturative stress and low-self confidence in one's own abilities/competencies were both perceived to be independent risk factors for increased peer use, whereas lower stress and higher self-confidence were perceived to be protective factors for decreased use. In the context of cross-PD gender and sexual orientation subthemes that emerged, it was interesting to note that more specific perceived gender differences could also be identified for each type of PD (e.g., female-identifying students were perceived to be more likely to seek out or use S&Ts, while male-identifying students were perceived to be more likely to be prescribed or use stimulants).

Taken together, Study 2 incorporated PAR and the perspectives of PWLLE to create a more comprehensive and nuanced understanding of the inflated perceptions of peer PDU/NMPDU that have been reported in quantitative research (e.g., Sanders et al., 2014). Furthermore, the study highlighted individual and contextual factors that students perceive as being involved in the relationship between social norms and personal use, for multiple types of PDs across both PDU and NMPDU (for example, across and forms and types of PDs, social networks were perceived to play an important role in use). I concluded by noting that social norms interventions can be a helpful approach to correct students' inflated perceptions and to

curb their own behaviours, especially given the high rates of perceived peer use that emerged in all focus groups. I identified multiple contextual and individual difference factors perceived to influence peer use (across all types of PD use). Given the sizeable number of common themes across the three substance types and the two forms of use, I suggested that broad group social norms interventions would likely not need to separate out students by different types of forms of usage. Such an approach may be increasingly resource intensive and may limit intervention access. Instead, in order for students to benefit, perhaps a simple history of PD use would be sufficient to see program efficacy for broad interventions. However, interventions with sufficient samples and resources may benefit from a more targeted approach separated by type of PD (as perceptions were found to most commonly diverge for PD type, but not PD form).

Summary: Study 3

Study 3, entitled “*The impact of normative feedback on undergraduates’ prescription drug use knowledge and behaviour: A mixed methods study*” utilized a mixed method approach to investigate a group-based social norms intervention for students who had engaged in recent (or current) use of PDs (either PDU or NMPDU). Thirty-six undergraduate students participated in a ‘youth summit’ during which they received information about PD social norms. They provided their own estimates of different types of PD use (i.e., any use, PDU, or NMPDU for opioids, stimulants, and S&Ts) among peers pre- and post-intervention. They also provided information on their behavioural intentions to change their PDU/NMPDU both pre- and post-intervention. Similar to Study 2, the structure of the summit was developed in consultation with an advisory committee that included students and clinicians, in line with PAR and PWLLE approaches (e.g., Salazar et al., 2021).

T-tests and RM-ANOVA were used to analyze pre-post participant changes to perceptions and behavioural intentions. Results highlighted that the participants significantly overestimated every type and form of their peers' PDU/NMPDU at pre-intervention relative to actual rates. While participants' perceptions significantly decreased from pre- to post-intervention, it is interesting that participants still continued to significantly overestimate peer use compared to true rates even immediately after the intervention.

From pre- to post-intervention, there was no significant difference in participants' intentions to change PDU/NMPDU behaviours. Even when participants were separated by PDU and NMPDU categories, significant differences did not emerge, though Study 3 specifically highlights how larger-scale studies may need to be conducted to detect smaller effect sizes. For other behaviours, a gap between knowledge acquisition and behaviour change has been demonstrated (Nagy-Pénczes, 2020), and Study 3 highlights that the knowledge-behaviour gap appears to similarly exist with PDU/NMPDU social norms. Specifically, although the participants acquired more accurate social norm perceptions regarding peer PDU/NMPDU, this knowledge did not lead to changes in behavioural intentions to use.

Following the norms intervention, I conducted a qualitative investigation, during which participants shared their experiences and reflections on the PD social norm information they had received, as well as on social norm interventions more generally. Reflections were coded with a content analysis, and four primary categories emerged: (1) *coming to terms with overestimation*, (2) *reflections on social networks*, (3) *stigma and norms*, and (4) *benefits of a social norms approach*. Taken together, participants' reflections highlighted a sense of surprise and disbelief with the true PDU/NMPDU rates shared with them. They highlighted how different social connections may influence students' perceptions and personal behaviours in unique ways, they

indicated that under-reporting of PDU/NMPDU may be common due to stigma and fears surrounding disclosure, and they generally noted that social norms interventions may be helpful as a way to put more harmful PD use into perspective, especially among students who use PDs as a method of self-medicating for mental health issues. However, participants also raised perceived limitations to the social norms approach, such as noting that PDU/NMPDU behaviours may continue after norms interventions due to PDs potentially being perceived to be a convenient way to mitigate subjective medical or mental health symptoms and this over-riding any effects of changes in social norm perceptions.

It was concluded that social norms interventions may be helpful to correct PDU/NMPDU misperceptions, though it was also highlighted that qualitative feedback provided an additional understanding regarding how to better tailor social norms interventions in future to promote behaviour change. Given that students' surprise and lack of believability regarding actual PDU/NMPDU rates kept re-emerging as a topic of discussion throughout the feedback session, it was ultimately concluded that enhancing student 'buy-in' (i.e., belief in the true rates) and building rapport with participants prior to imparting corrective norms information may be helpful first steps to implementing effective social norms interventions for risky or harmful use among students.

Integration

Taken together, all three dissertation studies demonstrated the common nature of PDU/NMPDU misperceptions (i.e., overestimations) among students compared to actual rates of peer use. These studies represent an important extension to decades of prior research which have shown that EAs (and students, specifically) tend to overestimate substance use and other high risk behaviours among their peers (Perkins, 2014). Additionally, each of the three studies

uniquely highlighted pertinent factors that require consideration in the appraisal and management of social norms among post-secondary students (e.g., motivation for use, social networks, and overall ‘buy-in’). Each of these factors have been discussed in further detail in the Clinical Implications section.

Relevant Theories Pertaining to Social Norms and Their Effects on Behaviour

All three dissertation studies were guided by Perkins and Berkowitz’ social norms theory (1986), which has shown a relationship between perceptions of others’ substance use and one’s own personal use. In particular, social norms theory has purported that one’s perceptions of others’ behaviour drive one’s own behaviour in a similar direction (Berkowitz, 2005).

Given that the data included in the three dissertation studies was not longitudinal, a causal relationship between PD use perceptions and personal PD behaviours cannot be determined. However, Study 1 showed support for assumptions inherent in social norms theory, and Study 2 similarly uncovered meaningful participant perceptions that appeared to align with social norms theory. Particularly, both studies highlighted noticeably high perceived rates of use (and Study 1 quantitatively demonstrated overestimations). However, some assumptions of the theory were challenged in Study 3, as behavioural intentions were not impacted when social norms perceptions were curbed.

Social norms theory purports that personal behaviour is changed as the perception-personal behaviour discrepancy of substance use changes, but it also notes the importance of attitudes in behaviour change (Perkins & Berkowitz, 1986). Our participants endorsed several positive or neutral attitudes towards both their own and their peers’ PD use during the feedback session, which perhaps impeded the perception-personal behaviour association implicated in social norms theory.

Taken together, these findings have some additional theoretical links that warrant discussion. In the following sections, consistency and inconsistency of relevant theories with the dissertation findings will be discussed.

Consistency with Findings

Each of the three dissertation studies independently (and together) highlighted how students tend to overestimate PDU/NMPDU compared to actual use rates. This finding appeared to be consistent with tenets inherent in both Pluralistic Ignorance (Miller & McFarland, 1987) and the False Consensus Effect (Ross et al., 1977). Namely, students articulated moral qualms and mixed opinions surrounding PDU/NMPDU in Study 2 and 3, and these perceptions appeared alongside continued personal PDU/NMPDU (often because participants believed it was common/normative), which appears to be consistent with Pluralistic Ignorance. Similarly, the overarching tendency for students to view their own behaviours as relatively common across all three studies are consistent with the False Consensus Effect.

The dissertation studies also suggest that overestimations of PDU/NMPDU may be related to greater personal use, though the causal relationship could not be confirmed. Notwithstanding, this finding appears to be consistent with tenets of Social Comparison Theory (Festinger, 1954), Social Identity Theory (Tajfel & Turner, 1979), and Social Impact Theory (Latané, 1981). Each theory highlights individuals' tendency to compare themselves to others and to have their opinions/behaviours guided by their perceptions of themselves in relation to others.

Dissertation findings (namely Study 3) also suggested that changing students' perceptions about peer PDU/NMPDU may not be sufficient to change personal PDU/NMPDU. While inconsistent with social norms theory (Perkins & Berkowitz, 1986), this finding may actually be

consistent with Social Identity Theory (Tajfel & Turner, 1979) and Social Impact Theory (Latané, 1981). In particular, in Study 3, participants expressed doubts about the PDU/NMPDU rates of typical university students, noting that rates seem to be higher in their networks (during qualitative feedback). Given that participants did not indicate any significant intention to change their PDU/NMPDU behaviours, while they simultaneously reported PDU/NMPDU in their personal networks that more closely corresponded to their own use, the influence of participants' in-group appear to possibly be consistent with Social Identity Theory. Namely, participants' behavioural intentions were potentially more influenced by their immediate social circles (i.e., their in-group) than by 'typical' university students (i.e., their out-group). Additionally, Social Impact Theory may suggest that behavioural intentions to change PDU/NMPDU did not occur in Study 3 because the social norms comparator used in the intervention (i.e., 'typical students') was not immediate/intimate enough to permit the intervention to have behaviour impacts.

As each of the abovementioned theories were not tested directly in the current dissertation, this section has merely highlighted the theories that appear to be consistent with the observed findings. Future research can benefit from directly exploring the impact of each theory to understand the theoretical underpinnings of PDU/NMPDU norms.

Inconsistency with Findings

The current dissertation (notably Study 1) demonstrated that a stronger relationship between perceived NMPDU and personal NMPDU did not emerge for sex-matched comparators versus non-sex-matched comparators. This finding appears to most noticeably be inconsistent with certain tenets inherent in Social Identity Theory (Tajfel & Turner, 1979) and Social Impact Theory (Latané, 1981). Study 1 contained an assumption that same-sex peers would be viewed as more proximal (and therefore, to be more of an in-group) than opposite-sex peers. Thus, Social

Identity Theory would likely suggest that sex-matching for social norms would have a larger impact on one's own behaviour. However, evidence of sex-matching in the norms-behaviour link was not seen. Similarly, the referent group in Study 1 (i.e., 'first year students'), did not have a stronger impact on first year students' perceptions as opposed to students of other years, indicating inconsistency with Social Impact Theory's tenet that the amount of influence imposed by a referent depends on the strength/immediacy of the referent.

The finding that students consistently overestimate PDU/NMPDU compared to actual rates appears to be in direct contrast to tenets inherent in the False Uniqueness Effect (Suls & Wan, 1987). Such an effect would suggest that students would underestimate (rather than overestimate) the degree to which others share their thoughts and behaviours surrounding PDU/NMPDU.

Students' overestimations also appear to be inconsistent with some of the tenets outlined in Perkins' theory about misperceptions (Perkins, 1997). Notably, Perkins purported that misperceptions are maintained partially due to an attribution error where individuals mistakenly attribute less common behaviours to someone's individual disposition rather than to the unique environment that led to the behaviour. Participants in the focus groups shared their perceptions regarding both individual and contextual factors that may promote PDU/NMPDU, thus appearing to be somewhat discordant with Perkins' tenet of an increased focus on individual factors. Perkins' theory also proports a memory bias wherein more extreme or vivid behaviours are increasingly discussed in social interactions, and thus can be remembered more readily. While Studies 2 and 3 highlighted the important perceived role of social interactions/networks in PDU/NMPDU, limited evidence from either study suggested that participants viewed

PDU/NMPDU as vivid or extreme (if fact, the opposite perception of PDU/NMPDU being common emerged).

As each of the abovementioned theories were not tested directly in the current dissertation, this section has merely highlighted theoretical tenets that appear to be inconsistent with the observed findings. Future research may be able to elucidate factors that may better explain disagreement with these tenets. For example, some research has suggested that students may more closely identify with ‘typical students’ rather than students engaging in similar substance use behaviours (e.g., Neighbors et al., 2013), a finding which may have theoretical implications and associated clinical implications for students engaging in potentially harmful PDU/NMPDU.

Summary

Social norms theory (Perkins & Berkowitz, 1986) proports that perceptions of others’ behaviours will motivate individuals to behaviour in a similar manner. This relationship has not only been demonstrated with descriptive norms, but has also been shown to extend to injunctive norms (e.g., Schultz et al., 2017). While each of the three dissertation studies contributed to a further understanding of social norms in the context of social norms theory, causality could not be inferred from dissertation results as they were cross-sectional (i.e., non-longitudinal) and/or qualitative in scope. Each of the studies were also non-experimental, with the exception of Study 3, where the causal effect that would be expected with social norms theory predictions was not seen (i.e., changing norms did not result in changes to behavioural intentions).

Findings from the three studies appear to be somewhat consistent with some tenets of social theories and phenomena such as the False Consensus Effect, Social Identity Theory, and Pluralistic Ignorance. However, it is difficult to ascertain the relative contribution of each theory

to norm perceptions and their relations to own behaviours in the dissertation as their influence was not studied directly in any of the studies. Additional research may be able to ascertain the contribution of each theory's tenets more directly to PDU/NMPDU social norms. Perhaps future research may demonstrate how multiple of these theories can work collaboratively to explain the overestimated social norms perceptions and their relations to participants' own PDU/MNPDU that emerged throughout this dissertation.

Clinical Implications

Social norms of PDU and NMPDU among post-secondary students appear to be a central consideration in understanding how students perceive PD use and how their perceptions interact with their own PD behaviours. Each of the dissertation studies independently demonstrated that students overestimate their peers' PDU/NMPDU, and these findings have separate yet intersecting implications for navigating potentially harmful PD use among student populations.

Study 1 highlighted social norms interventions may not generate additional benefits by sex-matching intervention participants with their perceived peers, as perceptions of the behaviours of same-sex peers were not found to have any added influence on one's own behaviours compared to perceptions of behaviours of their opposite-sex peers. The largest discrepancy between perceived norms and actual norms appeared to exist for female participants when they were perceiving use of their male peers, yet there still seemed to be little benefit to sex-matching from an intervention perspective. There was also no evidence of greater effects of perceived norms on own behaviour when the perceiver and perceivee were matched by year of university (i.e., when first-year students were matched with the first-year student referent). This would again suggest unlikely utility of matching the corrective feedback on actual rates of peer use to the student's year of study.

Clinically, the findings from Study 1 therefore raise important questions about the value of utilizing proximal same-sex or same-year referents, and whether the sex or post-secondary year of referents may actually be considered relevant factors in determining the proximity of a perceiver peer. Reviews of social norms approaches have generated mixed results pertaining to using distal versus proximal referents and have often used categories such as ‘typical student’ versus ‘close other’ to define distal versus proximal categories, respectively (e.g., Rhodes et al., 2020). Perhaps same-sex and same-year referents are too restrictive or rigid in their assumption that students of the same sex or study year would be viewed by the intervention recipient as more proximal than other groups of students. Prior substance use research has indeed shown that ‘friend norms’ are highly predictive of one’s own substance use behaviours (e.g., Lac & Donaldson, 2018), which might initially suggest that using ‘friends’ as a referent in future interventions would parsimoniously allow students to generate their own friend-related perceptions and schemas as they deem appropriate.

However, a further analysis of using ‘friends’ as a referent also highlights several issues. Firstly, generating corrective norms becomes challenging, as information would have to be collected on the behaviours of each participants’ friends to illustrate a true comparison. Additionally, given that rates of PDU/NMPDU for students engaging in use are likely to be higher within their social network (e.g., Garcia et al., 2021), there is a lower chance of a discrepancy needing to be corrected with normative feedback. Finally, this type of intervention would require delivery on an individual level, as the norms would need to be individualized for each person. Consequently, the approach would lose the economy of scale, making a social marketing approach or small-group approach impossible. Thus, ongoing research should continue to explore which proximal referents may have the largest impact on students’

perceptions and personal behaviours, while recognizing that the most proximal referents may actually render social norms interventions unfeasible. If opting for more distal referents (i.e., to capture the largest discrepancy between perceived and personal behaviours), it is also clinically useful to note that prior alcohol-focused research has shown that most students think of ‘male students’ when asked to perceive drinking behaviours of their ‘typical’ peer (Lewis & Neighbors, 2006b), so future PDU/NMPDU research can benefit from investigating students’ prototypical ‘typical’ peer for PDU/NMPDU, in particular, to gain a better understanding of how the discrepancy may be perceived and conceptualized.

While sex-matching did not appear to result in different behavioural outcomes in Study 1, Study 2 furthered the results in Study 1 by exploring students’ perceptions of other relevant factors as they relate to social norms and their relations to personal use behaviours. Notably, Study 2 showed that PD-using students likely overestimated use of PDU/NMPDU among peers. For example, when discussing stimulants, one focus group participant stated they thought prior usage would occur for “maybe 10% of the people who have not been prescribed... it would be even higher if prescribed.” Not only were overestimations demonstrated for general PD use, but also for phenomena such as PD diversion as well as polysubstance use. For example, with PD diversion, one participant noted “It’s really easy to obtain sedatives.”

Polysubstance use has been found to be a relatively common occurrence in the context of PD use (e.g., Steyn, 2016), and thus participants’ perceptions of the commonplace of polysubstance use may more accurately represent the state of affairs among post-secondary students (though, even with *more* accurate perceptions, overestimations are still possible as demonstrated by some of the dissertation studies). For example, one participant during their focus group in Study 2 remarked “people who have prescriptions... go and take whatever... yeah

I guess like people mix a lot.” Regarding perceptions of polysubstance use among students, the perceived normative nature of polysubstance use, and of engaging in polysubstance use despite known risks, has been substantiated (Willis et al., 2019). The dissertation study demonstrated that normative perceptions of polysubstance use extend to different types of PD use among those engaging in PDU/NMPDU themselves.

The findings suggest that PD-using students should be screened for polysubstance use in clinical settings. Another suggestion may involve incorporating other clinical interventions focusing on polysubstance use alongside a social norms approach for PDU/NMPDU, which may be particularly impactful in mitigating the high perceptions and associated harmful behaviours of polysubstance use. Recent research has confirmed the importance of considering polysubstance use-based approaches in navigating harmful PDU/NMPDU among EAs, highlighting that mixing PDs with other substances increases the risk of death from overdose (Philbin & Mauro, 2019). While a more general addition of polysubstance intervention approaches may be helpful (e.g., sharing informative and realistic information about combining substances; Willis et al., 2019), incorporating *social norms information* about polysubstance use, in particular, may be impractical or unhelpful. A social norms intervention for polysubstance use may only be beneficial if additional research can quantitatively confirm polysubstance use overestimations among students engaging in PDU/NMPDU, and if research can confirm that perceptions of polysubstance use involving PDs predict personal engagement in high/risky use.

Study 2 also highlighted key factors to consider when the focus is more selective and focused on PDU/NMPDU. In particular, perceptions that students are taking PDU/NMPDU for various reasons is supported by research which highlights various motivations in actual PD use behaviours. The motivational model of substance misuse posits that four primary motivations are

typically involved in substance use decision making: coping, enhancement, social, and conformity (see Votaw & Witkiewitz, 2021 for review). Several motivations have also been identified for PDU/NMPDU in particular, with broad motivational categories related to recreation vs. self-medication (e.g., LeClair et al., 2015; Lord et al., 2011). These established motivations largely correspond to participants' perceptions in the current dissertation about reasons that their peers may engage in PDU/NMPDU (e.g., social motivations to enhance quality time with social networks, or self-medication motivations to improve academic performance, that were described qualitatively during the dissertation studies).

Thus, given that participants' insights often pertained to their peers' motivations when describing social norms, perhaps social norms interventions could benefit from acknowledging and incorporating common motivations into the treatment framework. In order to beneficially incorporate a focus on PD use motivations for social norms interventions, it may potentially be useful for future research to explore if there are particular motivations for use that are overperceived among students. These findings would allow for corrective normative feedback to be provided when norms are being misperceived. For example, if students are found to overestimate self-medication with PDs, perhaps corrective information on true self-medication rates could be provided in order to curb PDU/NMPDU perceptions and associated behaviours. Preliminary research suggests that students have high normative perceptions of peers engaging in self-medication with substances for mental health issues (e.g., Hudson et al., 2018), but further research can potentially clarify if a self-medication discrepancy exists for PDU/NMPDU perceptions and behaviours more specifically.

Study 2 further highlighted students' perceptions that PDU/NMPDU and associated consequences are likely to be higher among individuals of certain backgrounds, such as students

from particular cultures or students who identify as LGBTQ+. Similar heightened perceptions for sexual minority EAs have been found for other substances (e.g., alcohol; Litt et al., 2015). In Study 2, it was noted how actual rates of substance use (including PDU/NMPDU) has been shown to be higher in the LGBTQ+ community (e.g., Duryea et al., 2015), and how certain cultural factors could predispose students to substance use (e.g., Hunt et al., 2017). The potentially higher rates of PDU/NMPDU among such student identities/backgrounds highlights that intervention approaches may benefit from being culturally-informed, though may not necessarily benefit from gearing social norms information towards these groups in particular. In order to be more culturally-informed, social norms interventions that are incorporating cultural, racial, sexual, or gender-minority students should critically consider the values and background of the groups being included in the intervention (Blume, 2016).

However, it may not be beneficial to target social norms information to minority groups specifically for two notable reasons. Firstly, when deciding whether to develop such tailored interventions, clinicians and researchers would need to consider sizeable heterogeneity within each minority group, and whether tailored interventions can accurately and beneficially capture the beliefs and values of the target group (Blume, 2016). Secondly, it would be difficult to determine the referent group for minority participants in the context of the heterogeneity and individuality that they bring to the group. For example, the ‘immigrant paradox’ and the ‘healthy immigrant effect’ have shown that that minority students typically engage in less substance use when they arrive in a new country, and that their use shifts towards the majority culture norm over time (e.g., Greene & Maggs, 2018). Social norms would not be beneficial if minority students are presented with norms that are higher than their own, as this may have iatrogenic effects. Thus, a social norms approach which is inclusive, yet simultaneously does not include

corrective information geared towards visible minority students in particular, may be a general way in which to maximize the benefits of social norms interventions while limiting the abovementioned issues.

With regard to more generally instituting group-based social norms interventions for students engaging in PDU/NMPDU, Study 3 highlighted the importance of using student voices to demonstrate the facilitators and barriers to utilizing this type of universal treatment approach with a broader student body. The feedback provided by students highlighted the benefit of including students in research that affects them, in line with participatory action frameworks that include PWLLE (e.g., Anyon et al., 2018; Nosyk et al., 2021). Quantitatively, results from Study 3 highlighted that social norms interventions for students engaging in PDU/NMPDU are effectively able to reduce sizeable overestimations of PDU/NMPDU, while also highlighting that overestimations remain (albeit, at a less pronounced level) and that these changes in norms perceptions, unfortunately, do not translate into intentions to change PDU/NMPDU behaviour.

A review of interventions for illicit substance use using mass media campaigns has demonstrated that such programs are usually ineffective at changing substance use behaviours (Allara et al., 2015), though this review is limited in its implications because of study heterogeneity. The review highlighted that more effective mass media communications appear to include messaging about autonomy and achievement of competence. While the review found lower effectiveness for the studies incorporating corrective norms information, the results are generally quite limited with regard to generalizability, again because of multiple overlapping intervention components and study heterogeneity.

Thus, Study 3 encountered issues that have been identified more generally with substance use interventions using mass media and group-level intervention components. Namely, such

interventions have used several different methods to approach student substance use on a more universal scale. While the intervention in Study 3 was grounded in social norms theory (Perkins & Berkowitz, 1986), and was guided by prior group-level and social marketing campaigns for substance use among post-secondary students, the program nevertheless represented a social norms intervention that was conducted in unique group conditions and with relatively novel normative information provided on a comprehensive level (i.e., for multiple forms/types of PDs).

Some of the abovementioned issues potentially contributed to a lack of behaviour change among the participants in Study 3, leaving ongoing questions about how to potentially narrow the gap between knowledge acquisition and behaviour change for PDU/NMPDU. This gap between knowledge and behaviour has been established with other health behaviours (Rimal, 2000) and therefore warrants ongoing consideration.

In order to possibly narrow the knowledge-behaviour gap and facilitate behaviour change as part of a social norms intervention, participant feedback during Study 3 highlighted that an important factor involves trusting the credibility and truthfulness of information that is presented to group participants. Garnering sufficient ‘buy-in’ during social norms interventions has been previously established as a pre-requisite for the effectiveness of the intervention (Burchell et al., 2013). Thus, an important question raised by the dissertation studies is how to potentially enhance ‘buy in’ for students being presented with PDU/NMPDU social norms information. In the following sections, some external/environmental considerations and suggestions for enhancing student ‘buy-in’ will be elaborated upon, though it is first crucial to note that internal/individual cognitions, attitudes, and beliefs may have an important impact on one’s ‘buy-in’. For example, social norms interventions for student substance use have been found to have increased effectiveness when students have a tendency to perceive a higher level of

pressure from their environment and to experience a lack of true choice in their behaviour (i.e., a ‘controlled orientation’; Neighbors et al., 2006).

Prior research has shown that factors such as longer exposures to corrective information, enhanced creativity, and capturing higher levels of identification with the reference group as some independent ways to enhance the effectiveness of social norms interventions (Burchell et al., 2013), potentially suggesting avenues to enhance ‘buy-in’ and the overall success of future social norms interventions for PDU/NMPDU. For example, pending adequate time and resources, future social norms interventions may benefit from sharing multiple types of corrective information to participants over several sessions or multiple weeks in order to enhance believability and allow more time for information retention.

When navigating the knowledge-behaviour gap, previous substance use research has also generally highlighted the importance of considering usage contexts among EAs (Patrick et al., 2014), again supporting the qualitative findings in the dissertation that incorporating motivational and contextual information in social norms program is likely important to enhance buy-in and change behaviours. Social norms have found to play a particularly influential role in students’ substance use behaviours, and further research should explore how one’s social networks may impact their perceptions of PDU/NMPDU and their personal PDU/NMPDU behaviours. To date, research has demonstrated that EAs overestimate substance use motives of people in their social network, and that their own substance use behaviours are influenced by such overestimations (Bartel et al., 2022). Research has further demonstrated that substance use behaviours greatly increase when someone’s social network is engaging in substance use (Mason et al., 2014), suggesting that it may be helpful for PDU/NMPDU social norms interventions to consider how participants’ overestimations and personal behaviours may be strongly influenced

by higher risk networks. Correlational relationships have further been demonstrated between the PDU/NMPDU behaviours of students' social networks and their own PDU/NMPDU behaviours (Meisel & Goodie, 2015).

Alongside peers, romantic partners of EAs have also been found to play a sizeable role in their personal substance use (Bartel et al., 2020), though more research may benefit from exploring the role of romantic partner influence in PDU/NMDPU specifically. Taken together, these findings potentially raise questions about the value of focusing on proximal referents in social norms interventions for higher risk students, as the base rates of use among one's social network may be higher than base rates of more distal/typical referents. However, as mentioned previously, this approach would need to depend on if overestimations still exist within each person's social network, and would likely end up requiring the substitution of more practical referents (i.e., non-personal referents for whom individual norms would not need to be calculated) in order to promote feasibility and sustainability of the intervention.

Finally, among students engaging in PD use for reasons that may be treated by mental health clinicians (e.g., performance enhancement at school, behavioural activation in the context of pain, or mood improvement and anxiety reduction) perhaps buy-in during future social norms programming would benefit from including information about alternate services or methods of managing relevant symptoms. Recent research has demonstrated that mental health care utilization has been increasing among students, though a significant percentage of students with self-reported concerns are still not receiving service (Lipson et al., 2019), and students may thus perceive PDs to be an 'easier' form of symptom management (as highlighted during student feedback following the social norms intervention in Study 3).

Strengths, Limitations, and Directions for Future Research

Strengths

The current dissertation had several overall strengths that are important to mention. With respect to methodology, the mixed methods approach provided a comprehensive understanding of social norms and their influence on behaviour among post-secondary students engaging in PDU/NMPDU. Second, there is consistency of several primary findings across the dissertation studies, namely that (1) overestimations of PDU/NMPDU are common among students, (2) there is a notable relationship between students' perceptions of PDU/NMPDU and their own PDU/NMPDU, and (3) student perceptions highlight that both individual characteristics and social contexts may influence one's PDU/NMPDU social norms and behaviours. Third, the dissertation was theoretically guided by social norms theory (Perkins & Berkowitz, 1986) and related social theories which purport to explain the connection between one's one perceptions/beliefs and behaviours. Finally, both studies which involved new data collection in the dissertation (i.e., Studies 2 and 3) incorporated a focus on centering 'student voices' by including students on an advisory committee (aligning with a PAR and PWLLE framework to research) and by qualitatively incorporating student reflections and feedback on social norms phenomena and interventions (Selseng et al., 2021). The archival data utilized in Study 1 had similarly belonged to a project that centered 'student voices' during its original design and data collection stages (Stuart et al., 2019). The project had assumed an empowering and collaborative approach with undergraduate students, thus closely aligning with the student participatory aspect assumed during Studies 2 and 3.

Limitations and Directions for Future Research

Alongside the dissertation's strengths, there were also several limitations that are important to consider. Each of these limitations highlight potential helpful directions for future research. First, studies 1 and 2 were not able to establish causality between social norms perceptions and personal behaviours. While Study 1 assumed a theorized direction of perceptions leading to behaviours (in accordance with social norms theory [Perkins & Berkowitz, 1986]), the study was still cross-sectional and was thus unable to infer causality. The qualitative components of Study 2 and Study 3 demonstrated that participants appeared to perceive both a perception-behaviour and a behaviour-perception relationship between social norms and PDU/NMPDU, though the qualitative nature of the study created fundamental barriers to demonstrating a causal relationship. Similarly, the pre-post design of Study 3 was temporal, but measurements were taken during a brief period of time and were ultimately quasi-experimental. However, Study 3 was still able to provide some information on causality, and demonstrated findings that contradicted a perception-personal behaviour causal relationship purported by social norms theory (Perkins & Berkowitz, 1986). This has left important remaining questions about causality in the PDU/NMPDU social norms relationship overall.

Longitudinal/cohort studies would be better able to substantiate a causal relationship (Mann, 2003), and longitudinal research has successfully demonstrated the intricate relationship between norms and other substances across multiple time points (e.g., Graupensperger et al., 2020; O'Grady et al., 2011). Thus, longitudinal data on the connection between social norms and PDU/NMPDU can potentially provide further clinical guidance about the most impactful approaches to social norms interventions for high risk PDU/NMPDU.

Similarly, randomization of participants was outside the scope of this dissertation, though a full scale RCT may provide more evidence of causality (Plotnikoff et al., 2019; Sibbald & Rolland, 1998) and identify additional factors implicated in the social norms/NMPDU relationship. In particular, a longitudinal RCT may help to consolidate findings from this dissertation by demonstrating how various types of normative information may impact personal behaviours or intentions to change behaviours over multiple presentations of social norms information (as opposed to a single session). However, an RCT would only be helpful if causality can be supported beforehand. Thus, prior to conducting an RCT, future research can perhaps benefit from conducting an open trial to detect if a signal is present. Given that the predicted effect based on social norms theory was not seen (i.e., a change in PDU/NMPDU perceptions leading to a change in PDU/NMPDU behavioural intentions), there are remaining questions about causality in the perceptions-personal PDU/NMPDU relationship. It is noteworthy that some research has demonstrated reciprocal and bi-directional relationships between norms and behaviours among other substances, for both descriptive (Wardell & Read, 2013) and injunctive norms (Lewis et al., 2015). Thus, rather than hypothesizing causality, perhaps open trials (and subsequent RCTs) can benefit from investigating a bi-directional relationship between PDU/NMPDU norms and behaviours.

A related limitation of the final study involved the sample size not being sufficient to detect a small effect. As substance use interventions have often generated small effects (e.g., Rooke et al., 2010), future trials should use sample sizes that are sufficient to detect effect sizes of smaller magnitudes. However, there were unfortunately no encouraging trends suggesting that an effect on behavioural intentions might be detected with a larger sample. This indicates that

future trials may benefit from making additional adaptations to the norms intervention structure/content itself before reassessing the intervention on a larger scale.

An additional limitation of the dissertation was a lesser focus on injunctive norms as opposed to descriptive norms. Historically, most social norms interventions for substance use utilized descriptive norms, and descriptive norms represented an effective focus for norms interventions (e.g., Borsari & Carey, 2003). However, years of subsequent research has led to increasingly mixed findings on the effectiveness of descriptive norms in social norms interventions for substance use (e.g., Foxcroft et al., 2015). Recent research has suggested that injunctive norms are an impactful component of normative perceptions and behaviours (Gavrilets, 2020). Notably, recent research also highlights that injunctive norms may be more impactful than descriptive norms for certain types of PDs (e.g., Kollath-Cattano et al., 2020). Future research would benefit from investigating the impact of injunctive norms information on perceptions and behaviours for different types of PDs.

A further limitation is that other factors were not investigated, such as motivations for use, that may account for high PDU/NMPDU perceptions or a lack of change to behaviours. As highlighted in earlier sections of the dissertation, PDs have been shown to be a potentially effective form of management for physical or mental health concerns, and the dissertation studies were unable to statistically evaluate the impact of such usage motivations (and perceived benefits) of ongoing PD use. Overall, future research would likely benefit from a deeper understanding of students' overall desire to change their PDU/NMPDU through an investigation of their subjective motives, benefits, and costs associated with their ongoing PDU/NMPDU. A deeper understanding may also be garnered through direct assessments of readiness to change, as

different interventions or approaches to use may be more beneficial for students who are considering or intending on making changes (Prochaska et al., 2015).

A final limitation regarded the conceptualization of PDU vs. NMPDU. The dissertation studies intended to use a comprehensive definition of NMPDU involving any type of PD use not indicated by an HCP during the indicated time-period. However, ensuring homogeneity within PDU and NMPDU groups, even with these concrete criteria, proved to be challenging for the dissertation studies. In accordance with the stated definitions of PDU and NMPDU utilized for the purposes of this dissertation, PDU and NMPDU were exemplified separately (for the most part) in Studies 2 and 3, and only NMPDU was examined in Study 1. In Study 2, perhaps themes did not saturate separately because of more PD heterogeneity than expected within each group. In Study 3, a supplemental analyses was subsequently conducted to quantitatively determine if results differed across PDU and NMPDU groups, but no differences were found. While the study may have been underpowered to detect an effect, it is again possible that no differences emerged because of possible heterogeneity pertaining to PD behaviours within each group.

Barrett et al. (2008) has suggested that definitions of NMPDU have been developed and applied inconsistently. A subsequent review determined that no instruments have been able to adequately measure NMPDU or contexts of NMPDU (Smith et al., 2015). These findings underscore measurement error as a large concern in PDU/NMPDU research, and a concern that potentially influences the dissertation data. As an important example (and as highlighted above), while the lack of thematic differences between PDU-NMPDU groups in Study 2 may represent a true overlap in students engaging in PDU and NMPDU, or may be due to measurement error. Developing a valid and reliable measure of NMPDU is an important area for future research. However, if the lack of observed differences between students engaging in PDU and NMPDU

does represent a true overlap between the two forms of use, then there are lingering concerns about the overall necessity or practicality of a consistent PDU-NMPDU distinction for students in the context of social norms. If this distinction was unnecessary from an intervention perspective, creating such a distinction in order to develop separate PDU and NMPDU norms interventions would lead to additional problems such as possibly reducing intervention group sizes or increasing the time and resources involved in intervention delivery.

Conclusion

To conclude, this dissertation included three studies that sought to better understand the connection between social norms perceptions and PDU/NMPDU among three major types of PDs utilized by university students. A mixed methods approach was utilized to test predictions emerging from tenets of social norms theory (Perkins & Berkowitz, 1986) and related social theories that have demonstrated a relationship between personal perceptions/beliefs and behaviours. Overall, it was found that (1) students significantly overestimate PD behaviours of their peers, (2) there is an important relationship between perceptions of others' PDU/NMPDU and students' personal PDU/NMPDU, (3) individual factors and social contexts (such as culture and social networks) are thought by students to impact students' normative perceptions, (4) despite changing normative PDU/NMPDU perceptions, no behaviour change emerged with a group-level social norms intervention, and (5) 'buy in' (i.e., believability) of social norms information may be a necessary requirement for behaviour change to occur.

Taken together, students' overestimations and subsequent reductions in overestimations when presented with corrective information suggest that social norms interventions can be clinically effective at changing perceptions when delivered in a small group context. Yet, they highlight an ongoing discrepancy in this context between changes to perceptions and changes to

behaviours (as behavioural changes did not occur despite reduced perceptions). Qualitative feedback from students highlights that group-level social norms interventions need to consider contexts and factors that may facilitate believability of social norms information delivered in norms interventions, such as changing the proximity of referents and increasing the episodes of exposure to messaging. Generally, the continual perceived normative nature of PDU/NMPDU, combined with perceived benefits that students attribute to PDU/NMPDU, may represent important considerations in students' receptiveness and responsiveness to social norms information intended to curb higher risk or potentially harmful PDU/NMPDU.

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APPENDIX A. COPYRIGHT NOTE TO INCLUDE STUDY 1

The study entitled “*College students’ prescription drug misuse social norms: What’s sex got to do with it?*” included in Jason Isaacs’ dissertation is an Accepted Manuscript of an article published by Taylor & Francis in *Journal of American College Health* on September 23, 2021, available online: <https://doi.org/10.1080/07448481.2021.1979007>

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The study entitled “*The impact of normative feedback on undergraduates’ prescription drug use knowledge and behaviour: A mixed methods study*” included in Jason Isaacs’ dissertation is the published version of an article published by Wolters Kluwer in the *Canadian Journal of Addiction* in June 2022, available online:

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APPENDIX C. FOCUS GROUP GUIDE (FROM STUDY 2)

Focus Group Guide

Following introductions/icebreaker/confidentiality with participants, the focus group guide proceeded with each group as follows...

“Now we’re going to bridge into more of a discussion about students and [type of PD – stimulants, opioids, or S&Ts, depending on the group],”

“Just a reminder that there are no right or wrong answers. We’re just interested in discussing and keeping the conversation engaging.”

1) Why do university students use [type of PD]?

Probes (if needed):

- How might people feel when they’re using and after they’ve used?
- What are some of the ways in which students use [type of PD] other than prescribed?
- What are some of the reasons they do this?
- What forms are [type of PD] typically consumed in (i.e., oral tablets, smoked, snorted)?
- What might someone’s first exposure to [type of PD] look like?

2) How do university students get [type of PD]?

Probes (if needed):

- How easy is it for university students to get access to [type of PD]?
- How common is it for university students to share [type of PD]?
- How many students are actually prescribed [type of PD]?
- What do students know when they first get [type of PD]? What kind of information is typically provided to them?

3) What are some situations where students might be more likely to use [type of PD]?

Probes (if needed):

- Are students more likely to use in certain places?
- Are students more likely to use when they’re having certain feelings or thoughts?

- 4) Are particular students more likely to use [type of PD]? Which students may be more likely to use {type of PD}?

Probes (if needed):

- Do you think gender affects how or why students might use [type of PD]? How so?
- In what ways might [type of PD] use be affected by different characteristics of students (e.g., age, years of study, residence status, different majors, or personality traits)?
- In what ways might [type of PD] use be affected by other things like income, family history, mental health, physical health, or cultural factors?

- 5) Do you think it is common for university students to combine [type of PD] with other substances or drugs? Why might they do this?

Probes (if needed):

- What substance combinations might students make?
- What might be some reasons that students might combine these substances?
- Why might some students *not* combine substances?

- 6) Have you seen any messaging around campus about [type of PD]? What kinds of messaging have you seen?

[*If no messaging on campus, ask about messaging in the community*]

Probes (if needed):

- Where is this messaging most noticeable?
- What is the focus of the messaging (or what messages are being delivered)?
- What are your thoughts about the messaging? How does it resonate with you?

- 7) How do you think [type of PD] are portrayed in the media (e.g., on TV or social media)?

Probes (if needed):

- What are the consequences of this portrayal, whether positive or negative (e.g., stigma)?
- How do you think they *should* be portrayed?
- Does the media portrayal reflect university student experiences with [type of PD]?
- Generally, which news sources do you trust (and not trust) to provide [type of PD]-related information?

8) What concerns, if any, may students have around [type of PD]?

Probes (if needed):

- Are there any situations where students might prefer to avoid using [type of PD]?
- What might a less pleasant/desirable experience with [type of PD] look like for a university student?
- Are there any times when taking [type of PD] would get in the way of doing or accomplishing something else?
- Do you have any thoughts about what a [type of PD] overdose might look like? Have you been given any information about how to address this kind of concern?

9) If a university student wanted to access some type of preventative service for harmful [type of PD] use, or if a student was having concerns related to [type of PD] use, what types of supports do you think are available for them?

Probes (if needed):

- What supports may be available (either on or off campus)?
- What kind of information might be useful for a student looking for service?
- What barriers might exist for these students seeking help?
- What services should be available so that these barriers can be overcome?
- What kinds of supports would be most helpful (physicians, university health centres, other community supports, peers, etc.) in preventing students from developing problematic or harmful use of [type of PD]?

“To round out our discussion, it would be interesting to talk about other questions that remain unanswered or poorly understood surrounding students and [type of PD].”

10) What questions surrounding prescription [type of PD] and students should researchers be focusing on?

Probes (if needed):

- What should healthcare providers know about students and prescription [type of PD]?
- What information should other students know about [type of PD]?
- What would be the most effective ways for information about [type of PD] to be shared and discussed among students?

CONCLUSION

“Does anyone have any other thoughts or questions they’d like to discuss today?”

[*Stop audio recording*]

“That brings us to the end of the focus group! Thanks so much again for coming out! Please sign your name and student number on our attendance sheet if you haven’t already. As a reminder, your attendance information will only be used for research purposes and will not be shared with anyone.”

“Before you leave, we want to pass out a list of helpful mental health resources on different campuses for your reference.” [*A researcher-developed list of local mental health resources is shared with students at this point*].

Additional Note for Reader:

Not all questions from the focus group guide were retained in the final analysis reported here, as some queries were outside the scope of social norms, and were thus included in other publications/presentations, but were not included in my dissertation. Only focus group data relevant to PDU/NMPDU social norms has been reported in my dissertation.

APPENDIX D. PRESCRIPTION NORMS AND INTENTIONS QUESTIONNAIRE (PSIQ)

Prescription Norms and Intentions Questionnaire (PNIQ)

Please answer each of the following questions by circling the number that best describes your opinion. Some of the questions may be similar, but they do address somewhat different issues. Please read each question carefully. Also try to remember how the questions are scaled. For example, in an “agree-disagree” type question, 1 would indicate “strongly agree”, while 7 would indicate “strongly disagree”.

ANSWER THE FOLLOWING QUESTIONS ABOUT THE TYPE OF PRESCRIPTION DRUG THAT YOU HAVE TAKEN MOST FREQUENTLY OVER THE LAST TERM

1. I plan to take the prescription drug.

Likely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Unlikely

2. I plan to avoid the prescription drug.

Likely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Unlikely

3. I will make an effort to take the prescription drug.

Definitely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Definitely Not

4. I will make an effort to avoid the prescription drug.

Definitely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Definitely Not

5. I intend to take the prescription drug.

Definitely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Definitely Not

6. I intend to avoid the prescription drug.

Definitely : 1 : 2 : 3 : 4 : 5 : 6 : 7 : Definitely Not

7. On a scale from 0-100, what percent of university students do you think have taken prescription opioids over the last term for *any reason*?

_____ %

8. On a scale from 0-100, what percent of university students do you think have taken prescription opioids over the last term *only as prescribed by a doctor to treat a medical condition*?

_____ %

9. On a scale from 0-100, what percent of university students do you think have taken prescription opioids over the last term in *any of the following ways*:

- a) Have a prescription, but sometimes do not take it as prescribed
and/or
- b) Without a prescription to treat a medical condition
and/or
- c) Take prescription drug and then drink alcohol
and/or
- d) To get high
and/or
- e) As a study aid

_____ %

10. On a scale from 0-100, what percent of university students do you think have taken prescription stimulants over the last term for *any reason*?

_____ %

11. On a scale from 0-100, what percent of university students do you think have taken prescription stimulants over the last term *only as prescribed by a doctor to treat a medical condition*?

_____ %

12. On a scale from 0-100, what percent of university students do you think have taken prescription stimulants over the last term in *any of the following ways*:

- a) Have a prescription, but sometimes do not take it as prescribed
and/or
- b) Without a prescription to treat a medical condition
and/or
- c) Take prescription drug and then drink alcohol
and/or
- d) To get high
and/or
- e) As a study aid

_____ %

13. On a scale from 0-100, what percent of university students do you think have taken prescription sedatives/tranquilizers over the last term for *any reason*?
_____ %

14. On a scale from 0-100, what percent of university students do you think have taken prescription sedatives/tranquilizers over the last term *only as prescribed by a doctor to treat a medical condition*?
_____ %

15. On a scale from 0-100, what percent of university students do you think have taken prescription sedatives/tranquilizers over the last term in *any of the following ways*:

- a) Have a prescription, but sometimes do not take it as prescribed
and/or
- b) Without a prescription to treat a medical condition
and/or
- c) Take prescription drug and then drink alcohol
and/or
- d) To get high
and/or
- e) As a study aid

_____ %

APPENDIX E. FOCUS GROUP GUIDE (FROM STUDY 3)

Focus Group Guide

- 1) What was it like to learn about, and participate in, a social norms session?

Additional prompts:

- a) What do you think about the structure the session (i.e., how the information was shared and discussed)?
- b) What was it like to hear the prescription drug rates? What are your reactions to this information (both positive and negative)?

- 2) What are your thoughts about using this type of intervention for university students at risk of developing problematic prescription opioid or drug use?

Additional prompts:

- a) How could social norms sessions like this one be further optimized for prescription opioid and drug use among university students?
- b) What are some advantages to presenting this type of an intervention? How about some disadvantages?

- 3) What are some facilitators and barriers to implementing prescription social norms interventions in university settings?

Additional prompts:

- a) Is there anything that can facilitate implementing social norms interventions with university students?
- b) What would make these interventions the most appealing?
- c) Would there be any challenges to implementing this type of program?

- 4) Do you have any additional thoughts about whether this might be applicable or useful in university settings?

APPENDIX F. SUBSTANCE USE SCREENING QUESTIONNAIRE (SUSQ)

Preamble (on Opinio):

The following questions will ask about your substance use. You may choose not to answer some questions that you do not want to answer, however some questions will require an answer in order to make sure we place you in an appropriate focus group.

1. Have you used any prescription drugs at all over the past 4 months? (Recreationally or prescribed by a doctor)?

- Yes No

2a. How often have you used painkillers (i.e., opiates such as Codeine, Oxycodone, or Percocet) over the past 4 months?

- Never
 Monthly or less
 2-4 times per month
 2-3 times per week
 4 or more times per week

2b. How have you used painkillers (i.e., opiates such as Codeine, Oxycodone, or Percocet) over the past 4 months? Check all that apply:

- Used as prescribed by my doctor to treat a medical condition or medical symptoms
 I have a prescription but sometimes do not use it as prescribed (e.g., I take more than prescribed, snort pills, etc.)
 I use them without a prescription to treat a medical condition or medical symptoms (e.g., obtain or purchased from a family member, friend, or other)
 I sometimes take prescription drugs and then drink alcohol
 I use them without a prescription for fun or other recreational reasons (e.g., to get high or relax)
 I sometimes use them as a study aid (e.g., they help me stay awake, focused, or concentrate)

2c. Which opioid(s) have you been prescribed?

2d. Why were you prescribed these opioids?

- Pain relief
- Mental health
- Other:

2e. Which opioids have you used/experimented with?

3a. How often have you used sedatives or tranquilizers (i.e., downers, Ativan, or Xanax) over the past 4 months?

- Never
- Monthly or less
- 2-4 times per month
- 2-3 times per week
- 4 or more times per week

3b. How have you used sedatives or tranquilizers (i.e., downers, Ativan, or Xanax) over the past 4 months? Check all that apply:

- Used as prescribed by my doctor to treat a medical condition or medical symptoms
- I have a prescription but sometimes do not use it as prescribed (e.g., I take more than prescribed, snort pills, etc.)
- I use them without a prescription to treat a medical condition or medical symptoms (e.g., obtain or purchased from a family member, friend, or other)
- I sometimes take prescription drugs and then drink alcohol
- I use them without a prescription for fun or other recreational reasons (e.g., to get high or relax)
- I sometimes use them as a study aid (e.g., they help me stay awake, focused, or concentrate)

3c. Which sedatives or tranquilizers have you been prescribed?

3d. Which sedatives or tranquilizers have you used/experimented with?

4a. How often have you used stimulants (i.e., uppers, Adderall, or Ritalin) over the past 4 months?

- Never
- Monthly or less
- 2-4 times per month
- 2-3 times per week
- 4 or more times per week

4b. How have you used stimulants (i.e., uppers, Adderall, or Ritalin) over the past 4 months?
Check all that apply:

- Used as prescribed by my doctor to treat a medical condition or medical symptoms
- I have a prescription but sometimes do not use it as prescribed (e.g., I take more than prescribed, snort pills, etc.)
- I use them without a prescription to treat a medical condition or medical symptoms (e.g., obtain or purchased from a family member, friend, or other)
- I sometimes take prescription drugs and then drink alcohol
- I use them without a prescription for fun or other recreational reasons (e.g., to get high or relax)
- I sometimes use them as a study aid (e.g., they help me stay awake, focused, or concentrate)

4c. Which stimulants have you been prescribed?

4d. Which stimulants have you used/experimented with?

5a. How often have you used cannabis (i.e., pot, hash, hash oil, etc.) over the past 4 months?

- Never

- Monthly or less
- 2-4 times per month
- 2-3 times per week
- 4 or more times per week

5b. How have you used cannabis (i.e., pot, hash, hash oil, etc.) over the past 4 months? Check all that apply:

- Used as prescribed by my doctor to treat a medical condition or medical symptoms
- I have a prescription but sometimes do not use it as prescribed (e.g., I take more than prescribed, snort pills, etc.)
- I use them without a prescription to treat a medical condition or medical symptoms (e.g., obtain or purchased from a family member, friend, or other)
- I sometimes take prescription drugs and then drink alcohol
- I use them without a prescription for fun or other recreational reasons (e.g., to get high or relax)
- I sometimes use them as a study aid (e.g., they help me stay awake, focused, or concentrate)

5c. What strains have you been prescribed?

5d. Which cannabinoids have you used/experimented with?

6a. How often have you used tobacco products (i.e., cigarettes, chewing tobacco) over the past 4 months?

- Never
- Monthly or less
- 2-4 times per month
- 2-3 times per week
- 4 or more times per week

6b. How have you used tobacco products (i.e., cigarettes, chewing tobacco) over the past 4 months? Check all that apply:

- Used as prescribed by my doctor to treat a medical condition or medical symptoms
- I have a prescription but sometimes do not use it as prescribed (e.g., I take more than prescribed, snort pills, etc.)
- I use them without a prescription to treat a medical condition or medical symptoms (e.g., obtain or purchased from a family member, friend, or other)
- I sometimes take prescription drugs and then drink alcohol
- I use them without a prescription for fun or other recreational reasons (e.g., to get high or relax)
- I sometimes use them as a study aid (e.g., they help me stay awake, focused, or concentrate)

6c. Which tobacco products have you used/experimented with?

7a. How often have you used e-cigarettes (i.e., vape, Juul, e- cigarettes, etc.) over the past 4 months?

- Never
- Monthly or less
- 2-4 times per month
- 2-3 times per week
- 4 or more times per week

7b. How have you used tobacco e-cigarettes (i.e., vape, juul, e-cigarettes, etc.) over the past 4 months? Check all that apply:

- Used as prescribed by my doctor to treat a medical condition or medical symptoms
- I have a prescription but sometimes do not use it as prescribed (e.g., I take more than prescribed, snort pills, etc.)
- I use them without a prescription to treat a medical condition or medical symptoms (e.g., obtain or purchased from a family member, friend, or other)
- I sometimes take prescription drugs and then drink alcohol

- I use them without a prescription for fun or other recreational reasons (e.g., to get high or relax)
- I sometimes use them as a study aid (e.g., they help me stay awake, focused, or concentrate)

7c. Which e-cigarette products have you used/experimented with?

8a. How often have you used hallucinogens (i.e., LSD, shrooms, etc.) over the past 4 months?

- Never
- Monthly or less
- 2-4 times per month
- 2-3 times per week
- 4 or more times per week

8b. How have you used hallucinogens (i.e., LSD, shrooms, etc.) over the past 4 months? Check all that apply:

- Used as prescribed by my doctor to treat a medical condition or medical symptoms
- I have a prescription but sometimes do not use it as prescribed (e.g., I take more than prescribed, snort pills, etc.)
- I use them without a prescription to treat a medical condition or medical symptoms (e.g., obtain or purchased from a family member, friend, or other)
- I sometimes take prescription drugs and then drink alcohol
- I use them without a prescription for fun or other recreational reasons (e.g., to get high or relax)
- I sometimes use them as a study aid (e.g., they help me stay awake, focused, or concentrate)

8c. Which hallucinogens have you used/experimented with?

9a. How often have you consumed alcohol over the past 4 months?

- Never
- Monthly or less

- 2-4 times per month
- 2-3 times per week
- 4 or more times per week

9b. How have you consumed alcohol over the past 4 months? Check all that apply:

- Used as prescribed by my doctor to treat a medical condition or medical symptoms
- I have a prescription but sometimes do not use it as prescribed (e.g., I take more than prescribed, snort pills, etc.)
- I use them without a prescription to treat a medical condition or medical symptoms (e.g., obtain or purchased from a family member, friend, or other)
- I sometimes take prescription drugs and then drink alcohol
- I use them without a prescription for fun or other recreational reasons (e.g., to get high or relax)
- I sometimes use them as a study aid (e.g., they help me stay awake, focused, or concentrate)

Additional Note for Reader:

Questions pertaining to e-cigarettes (question 7) and hallucinogens (question 8) were not included as data in Studies 2 or 3. E-cigarette questions were not included due to their likely overlap with the preceding tobacco questions, and hallucinogen questions were not included due to the low (and thus potentially identifying) endorsement rates of the items.