JAMES COOK UNIVERSITY

DOCTORAL THESIS

Development of the Singapore Youths' Drug Attitudes Scale (SYDAS) to Understand Youths' Attitudes towards Illicit Drugs

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Abstract

Illicit drug use among youths is a challenging problem internationally and locally. This research aims to understand the attitudes of Singaporean youths towards drugs through three studies. In Study 1, 245 drug users and 449 non-users answered the questions pertaining to Singapore Youths' Drug Attitudes Scale (SYDAS) and their assessment of the risk of drugs for the purposes of validating the SYDAS. The eventual SYDAS was a reliable and valid 12-item scale for use with the Singapore youth population. In Study 2, a sub-set of participants (85 users and 370 non-users) from Study 1 were tested to determine the factors that affected drug attitudes among Singaporean youths. Findings showed that the number of close friends youths had with a drug history, their gender, being of other ethnicities (non-Chinese, non-Malays, non-Indians), having prior drug use experience, and if they were rarely monitored by their parents significantly predicted their drug attitudes, explaining 21.5% of the variance. Using the Theory of Planned Behavior, Study 2 also examined the link between youths' drug attitudes to their drug use intention and their actual drug use. The results showed that there was a significant effect of drug attitudes on drug use through intention. In Study 3, a separate group of 36 users and 30 non-users participated in a semi-structured interview on their attitudes towards drugs, reasons for drug use, and preventive education. Results showed that users tended to have more rationalisations for drug use but both groups had a good understanding for users' reason for use. Both groups indicated the need to improve preventive education. Strategies for youth drug prevention are discussed.

Key words: Illicit drugs, youths, attitudes, scale, preventive education.

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List of Acronyms

Alternative High School (ATS)

Canadian Tobacco Alcohol & Drugs Survey (CTADS)

Canadian Tobacco & Nicotine Survey (CTNS)

Canadian Tobacco Use Monitoring Survey (CTUMS)

Central Narcotics Bureau (CNB)

Comparative Fix Index (CFI)

Confirmatory Factor Analysis (CFA)

Enthusiastic Substance Use Attitude Scale (ESUAS)

European School Survey Project on Alcohol and Other Drugs (ESPAD)

Exploratory Factor Analysis (EFA)

Kaiser-Meyer-Olkin measure of sampling adequacy (KMO)

Little's Missing Completely at Random (MCAR)

Lysergic Acid Diethylamide (LSD)

Marijuana Medical Law (MML)

Monitoring the Future (MTF)

Principal Axis Factoring (PAF)

Principal Components Analysis (PCA)

Prescription Drugs Attitudes Questionnaire (PDAQ)

Primary School Leaving Examination (PSLE)

Recreational Marijuana Law (RML)

Root Mean Square Error of Approximation (RMSEA)

Singapore Armed Forces (SAF)

Singapore-Cambridge General Certificate of Education Normal Level (GCE 'N' Levels)

Singapore-Cambridge General Certificate of Education Ordinary Level (GCE 'O' Levels)

Singapore Youths' Drug Attitudes Scale (SYDAS)

Task Force on Youths and Drugs (TFYD)

Theory of Planned Behaviour (TPB)

Tucker-Lewis Index (TLI)

Chapter 1: Introduction

International Drug Use Among Youths

Illicit drug use is a challenging problem worldwide. Illicit drug use refers to the use of controlled substances under both international and local legislation (Central Narcotics Bureau, 2024; United Nations Office on Drugs and Crime, 2023). In 2021, 296 million people within the age of 15 to 64 years old were estimated to be using drugs, making this 5.8% of the global population within this age range (United Nations Office on Drugs and Crime, 2023). Drug use is an even more challenging problem among the youths. The prevalence of drug use among youths was reported to be higher than among adults. It was estimated that 5.3% of those aged 15 to 16 years old (totalling up to 13.3 million people) had used cannabis in 2020 (or the most recent year for which data were available) compared to 4.1% of the entire population of individuals in the productive age of 15 to 64 years old (United Nations Office on Drugs and Crime, 2022). Reports also indicated that young people of this generation are using drugs more than those in previous generations (United Nations Office on Drugs and Crime, 2023). Higher drug use among the young can be concerning. For instance, early drug use initiation can lead to quicker drug dependence in youths as compared to adults. Early onset of cannabis use was also shown to result in poorer verbal intelligence in youths and can potentially be a gateway to other harder drugs with more detrimental effects (Chia et al., 2023). These can have long-lasting negative effects, especially since such drug use occurs when the youths' brains are still developing (United Nations Office on Drugs and Crime, 2023). Drug use is also a risk factor for youth suicidality, and youth drug use was postulated to contribute to suicide lethality (Choo et al., 2018) and youth suicide rates, which have been rising faster as compared to other age groups (Choo et al., 2017; 2018).

Local Drug Use Among Youths

Local statistics in Singapore indicated that the number of people beginning to experiment with drugs remained high. From 2022 to 2023, those arrested for drug use for the first time remained at about one-third of the total number of drug users who were arrested by the authorities (Central Narcotics Bureau, 2023). Amongst these new users, the younger population is at risk of substance use initiation (Kosterman et al., 2000; United Nations Office on Drugs and Crime, 2022).

Youth drug users arrested who were under 30 years of age formed half of the new drug users in 2023 (Central Narcotics Bureau, 2024). Among the youths below 20 years old, crystal methamphetamine (ice) remained the top choice for drug use, followed by cannabis and ecstasy. The number of cannabis users arrested in 2023 reached a 10-year high, with a 17% increase in 2023 compared to 2022. Out of these cannabis users arrested, the number of new users increased by 8%, from 168 in 2022 to 182 in 2023, of which approximately two-thirds were young drug users below 30 years old. More youths below the age of 20 years old were also arrested for taking cannabis in 2022 as compared to 2021 (Central Narcotics Bureau, 2024). This suggested that use of drugs among Singaporean youths mirrored global trends where cannabis remains a popular drug of choice (United Nations Office on Drugs and Crime, 2023). Perceptions of cannabis as being medicine for certain conditions and thus perceived as less or not harmful is a cause of concern (Central Narcotics Bureau, 2024). While cannabis remains an illicit drug, the government of Singapore allows the safe and controlled access to evidenced-based use of pharmaceutical products containing cannabinoids as medical treatment options (Ministry of Home Affairs, 2019).

Definition of Youth

To ensure a clear understanding of the term "youth" used in this study, a definition of youth must be clearly stated. With respect to the age of youths used in this study, the United Nations defines youths as persons between the age of 15 to 24 years old (United Nations, n.d.). In Singapore, youths are defined as persons who are between the age of 15 to 35 years old (Government of Singapore, 2024a). However, as this is a study focusing on drugs, this research shall follow the age range used by the National Council Against Drug Abuse, who defined youths as those between 13 to 30 years old within their research study (National Council Against Drug Abuse, 2020). The lower age limit was extended from 13 years old (used in the study by the National Council Against Drug Abuse) to 12 years old, as youths as young as 12 years old were also arrested for drug use in Singapore (Tang, 2024). Hence, the age range for youths in this study shall be defined as persons between the age of 12 to 30 years of age.

Theories of Youth Drug Use

Prior to becoming addicted or dependent on drugs, youths go through a stage of experimental drug use. Scientists have always tried to understand the reasons why youths engage in experimental drug use (Petraitis et al., 1995). This is especially critical for drug use, since the consequences for its use are dire (Central Narcotics Bureau, 2024; Choo et al., 2018; Defoe et al., 2022). Several theories have been used to understand the reasons why youths engage in experimental drug use (Petraitis et al., 1995).

Social Learning Theories

The Social Learning Theory primarily refers to the crime and deviance theory developed by Akers (1973). This theory was originally proposed in collaboration with Burgess (1966) as a behavioristic reformulation of Sutherland's differential association theory of crime originally developed in 1937. Sutherland's theory stated that systematic

criminal behavior is developed because of people's "differential association" between those who commit crimes and those who are law abiding. "Differential association refers to the process whereby one is exposed to normative definitions favorable or unfavorable to illegal or law-abiding behavior… The groups with which one is in differential association provide the major social contexts in which all the mechanisms of social learning operate" (Akers, 1973, p. 64). One of the most important referent groups for youths is their role models, particularly their family and friends. The social learning theory asserts that youth's drug use begins with how they observe and imitate their role models in their drug use. This is followed by encouragement and support (i.e. social reinforcement) from role models, specifically their parents and close friends. Eventually youths take drugs because they expect positive social (e.g. acceptance by drug use peers) and physiological (positive physiological effects of the drug) consequences from drug taking (Akers, 1973; Petraitis et al., 1995).

The Social Cognitive Learning Theory (Bandura, 1977; 1986) asserts that youths also acquire their beliefs about experimental drug use from their role models, especially their parents and peers who are also drug users (Petraitis et al., 1995). However, instead of just being passive observers of their role models, youths' behaviors are a result of their constant interaction with the environment (Whitham et al., 2013). Exposure to parents and peers who use drugs shape two types of drug attitudes in youths. The first posits that youths who observe role models experimenting with drugs will shape their beliefs about outcome expectations, including personal, social, and physiological consequences of drug use. Youths who observe their parents and peers enjoying drug use and having positive social interactions are likely to form positive beliefs about their own drug use. The second way which role models will influence youth's beliefs about drugs is through self-efficacy. There are two types of self-efficacy. The use self-efficacy refers to a youth's belief that

they can successfully obtain and use the drug. The refusal self-efficacy refers to a youth's belief in the ability to refuse the social pressure to take drugs (Petraitis et al., 1995). A youth who has no long-term plans to take drugs might still engage in drug-taking behaviors if he/she does not believe that he/she has the skills to refuse the peer pressure to take drugs. Observing parents and peers buy and use drugs can provide youths with use self-efficacy, while observing a peer resisting drugs can increase their refusal self-efficacy. In fact, youths do not need to necessarily observe significant others to be influenced. Hearing about influential people talk about the use of drugs can also influence their beliefs towards drug use (Petraitis et al., 1995).

Studies have shown empirical support for the social learning theories. Particularly, studies landed support on the influence of role models and significant others in youths' drug use behaviors. For instance, in a study involving Singaporean youths, it was found that having peers who were drug users was the key factor that differentiated the youth drug users from the non-users. From this study, it was shown that the peers provided access and opportunity for youths to begin drug use (Ministry of Home Affairs, 2015a; 2015b). Drug-using peers were found to be one of the greatest influences of youth drug use (Hawkins et al., 1992). Hawkins et al. (1992) also suggested that parents who are able to internalise traditional values and form a strong parent-child attachment with their children will also prevent their youths from associating with drug use peers, thereby preventing drug use initiation.

Conventional Commitment and Social Attachment Theories

While the social learning theories suggest that role models can significantly influence youths' drug use behaviors, the theories do not explain why some youths are influenced by their role models while others are not (Simons et al., 1988). The conventional commitment and social attachment theories postulate that youths who have

weak bonds to conventional society and role models (i.e., parents and peers who are assumed to have conventional anti-drug values) will have a higher propensity to be detached from conventional influences which encourage drug use. Two theories have been developed to explain the reasons behind the level of attachment that youths have with conventional society and role models.

The Social Control Theory (Hirschi, 1969) asserts that deviant behaviors occur when youths' bonds to society are weakened or broken. The theory postulates three reasons why youths have weak bonds to conventional society and role models. Firstly, youths form strong bonds with conventional society and role models only when they are effectively socialized to adopt conventional standards. When youths fail to form these bonds, drug use can occur. Secondly, youths can experience strain when there is a discrepancy between their aspirations and the perception of the opportunities to achieve those aspirations. Youths who are frustrated by the lack of opportunities will have a higher chance of being attached to deviant peers, encouraging drug use. Similarly, youths experiencing strain at home due to the lack of strong bonds with their parents will also attach themselves to anti-social peers who encourage drug use. Finally, youth deviancy and drug use is related to social disorganization, particularly related to the physical structure of the place they live in including its physical deterioration and proximity to industrial land usage, as well as other human problems such as adult crime, poverty, suicide, disease, and family instability (Shaw & McKay. 1942). It is believed that youths are unable to form strong bonds with conventional society if they come from disorganized neighborhoods. They are also not bonded to their parents if they come from disorganized families with absent parent/s or if their parents are divorced (Petraitis, 1995)..

The Social Development Model posits that a youth's drug use behavior is influenced by their parents, peers, and school during their developmental years, with each

of these groups having a different impact during various phases. This theory suggests that parents and the school are important for the socialization of youths (Hawkins & Weis, 1985). Hence, youths become acquainted with drug use peers if they do not have opportunities and skills for rewarding and positive interactions at home and in school (Petraitis et al., 1995).

Studies have shown evidential support for the conventional commitment and social attachment theories. Research indicated that experimental drug use is more common among the socially non-conforming, alienated, or rebellious youths (Petraitis et al., 1995). Strain, in terms of the lack of parent-child bonding and maternal involvement in activities, are also associated with drug use initiation. Studies have also shown that experimental drug use is more common among youths who perform poorer academically. Youths from disorganized families, where parents are divorced or where there is parental marital discord, is also associated with more drug use (Hawkins et al., 1992; Petraitis et al., 1995). Positive social skills and interactions have also been shown to influence youth drug use behaviors. For instance, experimental drug use is more commonly found among youths who report feeling rejected by their parents. Drug use is also more frequent among youths who are more irritable and interpersonally aggressive (Hawkins et al., 1992; Petraitis et al., 1995). However, the conventional commitment and social attachment theories may not be able to entirely explain the drug use behaviors of some youths in Singapore. For instance, local research has found that youth cannabis users are similar in many respects to non-drug users in that they have strong family support, close parental supervision, and have performed well academically (Ministry of Home Affairs, 2015a; 2015b). In addition, these theories argue that association with drug use peers influences youth drug use directly. However, this disregards the fact that drug use peers influence drug use indirectly through youths' own drug attitudes (Petraitis et al., 1995).

Theories where Intrapersonal Factors Play a Key Role

Regardless of the social setting they are in, youths' intrapersonal differences play a key role in affecting their attachment to drug use peers and motivation to use drugs (Petraitis et al., 1995). The Social Ecology Model suggests that youths' stress, particularly school-related stress, causes them to withdraw from school activities and to be attached to drug use peers, eventually using drugs as a way of relieving stress. The theory also suggests that youths who doubt their own academic skills are more likely to perceive school as being stressful (Petraitis et al., 1995). On the other hand, the Self-derogation Theory (Kaplan et al., 1984) postulates that youths who experience rejection or lack validation from others whom they value will experience low self-esteem and engage in frequent self-derogation, which is highly distressing. These youths will become alienated from conventional others and eventually compensate for their low self-esteem and feelings of rejection through associating with anti-social peers and engaging in rebellious and anti-social behaviors such as drug use (Petraitis et al., 1995).

The Family Interaction Model states that children are at risk of a variety of problems, including experimental drug use, if they have parents who lack conventional values or provide little affection towards them, and mothers who are psychologically maladjusted or exert little control over them. Individually, these children and youths also have characteristics such as low achievement orientation, poor ego strength, low self-esteem, high sensation-seeking, and impulsivity (Petraitis et al., 1995).

The Multistage Social Learning Model (Simons et al., 1988) posits that youths' experimental drug use begins with poor parenting practices and parental drug use which negatively impact on the youths' psychosocial development, such as low self-esteem, poor coping and social interaction skills, poor academic achievement, emotional distress, and values that emphasize present-oriented and hedonistic goals over long-term oriented goals.

These increase the propensity of youths to attach themselves to anti-social and drug-use peers. This model further delves into the factors that cause youths to progress from experimental drug use to regular use and abuse. For instance, youths who observe their parents and friends who engage in heavy drug abuse are likely to do the same (Petraitis et al., 1995).

Adolescence marks a period of difficulty and stress for many youths (Eccles et al., 1993) and some use drugs as a method to cope with the stress that they face during this period. Local research (Ministry of Home Affairs, 2012; 2015a) provides evidence for the Social Ecology Model which shows how stress can contribute to youth drug use. For instance, using drugs to cope with stress was found to be one of the key methods amongst Singaporean youths. It was widely accepted that those who rely on drugs to cope use them to manage their moods and emotions (Labouvie, 1986). On the other hand, active coping strategies such as planning and problem solving have been found to protect youths against drug use (Wills et al., 2001; 2006). Low acceptance by peers also seemed to put youths at risk for school problems, criminality, and drug use (Hawkins et al., 1992).

Intrapersonal characteristics such as impulsivity and sensation-seeking have also been shown to affect drug use. Trait impulsivity has been found to be a risk factor in drug experimentation and use, as well as the inability to abstain from drugs (Tarter et al., 2007; de Wit, 2008). As a state, brief impulses impair an individual's ability to abstain from drugs, usually due to "disinhibition" or lapses in decision making due to the inability to delay gratification for a riskier choice (Adinoff et al., 2007, Perry & Carroll, 2008). Sensation-seeking in youths has also been linked to reckless behaviors such as dangerous driving, unsafe sex, and substance use including marijuana and alcohol (Comeau et al., 2001; Ersche et al., 2010; Martins et al., 2008; Morojele et al., 2002; Wu, 2010).

Support from the multistage social learning model came from Kaplow et al. (2002) which found that children with two or more risk factors (if the child is male, have more thought problems, poorer social problem-solving skills, higher overactivity, and if he/she has a parent who has poorer verbal reasoning and/or abuse substances) had at least a 50% chance of early-onset substance use. While comprehensive, it should be noted that the multistage learning model was developed to capture youths' drug use from experimentation to regular use and abuse. In fact, Kaplow and colleagues (2002) attested to their findings being supportive of youth at risk for drug use experimentation but not drug abuse. In addition, there have been longitudinal studies which have not supported the relationships between self-esteem and experimental drug use, and between emotional distress (e.g. depression, anxiety) and experimental drug use (Petraitis et al., 1995).

Risk Factors and Attitudes in Affecting Drug Use Behaviors

In the preceding theories discussed, there are several risk factors that can influence youth drug use. The social learning theories and the conventional commitment and social attachment theories emphasize distal factors (parents, peers, school, and community) that influence youth drug use, disregarding the importance of proximal factors (youths' own beliefs and attitudes) that can directly influence such behaviors. Moreover, the Social Cognitive Theory has also alluded to the importance of the direct influence of youths' own attitudes and beliefs in self-efficacy when determining whether to consume drugs (Petraitis et al., 1995). On the other hand, though theories like the Social Ecology Model, Family Interaction Model and the Multistage Social Learning Model emphasise intrapersonal characteristics in influencing experimental drug use, these theories also downplay the impact of cognitive processes in influencing youth drug use. This is pertinent because studies have shown that intrapersonal factors do not affect experimental drug use directly, but rather indirectly through affecting the beliefs and attitudes of youths (Petraitis et al.,

1995). From this perspective, it means that understanding youths' drug-related cognitions (i.e., attitudes and beliefs) are key to understanding drug use initiation as attitudes are risk factors for drug use (Schwinn et al., 2016). This can also be a critical step in preventing experimental youth drug use and for experimental use to progress into abuse.

The Theory of Planned Behavior

The Theory of Planned Behavior (TPB) (Ajzen, 1991) has been used in explaining how attitudes can play a critical role in influencing intention and behavior and can be used in relation to drug use. Ajzen (2005) defined an attitude as a "disposition to respond favorably or unfavorably to an object, person, institution, or event" (p. 3). While social psychologists might not agree on a single, formal definition, most agree on its evaluative (e.g., pros and cons; pleasant or unpleasant) characteristic. The TPB is an extension of the Theory of Reasoned Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) and it postulates three determinants of intention – the attitude towards the behavior, subjective norm, and perceived behavioral control. The TPB posits that an individual's drug-cognitions directly affect how an individual evaluates and decides on whether to engage in drug use. It is largely a decision-making model based on the individual's cost-benefit analysis of engaging in drug use (Petraitis et al., 1995).

The attitude towards the behavior refers to how a person evaluates whether the drug use behavior is favorable or unfavorable. This is determined by one's beliefs about the outcome of drug use. This affects the intention towards drug use and once the intention is set, an individual is assumed to be more motivated to use drugs that he or she rates as positive. The second predictor is the subjective norm and refers to the perceived social pressure to use drugs based on whether one thinks the important referent groups or individuals will approve or reject it, and the motivation to conform to these norms. The third antecedent is the degree of perceived behavioral control, which is an individual's idea

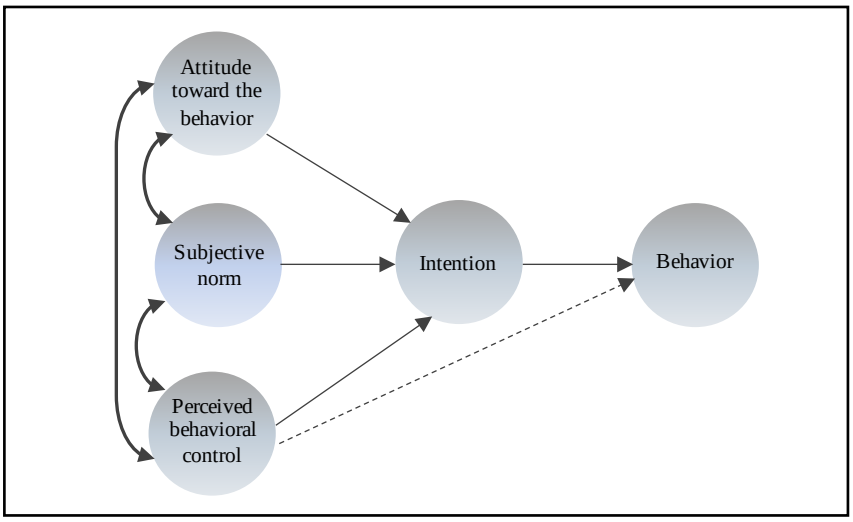
of how easy or difficult it is to engage in drug use (Ajzen, 2005). This reflects one's past experiences and anticipated obstacles. Individuals often do things they think they can control and master, an idea similar to self-efficacy (Rueda et al., 2015).

Links Between the TPB, Drug Use Intention and Behavior

The TPB has been shown to be a useful model in predicting health and particularly drug-related behaviors (e.g., Armitage et al., 1999; Conner & Mcmillan, 1999; Mcmillan & Conner, 2003). Across studies, it has been shown that attitudes, subjective social norm and perceived behavioral control predict intention, while intention and perceived behavioral control predict behavior (Mcmillan & Conner; 2003). Conner and Mcmillan (1999) tested the TPB in a population of undergraduate students and found that more positive attitudes and perceived pressure from salient others to use cannabis predicted their intention to use cannabis more frequently. When they perceived that they had more control over cannabis use, they also intended to use it more frequently. The authors also found that the students' intentions to engage in cannabis use was associated with actual cannabis use behaviors.

Figure 1

Theory of Planned Behavior (Adapted from Ajzen, 1991)



Similar effects were found in other studies where social and personal norms, attitudes, and perceived behavioral control predicted youths' intentions to use drugs and their later drug use (Kam et al., 2009; Mcmillan & Conner, 2003). When the TPB was tested on different drugs such as cannabis (Armitage et al., 1999; Conner & Mcmillan, 1999), ecstasy (Conner et al., 1998; Orbell et al., 2001), amphetamine and LSD (Mcmillan & Conner, 2003), it was found that attitudes were generally the strongest predictor of intention, and intention was the strongest predictor of drug use. Particularly, youths with positive attitudes towards drugs were 4.6 times more likely to use drugs (Mousavi et al., 2014). These research findings reinforced the pathway of the relationship between attitudes towards drugs and drug use intention, and the relationship between intention and eventual drug use. Hence, the present research will also focus on studying this pathway, rather than the entire theory.

Despite the strong research showing the influence of attitudes on youth drug use intention and behaviors, several factors have also been found to influence the valence and effect that attitudes have. For example, attitudes towards cannabis use were found to predict youths' intention to use the drug only when using drugs were not against their personal moral norms, i.e., whether they felt guilty or if it was morally or principally wrong to use cannabis (Conner & Mcmillan, 1999). While attitudes were found to be a significant predictor of intention for cannabis use, youths were more likely to use the drug if they also perceived themselves as being more confident in using it (Armitage et al., 1999). In addition, the strength of an attitude could also contribute to how much it can affect drug use intention. Mcmillan and Conner (2003) found that for youths who held higher levels of attitudinal variability towards ecstasy and LSD, attitudes were less likely to affect their intentions to use these drugs. Similarly, youths were only influenced by their friends' opinions when they held ambivalent attitudes towards cannabis use, rather than

when they were certain about their attitudes (Hohman et al., 2014). Hence, it seems that while others can influence the attitudes of youths, the strength of an attitude plays a part in how much they are influenced by others, and this in turn influences their intention to consume drugs.

It is also critical to establish if intention for drug use will lead to actual drug use behavior, as behaviors are what we want to measure and control for drug use prevention and education. As presented earlier, youths' drug use intention predicted their later drug use (Armitage et al., 1999; Conner & Mcmillan, 1999; Conner et al., 1998; Hohman et al., 2014; Orbell et al., 2001). However, intentions may not always lead to actual behavior. This is due to the possibility of a "behavior-intention gap" (Sheeran & Webb, 2016, p. 503), where people do not always do what they set out to do. There are numerous reasons why intentions do not always lead to behaviors, such as individuals presenting with overly optimistic goals, prior experience with the behavior, missing opportunities to act, and procrastination (Sheeran & Webb, 2016).

Another potential issue arising from using the TPB for explaining drug use intention and behaviors among youths is that the theory does not explain why some youths hold more positive attitudes than others. However, it should be noted that the theory was not developed as a comprehensive theory of substance use behavior, but as a model to explain the most immediate and proximal causes of behavior (Petraitis et al., 1995). Hence, it is important to understand the factors causing some youths to hold more positive attitudes versus those that hold more negative attitudes.

Understanding Singaporean Youths' Attitudes and Use of Drugs

Evidently, attitudes play an important role in affecting youth drug intention and actual drug use behaviors (Armitage et al., 1999; Conner & Mcmillan, 1999; Conner et al., 1998; Hohman et al., 2014; Orbell et al., 2001). However, there are also factors affecting

the effects of attitudes on drug use intention, and drug use intention may not always be associated with drug usage. In the context of a Singaporean youth population, it is important to understand the factors influencing local youths' drug use attitudes and establish if there is indeed a relationship between youths' drug attitudes, intention, and behaviors.

Drug use attitudes can be affected by various factors, including family, friends, community, and individual factors. For example, having absent parents, more peer pressure, having undergone harsher punishments, poorer academic achievements, lower socioeconomic status, and a greater availability of drugs can contribute to more positive attitudes towards drugs (Mousavi et al., 2014). The decriminalization of cannabis within countries such as the United States (U.S.) seems to have also caused a global shift in attitudes towards drug use, increasing the acceptance of cannabis and subsequently other drugs (Central Narcotics Bureau, 2023). With decriminalization and the proliferation of social media, Singaporean youths have ready access to online information such as YouTube, Facebook, Twitter and presently Tik Tok. News regarding law changes that allow use of recreational and medical use of cannabis, and information on alleged medical properties of cannabis can influence attitudes towards drug use (Harrison et al., 2023; Loria, 2018; National Council Against Drug Abuse, 2017). Furthermore, media celebrities (Michaels, 2014) and movies can also promote the use of illicit drugs. With this global shift in attitudes, Singaporean youths have also shown to become more liberal towards drug use (National Council Against Drug Abuse, 2017).

Changing Attitudes to Prevent Drug Use

While this research aims to understand youths' drug attitudes and the links to drug use initiation, the purpose is to eventually prevent drug use. Drug use can be costly to the health of the youths and lives of their families. Since the focus of the study is on drug use

attitudes and beliefs, drug use prevention is key. Drug use prevention should also focus on persuasive messages that aim to change pro-drug attitudes. Based on preliminary research, Pertraitis et al. (1995) suggested various ways of how preventive messaging can potentially help change youth drug attitudes. First, preventive messages can possibly increase youths' expectations about the adverse consequences of drug use initiation and thus decrease their expectations of its potential benefits (Petraitis et al., 1995). For instance, messages can highlight the potential health dangers of using cannabis while providing factual information about the limits of cannabis being a treatment for certain medical conditions (United Nations Office on Drugs and Crime, 2023). Second, messages should target changing how youths evaluate the apparent costs and benefits of drug use initiation, giving more emphasis when evaluating the costs as compared to the benefits. For example, messages can graphically present all the specific health risks of using cannabis and how costly (i.e., risky) this can be to the individual (Petraitis et al., 1995). Third, messages can also challenge what youths think is the conventional perspective towards drug use. For instance, with the decriminalization of cannabis and the increase of information online (Ministry of Home Affairs, 2015a; 2015b), youths may think that the society is accepting of cannabis use. Youths may also overestimate the prevalence of cannabis use among their peers (Petraitis et al., 1995). Messages can help change such misconceptions. Lastly, significant others such as parents, peers, school teachers, and media celebrities can affect youths' attitudes towards drug use (Hawkins et al., 1992; Michaels, 2014; Ministry of Home Affairs, 2015a; 2015b; Petraitis et al., 1995). With the results of this study, the discussion shall aim to inform how the findings can effectively prevent youths from engaging in drug use, and for those who have already tried drugs the focus will be on how to prevent relapse.

The Present Study

The present research consists of three studies with different research aims. This present chapter, Chapter 1, introduces the severity of drug issues among youths internationally and within Singapore and identifies how attitudes are linked to drug use intention and drug use behaviors among youths. The chapter also presented several theories that explained drug use among youths (the Social Learning Theories, the Conventional Commitment and Social Attachment Theories, theories involving intrapersonal factors and the Theory of Planned Behavior). However, the key focus of this thesis is on the Theory of Planned Behavior. As explained, while the theory has three components – attitudes, perceived behavioral control and subjective norm that can lead to drug use intention, this study only focuses on the pathways of attitudes to intention and intention to drug use. Chapter 2 presents a scoping review on youths' attitudes towards drugs to establish the extent of the research from 2014 to 2024. This will help to identify the scope of the parameters for this research. Chapter 3 aims to identify the factors that are associated with drug attitudes among youths. As described in the earlier paragraphs, the Theory of Planned Behavior, as a theoretical framework, does not address the factors associated with youth drug attitudes. This research aims to identify those factors that are associated with shifts in drug attitudes for youths (e.g., family, friends, past drug experiences) so that the relevant variables can be incorporated into the present study to understand if such factors are associated with the drug attitudes of Singaporean youths. Chapter 4 reviews the existing research on drug attitudes scales, particularly those established for use on youths. This is critical as a well-validated drug attitudes scale is the premise to accurately measure attitudes. Chapter 5 describes the method that is used to carry out this research, while Chapters 6 and 7 describe the results for the quantitative and qualitative studies, respectively. Chapter 8 presents the discussion of the research.

There are three studies within this present research consisting of two quantitative and one qualitative study. As discussed earlier, a good drug attitudes scale for youths is the premise for measuring youths' drug attitudes. Hence, Study 1 aims to develop a well-supported, empirically validated and reliable scale for use with the Singapore youth population. This scale, known as the Singapore Youths' Drug Attitudes Scale (SYDAS) is intended to measure the extent to which youths hold pro-drug attitudes (how positive they are) towards illicit drugs. As this is a validation study, the hypotheses of the study aim to demonstrate that the scale has strong validity. Hypotheses 1 and 2 are related to criterion validity while hypothesis 3 is related to the known-groups validity.

H1: Youths' drug attitudes scores should be negatively correlated with their assessment of the harmfulness of illicit drugs.

H2: Youths' drug attitudes scores should be negatively correlated with their assessment of the addictiveness of illicit drugs.

H3: Drug users' scores on the SYDAS should be significantly higher than non-users scores on the SYDAS.

To further understand the attitudes of the youths within the Singapore context, Study 2, also a quantitative study, aims to determine the factors associated with the attitudes of youths in Singapore. There are six hypotheses that link the factors to the attitudes of Singaporean youths. Hypotheses 4 to 7 were based on preliminary knowledge and understanding of risk factors associated with drug attitudes and drug use among youths (Hawkins et al., 1992; Ministry of Home Affairs, 2015a; 2015b; Mousavi et al, 2014). Friends were included as a factor in this study as they were found to be a significant source of influence for youth drug use (Allen et al., 2003; Kosterman et al., 2000; Liu et al., 2007; Otsuki, 2003; Schwinn et al., 2016; Siqueira et al., 2001; Wongtongkam et al., 2014). Families and parents were also included because they influence youths' drug use via poor

parenting practices, being the drug partners, modelling drug behaviors, and causing stress through family conflicts (Kosterman, et al., 2000, Maguire, 2013; Myers, 2013; Wu et al., 2010).

Hypothesis 8 on gender was based on past research where males showed more positive drug attitudes than females (e.g. Bull et al., 2017; Leos-toro et al., 2020; Mousavi et al, 2014; Myers. 2013) and data taken from the latest statistics from the Central Narcotics Bureau (2024) where approximately 81% of the new drug users arrested by the authorities in 2024 were males. For Hypothesis 9, low commitment to school was found to be related to youth drug use (Hawkins et al., 1992), hence youths with lower educational attainment were also hypothesised to have more pro-drug attitudes. Hypothesis 10 was based on the latest statistics from the Central Narcotics Bureau where there seemed to be a disproportionately higher number of Malays than Chinese who were reported to be new drug users. For instance, there was almost an equal number of Malays and Chinese new drug users being arrested in 2023 (Central Narcotics Bureau, 2024). However, this proportion did not equate to the actual population statistics in 2023, where the Chinese formed 75.6% and the Malays formed 15.1% of the Singapore population (Government of Singapore, 2023). Based on this, it is hypothesized that Malays would have more pro-drug attitudes than Chinese.

H4: Youths with close friends with a drug history are more likely than youths without close friends with a drug history to show pro-drug attitudes.

H5: Youths with less parental monitoring are more likely than youths with more parental monitoring to show pro-drug attitudes.

H6: Youths with family members with a drug history are more likely than youths without family members with a drug history to show pro-drug attitudes.

H7: Youths with family members with a criminal history are more likely than youths without family members with a criminal history to show pro-drug attitudes.

H8: Males are more likely than females to show pro-drug attitudes.

H9: Youths with lower academic achievements are more likely than youths with higher academic achievements to show pro-drug attitudes.

H10: Malays are more likely than Chinese to show pro-drug attitudes.

Study 2 also aims to determine if the pathways from attitudes to intention and intention to drug use as posited by the Theory of Planned Behavior (Ajzen, 1991) would be replicated among the Singaporean youths. Specifically, this study aims to determine if the pathway from attitudes to drug use among Singaporean youths are mediated by their drug use intention.

Study 3 is a qualitative study, which aims to gain a further understanding into Singaporean youths' attitudes and knowledge of drugs, the reasons for youths' drug use, and their perceptions of Singapore's preventive education. Together, all three studies aim to advance research, inform effective policymaking and suggest additional preventive education strategies for use within Singapore.

Chapter 2: Youths' Attitudes toward Illicit Drugs: A Scoping Review

International Drug Use Among Youths

Illicit drug use is a challenging problem worldwide (Central Narcotics Bureau, 2024; United Nations Office on Drugs and Crime, 2023). 296 million people within the age of 15 to 64 years old were estimated to be using drugs in 2021 (United Nations Office on Drugs and Crime, 2023). Drug use is an even more challenging problem among the youths as the prevalence of drug use among youths was reported to be higher than among adults. It was estimated that 5.3% of those aged 15 to 16 years old (totalling up to 13.3 million people) had used cannabis in 2020 (or the most recent year for which data were available) compared to 4.1% of the entire population of individuals in the productive age of 15 to 64 years old (United Nations Office on Drugs and Crime, 2022). Higher drug use among the youths can lead to various problems. For instance, early drug use initiation can lead to quicker drug dependence in youths as compared to adults. Early onset of cannabis use was also shown to result in poorer verbal intelligence in youths and can potentially be a gateway to other harder drugs with more detrimental effects (Chia et al., 2023).

Local Drug Use Among Youths

Local statistics in Singapore indicated that the number of people beginning to experiment with drugs remained high. From 2022 to 2023, those arrested for drug use for the first time remained at about one-third of the total number of drug users who were arrested by the authorities (Central Narcotics Bureau, 2023). Youth drug users arrested who were under 30 years of age formed half of the new drug users in 2023 (Central Narcotics Bureau, 2024). Among the youths below 20 years old, crystal methamphetamine (ice) remained the top choice for drug use, followed by cannabis and ecstasy. This trend of Singaporean youths' drug use mirrored global trends where cannabis remains a popular drug of choice (United Nations Office on Drugs and Crime, 2023). Perceptions of cannabis

as being medicine for certain conditions and thus perceived as less or not harmful is a cause of concern (Central Narcotics Bureau, 2024).

Effects of Attitudes on Drug Use Behaviors

Prior to becoming addicted or dependent on drugs, youths go through a stage of experimental drug use. Scientists have always tried to understand the reasons behind why youths engage in experimental drug use (Petraitis et al., 1995). This is especially critical for drug use, since the consequences for its use are dire (Central Narcotics Bureau, 2024). The Theory of Planned Behaviour (TPB) (Ajzen, 1991) has been used to explain how attitudes can play a critical role in influencing intention and behaviour and can be used in relation to drug use. The attitude toward the behaviour refers to how a person evaluates whether the drug use behaviour is favourable or unfavourable. This is determined by one's beliefs about the outcome of drug use. This affects the intention towards drug use and once the intention is set, an individual is assumed to be more motivated to use drugs that he or she rates as positive. The TPB has been shown to be a useful model in predicting health and particularly drug-related behaviours (e.g., Armitage et al., 1999; Conner & Mcmillan, 1999; Mcmillan & Conner, 2003).

Several factors have also been found to influence the valence and effect that attitudes have on drug use intention. For example, attitudes towards cannabis use were found to predict youths' intention to use the drug only when using drugs were not against their personal moral norms, i.e. whether they felt guilty or if it was morally or principally wrong to use cannabis (Conner & Mcmillan, 1999). While attitudes were found to be a significant predictor of intention for cannabis use, youths were more likely to use the drug if they also perceived themselves as being more confident in using it (Armitage et al., 1999). In addition, the strength of an attitude could also contribute to how much it can affect drug use intention. Mcmillan and Conner (2003) found that for youths who held

higher levels of attitudinal variability towards ecstasy and LSD, attitudes were less likely to affect their intentions to use these drugs. Similarly, youths were only influenced by their friends' opinions when they held ambivalent attitudes towards cannabis use, rather than when they were certain about their attitudes (Hohman et al., 2014). Hence, it seems that while others can influence the attitudes of youths, the strength of an attitude plays a part in how much they are influenced by others, and this in turn influences their intention to consume drugs. Based on these research findings, it reinforced the pathway of the relationship between attitudes towards drugs and drug use intention, and the relationship between intention and eventual drug use (Armitage et al., 1999; Conner & Mcmillan, 1999; Conner et al., 1998; Hohman et al., 2014; Orbell et al., 2001).

Present Study Aims

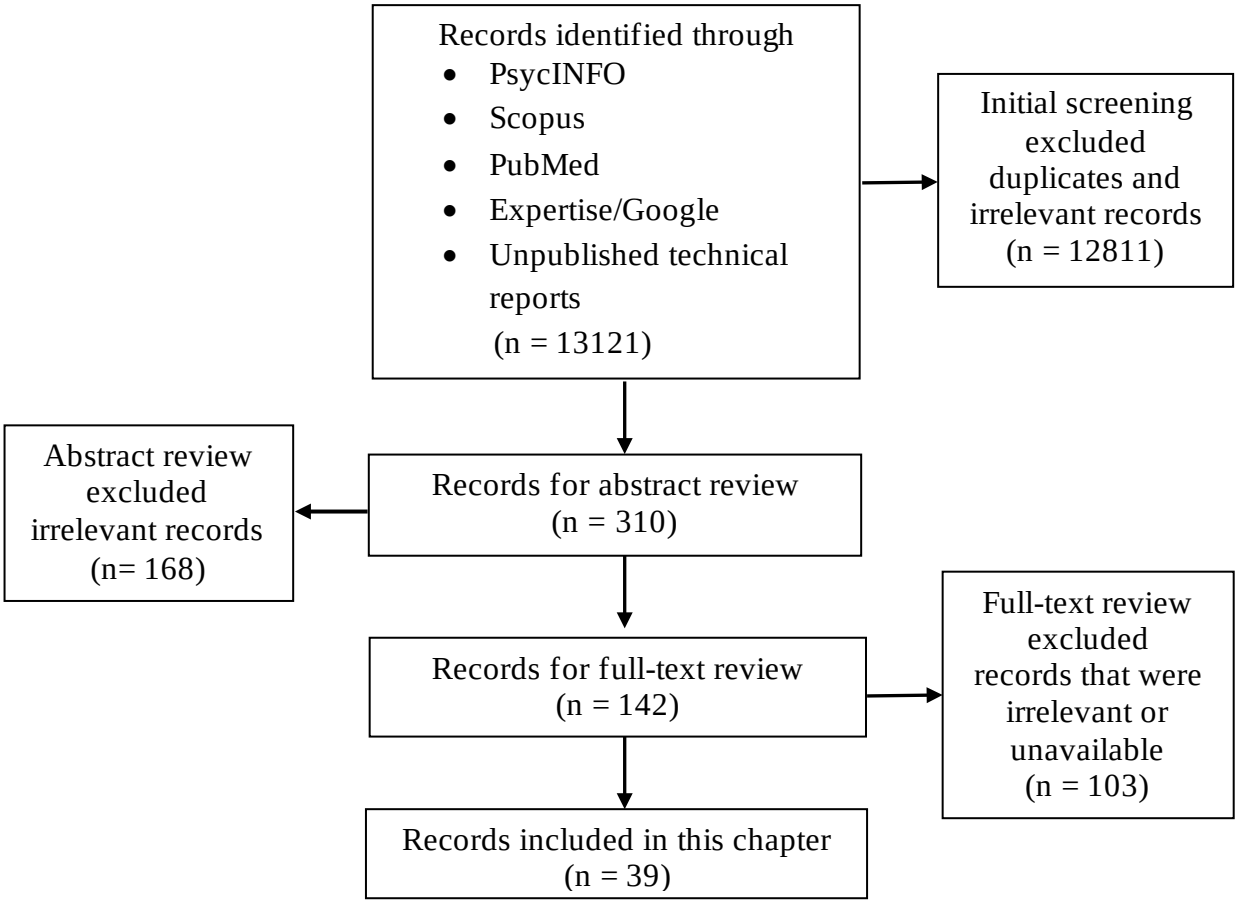
This paper aims to contribute to literature in three ways. First, this research aims to establish the extent of the research conducted thus far on youths' attitudes towards drugs over the past ten years (January 2014 – June 2024) and to understand how attitudes of youths have changed over the last ten years. A 10-year time frame was chosen because the present thesis was based on data taken from the Task Force on Youth and Drugs that had begun its research work in 2014. Hence, this review was based on the period of January 2014 to June 2024 (present). This review also aimed to understand the critical factors that have been linked to youth drug attitudes. While there has been research on the attitudes of youths on drugs, this review provides a synthesis of the literature in this field from the past ten years. Second, this review also contains unpublished data from technical reports (Ministry of Home Affairs, 2015a, 2015b). Third, it discusses what are the implications of the findings to Singapore, a country which holds a position with zero tolerance towards the use of illicit drugs (Ministry of Home Affairs, 2019).

Review Methodology

The literature was reviewed systematically using a multi-step process (see Figure 2). English language articles were searched using the PsycINFO, Scopus, and PubMed databases. Expert knowledge and google searches were also used to search for relevant articles. Due to the scarcity of this area of research in the local context, unpublished local technical reports were also included in this review. Other grey literature was not included in this review. The search terms (and their derivatives) used were ("youth" OR "young person") AND ("attitude" OR "perception") AND ("illegal drug" OR "illicit drug" OR "illegal substance" OR "illicit substance" OR "methamphetamine" OR "ice" OR "cannabis" OR "marijuana" OR "heroin" OR "new psychoactive substance"). The exclusion criteria excluded records with irrelevant populations not within the age range (12 – 30 years old) nor population of interest, (e.g., adults, clinicians, parents) and content (e.g., non-illicit drugs such as alcohol or nicotine, content-related attitudes towards therapy), to derive at the final set of articles for the current review. As a dissertation research and the main author's key area of study, the records/studies were only coded and reviewed by the main author. The papers reviewed contained a range of youths' attitudes towards drug and drug use. No primary data nor data from any human subjects were collected for this review.

Figure 2

Review Flow-chart



Review Results

A total of 13121 records were initially identified for review. After initial screening and removing of the duplicates, 310 records were left and screened by their titles and abstract. The abstract review resulted in 142 full-text records that were assessed for eligibility. After removing records that were not relevant and records which could not be found, 39 records were included in this review (including the unpublished technical report). Quality criteria were not used since it is not a criterion of the scoping review process (Grant & Booth, 2009).

Thirteen countries were represented in the present review. Most of the papers were from the United States (U.S.) with some from Canada, South America, and the rest from

other parts of the world. There was a paucity of papers from Eastern Europe, Africa and Asia, although this can be an artifact of excluding English language papers. There were only two papers from Singapore. The research consists of youths' self-reported attitudes towards drugs with most of the research employing quantitative surveys/questionnaires (28 papers) to collect the data. Other papers used the qualitative interviews/focus group discussions (8 papers) and the rest used mixed methods consisting of both quantitative and qualitative methods (3 papers). As this review was only concerned about illicit drugs, most of the papers were found to have examined youths' attitudes towards cannabis, with only a small number which looked at multiple drugs including cannabis (4 papers) and methamphetamine (2 papers). Full details of the papers can be seen in Table 1.

In the sub-sections that follow, this review will present youths' attitudes towards drugs as a determinant or an outcome. As an outcome, differences across time and jurisdiction have also been studied to determine how it has affected youths' attitudes towards drugs. Most of these studies focused on the differences in attitudes over time and across jurisdictions because of a change in the cannabis legislation, which refers to the Marijuana Medical Law (MML) and the Recreational Marijuana Law (RML). Youths' attitudes towards drugs have also been examined extensively to determine how it affects youths' perception of their psychological, physical and social health, as well as legal consequences. Different groups (e.g., users versus non-users) show diverse attitudes and this affects how they perceive the harmfulness of drugs.

Table 1

Articles included in the full review

Title	Author & Year	Country	N size	Age range	Mean Age	Gender distribution (if available)	Method	Drug/s examined*
Attitudes toward cannabis of users and non-users in Spain: A concept mapping study among university students	Alvarez-Roldan et al. (2023)	Spain	Focus groups: 56 Pile-sorting and rating: 140	Pile-sorting and rating: 19-24 years	Pile-sorting and rating: 21.6 years	Pile-sorting and rating: 77% females	Focus groups Pile-sorting and rating	Cannabis
Adolescent alcohol and cannabis use in Iceland 1995–2015	Arnarsson et al. (2018)	Iceland	European School Survey Project on Alcohol and Other Drugs (ESPAD) study: 19,865	Grade 10 (16 years)	Not available	Approximately 50% females	Quantitative survey	Cannabis

Perceived harm, addictiveness, and social acceptability of tobacco products and marijuana among young adults: Marijuana, hookah, and electronic cigarettes win	Berg at al. (2015)	U.S.	2002	Approximately19-23 years	21.02 years	71.6% females	Quantitative survey	Cannabis
Awareness, perception of risk and behaviors related to retail marijuana among a sample of Colorado youth	Bull et al. (2017)	U.S.	241	13-18 years	Not available	36% females	Quantitative survey	Cannabis
Does perception of drug-related harm change with age? A cross-sectional online survey of young and older people	Cheeta et al. (2018)	UK	184	18–24 years	21 years	61.4% females	Quantitative survey	Cannabis Heroin Cocaine Crack Cocaine Methamphetamine

Perceived factors influencing the initiation of methamphetamine use among Akha and Lahu youths: A qualitative approach	Chomchoei et al. (2019)	Thailand	41	15–24 years	Not available	Not available	Qualitative interviews	Methamphetamine
Marijuana risk perceptions are associated with past-month marijuana use among Black first-year college students at a historically Black university	D'Silva et al. (2022)	U.S.	213	16-21 years	18.4 years	52% females	Quantitative survey	Cannabis
Young adult cannabis users' perceptions of cannabis risks and benefits by chronic pain status	Fennell et al. (2022)	U.S.	176	18-29 years	24.08 years	Females: 47.2% Males: 48.9% Non-binary: 4.0%	Quantitative survey	Cannabis
"Is marijuana even a drug?" A qualitative study	Friese (2017)	U.S.	47	15-18 years	Not available	46.8% females	Qualitative interview	Cannabis

of how teens view marijuana use and why they use it								
Effects of risk perception and accessibility on cannabis use among young population in Spain: Findings from the 2016 national survey (ESTUDES)	González-Roz et al. (2022)	Spain	35,369	14-18 years	Not available	50.1% females	Quantitative survey	Cannabis
Adolescents and youths' opinions about the factors associated with cannabis use: A qualitative study based on the I-Change model	González-Cano-Caballero et al. (2023)	Spain	Focus group: 20 Interview: 8	Focus group: 14-17 years Interview: 16-20 years	Focus group: 15.5 years Interview: 18.1 years	Focus group: 65% female Interview: 12.5% females	Focus group Qualitative interview	Cannabis
Adolescent marijuana use and perceived ease of access before and after recreational marijuana	Harpin et al. (2018)	U.S.	Healthy Kids Colorado Survey (HKCS) Data: 24,171	Grade 6-12 (Approximately 11/12-17/18 years)	Not available	50.2% females	Quantitative survey	Cannabis

implementation in Colorado								
Monitoring the Future national survey results on drug use, 1975-2017: Overview, key findings on adolescent drug use	Johnston et al. (2018)	U.S.	44,500	Grade 8,10, 12 (13-18 years)	Not available	Not available	Quantitative survey	General drugs, including drugs such as cannabis, cocaine, LSD etc.
Knowledge, attitude, and expectancies related to cannabis use: A cross-sectional community study among college students from Bangalore, Karnataka	Kannan et al. (2024)	India	405	Approximately 18-22 years	20.16 years	55% females	Quantitative survey	Cannabis
How does state marijuana policy affect U.S. youth? Medical marijuana laws, marijuana use and perceived	Keyes et al. (2016)	U.S.	113,4734	Grade 8,10, 12 (13-18 years)	Not available	Not available	Quantitative survey	Cannabis

harmfulness: 1991–2014								
Attitudes, subjective norms, and perceived behavioral control associated with age of first use of cannabis among adolescents	Korn et al. (2021)	U.S.	NEXT Generation Health Study: 1848	Grade 10 (Approximately 16-17 years)	16.3 years	58.8% females	Quantitative survey	Cannabis
Attitudes to cannabis use and public prevention information among young adults: A qualitative interview study with implications for prevention practice	Kvillemo et al. (2022)	Sweden	32	18-29 years	Not available	46.9% females	Qualitative interview	Cannabis
The impact of cannabis legalization in Uruguay on	Laqueur et al. (2020)	Uruguay Chile	Uruguay: 10,000+ Chile:	12-21 years	Not available	Not available	Quantitative survey	Cannabis

adolescent cannabis use			30,000+					
Perceptions of cannabis use risk to mental health among youth in Canada, England and the United States from 2017 to 2021	Lemos et al. (2023)	Canada England U.S.	89,158	16-19 years	Not available	49%-48.8% females	Quantitative survey	Cannabis
Cannabis health knowledge and risk perceptions among Canadian youth and young adults	Leos-Toro et al. (2020)	Canada	870	16-30 years	Not available	52.1% females	Quantitative survey	Cannabis
Student perceptions of cannabis use	MacDougall & Maston (2023)	Canada	20	19-24+	Not available	Not available	Qualitative interview	Cannabis
“What do you consider use?” Perspectives of Black youth on cannabis use	Matson et al. (2023)	U.S.	20	15-20 years	18 years	65% females	Group model building	Cannabis
Factors that influence cannabis vaping	McKenzie et al. (2022)	U.S.	21	18-25 years	22 years	28.6% females	Qualitative interview	Cannabis

habits of college students: A qualitative study								
Trends in use of marijuana and attitudes toward marijuana among youth before and after decriminalization: The case of California 2007–2013	Miech et al. (2015)	U.S.	MTF survey: 320,809	Grade 8, 10, 12 (13-18 years)	Not available	51% females	Quantitative survey	Cannabis
Behavioral analysis of new and young drug offenders	Ministry of Home Affairs (2015a; 2015b)	Singapore	Quantitative: 700 youths (237 users and 463 non-users) Qualitative: 137 youths (28 users and 109 non-users)	12-29 years	Quantitative: Users: 22.3 years Non-users: 19.8 years Qualitative: Not available	Quantitative: Users: 24.5% females Non-users: 26.3% females Qualitative: Not available	Mixed methods: Quantitative survey Qualitative interview and focus group discussions	Cannabis Ice
Youths display more liberal views towards drugs; parental influence key in deterring drug abuse	National Council Against Drug Abuse (NCADA) (2017)	Singapore	1518	13-30 years	Not available	Not available	Quantitative survey	Cannabis Heroin Methamphetamine New Psychoactive Substances

Adolescents' and young adults' perceptions of risks and benefits differ by type of cannabis products	Nguyen et al. (2022)	U.S.	433	16-22 years	18.9 years	66.5% females	Quantitative survey	Cannabis
Short-term effects of recreational cannabis legalization on youth cannabis initiation	Nguyen et al. (2023a)	Canada	CTUMS+*: 49.060 Canadian Student Tobacco Alcohol & Drugs Surveys (YSS+): 219,917	15-18 years	Not available	Not available	Quantitative survey	Cannabis
Changes in perceived harms of tobacco and cannabis and their correlations with use: A panel study of young adults 2014–2020	Nguyen et al. (2023b)	U.S.	San Francisco Bay Area Young Adult Health Survey Baseline:1363 Follow-up: 306	18-26 years	23.5 years	64.4% females	Quantitative longitudinal survey	Cannabis

Trends in cannabis-related attitudes and behaviors among cannabis-using adolescent and young adult outpatients following medical cannabis legalization in Massachusetts	O'Connell et al. (2022)	U.S.	273	13-24 years	18.2 years	32.4% females	Quantitative survey	Cannabis
Perceived risk and social norms associated with alcohol, tobacco, and marijuana use in Argentinean teenagers	Pilatti et al. (2023)	Argentina	378	13-18 years	15.26 years	60.3% females	Quantitative survey	Cannabis
The impact of cannabis legalization in Canada on adolescents' perceptions	Robinson et al. (2020)	Canada	Pre-legalization: 398 Post-legalization: 377	Grade 8 (Approximately 13-14 years)	Pre-legalization: 13.24 years Post-legalization: 13.03 years	Pre-legalization: 50% females Post-legalization: 46.2% females	Open-ended question and ranking	Cannabis

Adolescents' perceptions of risks and benefits of conventional cigarettes, e-cigarettes, and marijuana: A qualitative analysis	Roditis & Halpern-Felsher (2015)	U.S.	24	Approximately 16-19 years	17.5 years	37.5% females	Small group discussion	Cannabis
Changing perspectives on marijuana use during early adolescence and young adulthood: Evidence from a panel of cross-sectional surveys	Salas-Wright et al. (2016)	U.S.	NSDUH Data 12-17: 230,452 18-21: 120,588	12–17 years 18-21 years	Not available	Not available	Quantitative survey	Cannabis
Methamphetamine use among Iranian youth: A population-based knowledge, attitude, and practice study	Sharifi et al. (2017)	Iran	4868	15-29 years	21.8 years	49.5% females	Quantitative survey	Methamphetamine

Investigating how perceived risk and availability of marijuana relate to marijuana use among adolescents in Argentina, Chile, and Uruguay over time	Schleimer et al. (2019)	Argentina Chile Uruguay	Total: 700,178 Argentina: 293,433 Chile: 244,364 Uruguay: 46,872	Grade 8-12 (Approximately 13/14-17/18 years)	Not available	Argentina: 53.6% females Chile: 50.8% females Uruguay: 54.2% females Less than 1% of missing responses	Quantitative survey	Cannabis
International differences in patterns of cannabis use among youth: Prevalence, perceptions of harm, and driving under the influence in Canada, England & United States	Wadsworth and Hammond (2019)	U.S. Canada England	Total: l12,064 US: 4086 Canada: 4008 England:3970	16-19 years	Not available	US: 60.4% females Canada: 65.3% females England: 57.3% females	Quantitative survey	Cannabis
Prevalence and correlates of medicinal cannabis use	Wardell et al. (2021)	Canada	3221	Grades 9-12 (Approximately 14/15-	Not available	Non-user: 47.76% females	Quantitative survey	Cannabis

among adolescents				17/18 years)		Recreational user: 50.77% females Medical user: 47.95% females		
The influence of parent and peer disapproval on youth marijuana use mediated by youth risk perception: Focusing on the state comparison	Yang et al. (2022)	U.S.	National Survey of Drug Use and Health (NSDUH) Data: 2293	12-17 years	15.71 years	51% females	Quantitative survey	Cannabis

*CTUMS+ is a combination of The Canadian Tobacco Use Monitoring Surveys (CTUMS) and its replacements, the Canadian Tobacco Alcohol & Drugs Surveys (CTADS), and the Canadian Tobacco & Nicotine Survey (CTNS).
*The studies may have examined other drugs (e.g. alcohol, tobacco) but this review only presented drugs of concern.

Youths' Attitudes as an Outcome

Differences in Attitudes over Time and the Effects of Cannabis Legalization

Changes in youths' attitudes over time, especially over extended periods have been examined in several studies. For instance, using a large data set of over 19000 Icelandic students from the European School Survey Project on Alcohol and Other Drugs (ESPAD), Arnarsson et al. (2018) found that Icelandic students' perception of risk of cannabis use was significantly lesser over a 20-year period from 1995 to 2015. Using data from the Monitoring the Future (MTF) study, a yearly nationally representative cross-sectional survey of US 8th, 10th and 12th grade students, it was found that youths' perception of the occasional use of cannabis as having moderate or great risk decreased substantially between 1991 and 2014, from 84.0% to 53.8% (Keyes et al., 2016). Johnston et al. (2018), also using data from the MTF, found a steep decline in perceived great risk of using cannabis regularly from the mid-2000s to 2016. Of particular concern is also the drop in perceived great risk in using synthetic cannabis once or twice from 2016 to 2018. There was a scarcity of studies that examined the effects of youths' attitudes towards other drugs (Johnston et al., 2018; National Council Against Drug Abuse, 2020). Within the few studies that were found, a consistent picture could not be formed regarding the attitudes of youths towards these drugs. Within the MTF sample of U.S. youths, youths' perceived risk of using cocaine, crack and amphetamine fluctuated over the years, making it difficult to establish any distinct trend (Johnston et al., 2018). In another study involving a sample of Singaporean youths, the proportion of youths who perceived drugs as being harmful decreased from 2016 to 2020. Compared to 2016, there was a lower percentage of youths in 2020 who perceived that taking drugs would affect their lives and that they would get addicted to drugs (National Council Against Drug Abuse, 2020).

Changes in youths' attitudes towards drugs do not occur in a vacuum. Changes over time are impacted by environmental changes. For instance, perceived risk of cocaine

increased in 1986 in the U.S. because it was believed that the death of the American basketball player was due to his cocaine use (Johnston et al., 2018). Indeed, there were many studies which examined how youths' attitudes could change or were affected by drug legislations. Cheeta et al. (2018) found that youths perceived cannabis as the least harmful among the illegal drugs, compared to heroin, cocaine, crack cocaine, and methamphetamine. The perceived harm ratings were correlated with the legal classification of drugs with the higher classification drugs being perceived as being more harmful.

As of January 2024, countries such as Canada, Uruguay, and 27 jurisdictions in the U.S. had legalised the production and sale of non-medical cannabis (United Nations Office on Drugs and Crime, 2024). "As of 2021, 64 countries had provisions in their national legislation, or had developed guidelines, allowing the medical use of cannabinoid pharmaceutical preparations and/or cannabis-based products for a range of medical conditions" (United Nations Office on Drugs and Crime, 2023, p. 44). A number of studies have examined the changes in youths' attitudes due to MML and RML changes (Keyes et al., 2016; Laqueur et al., 2020; Nguyen et al., 2023a; 2023b; O'Connell et al., 2022). However, the results on such legislative changes on youths' attitudes towards drugs were not consistent across youths in different studies. Salas-Wright et al. (2016) found cohort differences between youths born in the mid to late 1980s and those born in the mid-1990s (entering teenage years in the latter half of the 2000s), where those born earlier were more disapproving of cannabis use during their early-to-mid adolescence but these negative attitudes decreased later when they reached young adulthood. The authors hypothesised that cannabis legalization changes in the late 1990s/early 2000s in parts of the U.S. may have resulted in more prevention education for the youths about the harms of cannabis when they were teens which could have worn off by the time they were young adults. In addition, as legalization of cannabis changed in more

parts of the U.S., later cohorts of youths might have been influenced differently from earlier cohorts.

Keyes et al. (2016) found that the perceived harmfulness of cannabis increased for the US 8th grade students after the MML was passed, while the perceived risk remained unchanged for the 10th and 12th graders. Perceived risk of cannabis use also increased among Canadian students after RML inception and this increase was greater for students from the 11-12 grades (11.7 percentage points) than those from the 9-10 grades (7.5 percentage points) (Nguyen et al., 2023a). On the other hand, the RML did not impact youths' perceived risk of cannabis use in Colorado (Harpin et al., 2018), California (Nguyen et al., 2023b), Canada (Robinson et al., 2020) and Uruguay (Laqueur et al., 2020), respectively. O'Connell et al. (2022) also found that cannabis-using youths' perception of regular cannabis use as having "no" or "slight" risk did not change significantly from 2013 to 2016 after the MML was implemented in Massachusetts. Youths' perception of using cannabis having "little risk" to their mental health also did not change significantly right before and after RML in Canada and the highly restricted medical cannabis legislation in England (Lemos et al., 2023).

Differences in Attitudes across Jurisdictions

As an outcome, studies have compared youths' attitudes in regions that had RML and MML compared to those without. Generally, youths living in regions that had RML and MML implemented tended to have more positive views of cannabis compared to those without. Yang et al. (2022) found that within a sample of U.S. youths, those living in non-MML states viewed cannabis use as being more harmful than those living in MML states. After decriminalization, Californian Grade 12 students' attitudes towards cannabis became significantly more permissive as compared to their peers in the rest of the U.S. (Miech et al., 2015). Comparing youths in U.S., Canada, and England, U.S. youths were more likely to perceive lower levels of physical and mental harms from cannabis use compared to youths in

Canada or England. This pattern was considered to have been consistent with the trend of lower risk perceptions of cannabis among U.S. high school students over the last 25 years (Wadsworth & Hammond, 2019). Laws also affect youths differently depending on the drug's usage. In another study, youths who use cannabis for medical purposes were at a greater risk of cannabis dependence and had a lower likelihood of perceiving cannabis use as harmful compared to those who used cannabis for recreational purposes (Wardell et al., 2021).

Youths' Attitudes as a Determinant

As determinant, youths' drug attitudes can affect their perception of the risks and benefits of drug use. Research has examined how youths' positive attitudes towards drugs translates into perceptions of drug use benefits versus negative attitudes that translate into drug use harms. Youths perceive drugs affecting them physically, psychologically, socially and even legally. While there were a few studies that examined other drugs, most of the studies examined the effects of attitudes on the risks and benefits of cannabis use.

Perception of Harms of Drugs/Cannabis

Youths were concerned about the short-term and long-term physical effects of taking cannabis. Short-term effects could include getting a bad cough, while longer-term issues could include lung diseases and cancer (Alvarez-Roldan et al., 2023; MacDougall & Maston, 2023; McKenzie et al., 2022; Nguyen et al., 2022) or other negative neuropsychological effects (Kvillemo et al., 2022). As expected, users of cannabis have been shown to be more likely to view cannabis as less harmful. American youth drug users were more likely to report no risk (50.0% versus 20.2%) and less likely to report great risk (9.1% versus 22.9%) associated with cannabis use as compared to non-users (D'Silva et al., 2020). In studies across American, Canadian and English youths, it was found that of those who had used cannabis, over half of all youths were "not at all" worried that cannabis would damage their physical health in the future (Wadsworth & Hammond, 2019). In a sample of Canadian youths, current

cannabis users were less likely to report physical concerns with use compared to those who never or ever used cannabis in the past (Leos-Toro et al., 2020). In the same study by Leos-Toro et al. (2020), 78.0% of all respondents cited at least one physical concern, and the most cited physical concerns were effects on the brain and respiratory function. In another study, those who ever used cannabis perceived less risk of getting lung cancer compared to those who never used cannabis before (Nguyen et al., 2022).

Concerns were found among youths using cannabis causing mental or psychological issues including addiction (Nguyen et al., 2023a), memory loss (Kvillemo et al., 2022), and mental illnesses such as paranoia, psychosis, and schizophrenia (Alvarez-Roldan et al., 2023; Leos-Toro et al., 2020; MacDougall & Maston, 2023; McKenzie et al., 2022). Cannabis users are also likely to perceive less risk to mental health from using the drug. In a study of youths in Canada, England, and the U.S., there is a higher proportion reporting that cannabis use posed “no risk” to mental health among those who used cannabis in the past 30 days compared to those who had never used cannabis (Lemos et al., 2023). Similarly, significantly fewer Colorado youths who use cannabis agree that using cannabis during pregnancy may be harmful to the child’s IQ or that daily use can impair memory compared to those who indicated not using cannabis or who did not respond to a query on use (Bull et al., 2017). While 43.0% of Canadian youths studied cited at least one psychological concern associated with cannabis use, those who ever tried or were currently taking cannabis were less likely to report mental health concerns regarding use than those who had never used cannabis. Similarly, ever and current cannabis users were less likely to be worried about addiction as compared to non-users. Males perceived cannabis as less addictive than females (Leos-Toro et al., 2020).

Apart from physical and psychological effects, youths also reported cannabis bringing about problems to their social lives. For instance, 4.5% of the youths in the study by Leos-

Toro et al. (2020) cited at least one social issue relating to taking cannabis. For instance, they were worried that their behavior was changing because of cannabis consumption, consequently bringing about problems for them socially. Additionally, youths were also concerned about upsetting their friends if they took cannabis (Nguyen et al., 2022). Youths were also concerned if getting high would land them in dangerous situations (Roditis & Halpern-Felsher, 2015). In places where it was illegal to take cannabis, youths were concerned about getting into trouble with the law if they took cannabis illegally or if they were inadvertently involved in or have contributed to the promotion of any organized crime (Kvillemo et al., 2022; Roditis & Halpern-Felsher, 2015).

Perception of Benefits of Drugs/Cannabis

With the implementation of MML and RML at the U.S. state level and some other countries, youths perceived cannabis as being easily available (Miech et al., 2015). For instance, approximately half of American youths would have tried cannabis by the time they reach late adolescence and transit into young adulthood (Salas-Wright & Vaughn, 2017). It was hence not surprising that American youths could easily perceive benefits for cannabis use and did not see using it as a problem behavior (Matson et al., 2023; MacDougall & Maston, 2023). Even when compared to other substances like cigarettes, cigar products and smokeless tobacco, cannabis was the most favored and considered the least harmful and addictive (Berg et al., 2015). Perceptions of fewer risks and more benefits of drug use were associated with better mental health. Unfortunately, while benefits of cannabis use were associated with better mental health, these benefits were found to be accompanied by current cannabis problems that should not be negated. However, youths can easily overlook such issues due to the positive expectancies (Fennell et al., 2022). Expected benefits perceived by youths include assisting with their chronic pain, headaches, sleep issues, vision problems, and lung health. Youths shared that they use cannabis similarly to how they would use prescription medication and in

fact view cannabis as a less harmful alternative to prescription medication (MacDougall & Maston, 2023).

Users were found to hold more favorable attitudes than non-users when perceiving cannabis's effects on their health. In the states, American cannabis-using youths reported overall low risks associated with their cannabis use and moderate benefits (Fennell et al., 2022). Similarly, regular cannabis-using American youths perceive cannabis as safe for use and smoking cannabis as an enjoyable activity, much like a hobby or sport (Friese, 2017). In another study of Bangalore youths, cannabis users were significantly more favorable toward cannabis use and expect more positive effects from its use (Kannan et al., 2024). Regardless of whether they were users or non-users, youths were affected by what they read in the social media and online sources, and might be over-evaluating the benefits of drug use, especially cannabis, and under-estimating the harms of using it. In a study involving Singaporean youths, over 33% of the youths perceived cannabis as being not addictive and this misperception was largely perpetuated by information they obtained from online sources, which also provided information about medical cannabis, prompting youths to push for its legalization (National Council Against Drug Abuse, 2020). Similar results were found in another Singapore study where youths perceive cannabis as less harmful and addictive than tobacco, and Singapore laws were too strict (Ministry of Home Affairs 2015a; 2015b).

This review also suggested that youths perceived cannabis as being beneficial for their mental health. Several studies reported that youths saw cannabis as a drug that could help them relax, unwind, manage stress, reduce anxiety, and help them sleep. Cannabis also helped them to disconnect or escape from reality. Socially, it helped them to feel good and interact better with others (Alvarez-Roldan et al., 2023; González-Cano-Caballero et al., 2023; Kvillemo et al., 2022; MacDougall & Maston, 2023; McKenzie et al., 2022; Roditis & Halpern-Felsher, 2015).

This review only found two studies which examined the attitudes of youths towards methamphetamine. In the study of Iranian youths by Sharifi et al. (2017), a larger percentage of the youths had positive attitudes (37.7%) than negative attitudes (27.1%) towards methamphetamine use. The rest of the youths felt neutral towards methamphetamine use. Another study examined youths' perception of the effects of methamphetamine, within the hill tribes of Thailand. In this study of Akha and Lahu youths, it was found that most of the youths reported that methamphetamine use was common in their villages. These youths had positive expectations of methamphetamine use, particularly when they first started using the drug. In these villages, youths perceived methamphetamine as helpful for various reasons, such as giving them energy to work in the fields, relieving pain, assisting them in improving their social relationships with their peers and addressing mental health problems. For economic reasons, methamphetamine was socially accepted and was seen as a means for youths to work longer hours to earn more money (Chomchoei et al., 2019). The general acceptance of youths' use of methamphetamine could be attributed to the lack of knowledge about the harm of methamphetamine use due to the lack of preventive education. As preventive education was also more accessible in urban areas compared with rural areas (Sharifi et al., 2017), the lack of education within the hill tribes of Thailand could also explain their acceptance of methamphetamine.

Through this review, it was found that attitudes as a determinant was not only associated with how youths view drugs as either harmful or beneficial to them, but also if they would eventually use the drugs. This was consistent with the Theory of Planned Behavior, which described how one's attitude was linked to one's intention to use drugs and eventually with actual drug use (as discussed in Chapter 1). Specifically, those with more positive attitudes towards cannabis were more inclined towards drug use. Conversely, those with more

negative attitudes towards cannabis were less likely to take the drug (D'Silva et al., 2019; González-Roz et al., 2022; Korn et al., 2021; Pilatti et al., 2023; Yang et al., 2022).

Discussion

This review found that most of the studies regarding youths' attitudes were conducted within the U.S. as compared to other countries. There was a paucity of studies conducted in Asia and within Singapore. While this could be an artifact of selecting only English articles for this review, this could not be the case for Singapore, where English is the first language. Studies were also focused on attitudes regarding cannabis. There were only two studies on attitudes towards methamphetamine. This finding should not be surprising, since cannabis continues to be the most widely used drug globally (United Nations Office on Drugs and Crime, 2023) and an estimated 5.3% of those aged 15 to 16 years old (totalling up to 13.3 million people) had used cannabis in 2020 (or the most recent year for which data were available) (United Nations Office on Drugs and Crime, 2022). Hence, studying American youths remains a subject of interest for many researchers, where changes over time and across different jurisdictions may present different scenarios given that cannabis remains illegal at the Federal level, with varying degrees of legislative approaches at the state level (Oldfield et al., 2022).

Additionally, during the search for literature to be included in this review, a large number of studies were found (not included in this review) that focused on cannabis prevalence among youths, either over time or examined the impact of cannabis legalization policies on youths' cannabis use. Comparatively, there were fewer studies that focused on looking at attitudes. As what Robinson et al. (2020) mentioned, despite an increasing amount of literature examining effects of legalization on youth cannabis use, there were few studies looking into the effects of legalization on youths' perception. Although risk perceptions are

linked to use, knowing the prevalence is a more direct way of understanding the extent of the youth cannabis problem so that solutions can be directly implemented.

While knowing prevalence is a more direct way of tackling the drug problem, it may not always be feasible. For instance, with regards to Singapore, the tough laws against drug use (Government of Singapore, 2025) would make it difficult for researchers to directly ask questions about use as youths may fear that reporting their actual use may lead to severe repercussions. Even though researchers may promise confidentiality and anonymity of data, youths may still fear the severe legal repercussions, and this can result in the under-reporting of use. Within environments where drug laws may be harsh like Singapore, measuring attitudes and using it as a proxy is thus a good gauge of the extent of the drug problem, as a positive attitude towards drug use is associated with actual drug use, found by several studies through this review (D'Silva et al., 2020; González-Roz et al., 2022; Korn et al., 2021; Pilatti et al., 2023; Schleimer et al., 2019).

Hence, understanding the attitudes of youths towards drugs is of critical importance. However, this review showed no consistent findings of the impact of time or drug legalizations on youths' attitudes. There are various reasons that were postulated for these differences. For instance, campaigns that are aimed at promoting public health may limit the extent to which legalization of cannabis can reduce risk perceptions of use among youths over time. This happened in the case of Uruguay (Laquer et al., 2020). Similarly, widespread campaigns to discuss the cannabis policies prior to their enactment in Canada and England might have reduced their impact when it happened (Lemos et al., 2023). In addition, for existing users who already have access to cannabis and low perceptions of harm, legalization might have limited impact on their perceptions of harm over time (O'Connell et al., 2022). These findings illustrated the importance of how public campaigns and policies can impact the perceptions of drugs and its usage. As shown in the studies by Chomchoei et al. (2019)

and Sharifi et al. (2017), the lack of access to preventive education was possibly the reason for youths' limited knowledge of methamphetamine's harmfulness, which resulted in their acceptance of methamphetamine use.

Despite the inconsistent findings, it was suggested that youths' attitudes in different places, irrespective of the drug polices, have become more permissive over time (Arnarsson et al., 2018; National Council Against Drug Abuse, 2020; Salas-Wright & Vaughn, 2017). Youths' liberalisation of attitudes over time seemed to have been facilitated by changes in cannabis legalization (Miech et al., 2015; Wall et al., 2011), resulting in more widespread use and accessibility of cannabis worldwide (United Nations, 2023). In fact, youths felt that they should have a voice in deciding the legal status of drugs like cannabis (Alvarez-Roldan et al., 2022) and locally, youths often found the laws against cannabis too strict (Ministry of Home Affairs, 2015a; 2015b). As youths reach adulthood, having more pro-drug attitudes could mean becoming more vocal in raising their opinions about drug-related matters and the associated laws relating to cannabis and other illicit drugs. As what Friese (2017, p. 209) has rightly put "…it is unclear whether policy changes are driving changes in beliefs and use, or whether community norms are driving changes in policy and marijuana use and beliefs. It may be that legalization of marijuana is a reflection of more liberal community norms regarding marijuana use, which, in turn, could affect youths' use of and beliefs about marijuana. Alternatively, it may be that both processes are at work."

For Singapore, studies have shown that youths obtain their information about drugs online or through the social media (Ministry of Home Affairs, 2015a; 2015b; National Council Against Drug Abuse, 2020). This indicated that effects of cannabis legalization and attitudes could spread from places with more established cannabis policies to those where there aren't such policies or where policies were newly minted. For instance, following the implementation of the MML, cannabis-using youths in Massachusetts increased their use of

diverted medical cannabis and most of their cannabis sources were from non-Massachusetts sources, indicating influence from states with more established cannabis policies (O'Connell et al., 2023). In a similar way, youths in countries such as Canada and Uruguay with more established cannabis policies can also influence youths in other jurisdictions with less established or even those without cannabis legalization to adopt more liberal attitudes towards the drug (Oldfield et al., 2022). This was also alluded to by Sarvet et al. (2018, p. 1013) in this quote "adolescents in non-MML states may be affected by the national conversation around MML passage in states other than their own (through popular culture and/or social media)…" While most Singaporean youths researched (over 75%) were still supportive of Singapore's drug free approach (National Council Against Drug Abuse, 2017), this might change with time with the influence of drug legalizations and norms of other jurisdictions. This could be especially concerning, as we reach an era where our youths, commonly known as the Generation Z, are also highly accustomed with the use of technology and social media (Singapore University of Social Sciences, 2021). Social media platforms and the internet have the advantage of disseminating information rapidly and across countries and regions.

Conclusion

This review suggested that there were fewer studies looking into youth drug attitudes, and these were concentrated in the U.S., with some in Canada, and a paucity of studies in Asia, especially Singapore. Most of the studies also examined cannabis attitudes, given that it was the most widely used drug internationally (United Nations Office on Drugs and Crime, 2023). Given that youths were more widely exposed to social media and online sources of information (Ministry of Home Affairs 2015a; 2015b; National Council Against Drug Abuse, 2020; Sarvet et al., 2018), legalization policies from other countries could potentially affect Singaporean youths in their attitudes towards drugs, particularly towards cannabis and its associated policies and regulations. While youths recognised both the risks and benefits of

taking drugs, especially cannabis, studies have shown that youths did not see cannabis use as problem behavior (Matson et al., 2023; MacDougall & Maston, 2023) and it was considered less harmful and addictive than tobacco (Berg et al., 2015; Ministry of Home Affairs 2015a; 2015b). The lack of knowledge about the health complications that cannabis could bring about (Leos-Toro et al., 2020; Kvillemo et al., 2022; MacDougall & Maston, 2023) and its potential as a gateway for other illicit drugs (Chia et al., 2023), further showed the critical importance of examining the state of drug attitudes among Singaporean youths.

Limitations of the Present Review

There are several limitations to the present review. The review is based on studies over the past ten years and hence the findings would not be an exhaustive overview of the factors related to youths' attitudes towards illicit drugs. The studies were also reviewed and coded by the main author and hence would not have interrater reliability on the eventual coded findings. Finally, it should be noted that the papers were not assessed for their quality since it is not a criterion of the scoping review process (Grant & Booth, 2009).

Chapter 3: Factors Associated with Youths' Attitudes towards Illicit Drug Use: A Scoping Review

The Theory of Planned Behaviour (TPB) (Ajzen, 1991) has been used to explain how attitudes can play an important role in influencing one's intention and behaviour towards drug use. Research has shown that the TPB, and particularly attitudes, were shown to be generally the strongest predictor of intention, and intention was the strongest predictor of drug use (Armitage et al., 1999; Conner et al., 1998; Conner & Mcmillan, 1999; Mcmillan & Conner, 2003; Mousavi et al., 2014; Orbell et al., 2001). However, there were also factors affecting the effects of attitudes on drug use intention, and drug use intention might not always be associated with drug use. Drug use attitudes could be affected by various factors, including family, friends, community, and individual factors. For example, having absent parents, more peer pressure, having undergone harsher punishments, poorer academic achievements, lower socioeconomic status, and a greater availability of drugs contributing to more positive attitudes towards drugs (Mousavi et al., 2014). The decriminalisation of cannabis in different countries such as the United States (US) seemed to have also caused a global shift in attitudes towards drug use, increasing the acceptance of cannabis and subsequently other drugs in even countries like Singapore, which has zero tolerance towards drug use (Central Narcotics Bureau, 2023).

Present Study Aims

This paper aims to contribute to literature in two ways. Firstly, this research aims to establish the extent of the literature on the critical factors that influence youths' attitudes towards drug use over the past ten years (January 2014 – June 2024). A 10-year time frame was chosen because the present thesis was based on data taken from the Task Force on Youth and Drugs that had begun its research work in 2014. Hence, this review was based on the period of January 2014 to June 2024 (present). Secondly, this review is a timely consolidation

of the literature, especially since environmental changes such as drug legalization can have significant impact on the factors that influence youths' attitudes towards drugs and drug use. Thus, recent and impactful changes of any factors that influences youth drug attitudes would be captured in this timely review.

Review Methodology

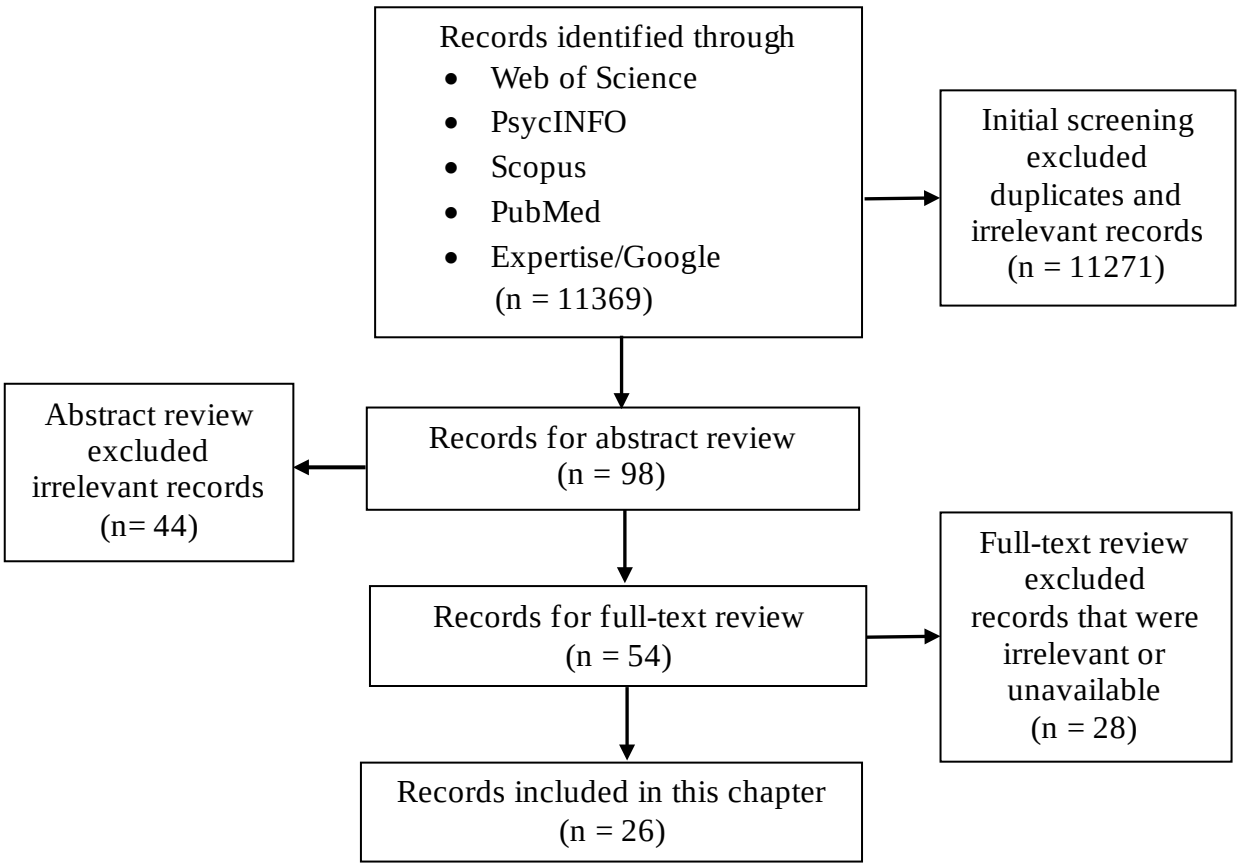
The literature was reviewed systematically using a multi-step process (see Figure 3). English language articles were searched using the Web of Science, PsycINFO, Scopus, and PubMed databases. Expert knowledge and google searches were also used to search for relevant articles. The search terms were ("drug attitudes" OR "substance use attitudes" OR "cannabis attitudes" OR "ice attitudes" OR "ecstasy attitudes" OR "heroin attitudes") AND ("risk factors"). These four drugs were chosen as ice, cannabis and ecstasy were the key drugs of use by youths over the past year (2024), while heroin was one of the most used drug in Singapore (Central Narcotics Bureau, 2025). This review was focused the risk factors that contributing to attitudes towards drug use. Hence, the search term was restricted to risk factors and did not include protective factors. Exclusion criteria excluded records with irrelevant populations such as those not within the age range (e.g., adults) nor population of interest (e.g., law enforcement officers, pregnant women (specialised populations rather than the general public, and were not the target of interest for this study) and content (e.g., non-illicit drugs such as alcohol or nicotine, factors associated with substance use rather than substance use attitudes) to derive at the final set of articles for the current review. As a dissertation research and the main author's key area of study, the records/studies were only coded and reviewed by the main author. The papers reviewed were coded based on factors associated with youths' attitudes towards drugs and drug use. No primary data nor data from any human subjects were collected for this review.

Review Results

A total of 11369 records were initially identified for review. After removing the duplicates, these records were further screened by their titles. After this initial screening, 11271 records were removed, retaining 98 articles to be screened by their abstracts. The abstract review resulted in 54 full-text records that were assessed for eligibility to be included in this review. After removing records that were not relevant and records which could not be found, 26 records were included in this review. Quality criteria were not used since it is not a criterion of the scoping review process (Grant & Booth, 2009).

Figure 3

Review Flow-chart



The research on factors associated with youth drug attitudes were scarce. The papers came from a variety of countries with nearly half of the papers coming from the U.S. (12

papers), one from Mexico and Canada (North America), respectively, and one from Chile (South America). The other papers came from different parts of Europe, such as Sweden, Denmark, Ireland, Malta, and one paper included seven countries in Europe. There were two papers from the middle east (Iran and Israel) and three from Asia (Hong Kong, India and Singapore), while the last paper was from Russia. Most of the papers employed quantitative surveys/questionnaires (21 papers) to collect the data. Two papers used mixed methods consisting of both quantitative survey and qualitative interviews, while others used qualitative methods (3 papers). Full details of the papers can be seen in Table 2. In the sub-sections that follow, this review will present the various factors associated with youths' attitudes towards drugs. These factors are classified according to two big categories – environmental factors and individual factors that can affect youths' drug attitudes.

Table 2

Articles included in the full review

Title	Author & Year	Country	N size	Age Range	Gender Distribution (if available)	Method
Seeking safety: A focus group study of young adults' cannabis-related attitudes, and behavior in a state with legalized recreational cannabis	Amroussia et al. (2020)	U.S.	32 (12 non-users; 10 occasional users, and 10 regular users)	18 – 24 years old undergraduate or graduate students	53.1% females	Focus group discussion (8 focus group discussions: 2 non-user groups, 3 occasional user groups, and 3 regular user groups
Sensation seeking to marijuana use: Exploring the mediating roles of risk appraisal and social norms	Barnum and Armstrong (2019)	U.S.	2117 high school seniors	56% were equal to or over the age of 18 years old	52% females	Monitoring the Future Quantitative survey (MTF) data MTF captures nationally representative samples of approximately 16,000 high school seniors
Attitudes and perceived risk of cannabis use in Irish adolescents	Barrett and Bradley (2016)	Ireland	507 students	15-18 years old	47.7% females	Quantitative survey

Nicotine and marijuana attitudes among flavor-only vaping youth: New evidence from Monitoring the Future	Boccio et al. (2020)	U.S.	6332 students	Grades 8 and 10	50.2% females	MTF quantitative survey data
Maltese health and social wellbeing student knowledge, attitudes and beliefs about medical cannabis	Bonnici and Clark (2021)	Malta	327 students	Only mean age was available – 23.3 years old	74.3% females 24.2% males 1.5% others	Online quantitative survey
Awareness, perception risk and behaviors related to retail marijuana among a sample of Colorado youth	Bull et al. (2017)	U.S.	241 youths	13 – 18 years old	36% females	Quantitative survey
Acceptance of drug use mediates future hard drug use among at-risk adolescent marijuana, tobacco, and alcohol users	Cappelli et al. (2021)	U.S.	777 who attend alternative high schools (ATS)*	Only mean age was available – 16.6 years old	43.9% females	Laptop, telephone, and web-based quantitative surveys
Attitudes and beliefs of medical students on cannabis in Hong Kong	Chung et al. (2022)	Hong Kong	187 medical students	Study included as 98.4% are within the ages of 18 – 30 years old	56.5% females	Online quantitative survey
Parental protective and risk factors regarding cannabis use in adolescence: A national sample from the Chilean school population	Concha et al. (2020)	Chile	43,060 students	Grades 8 to 12 (12 – 19 years old)	52.4% females	Chilean National School Survey on Drug Use (2013) Quantitative survey

Knowledge and attitude regarding substance use and its determinants among college students in a coastal town of South India	Das et al. (2024)	India	2170 students	Only mean age was available – 19 years old	61.2% females	Quantitative survey
The relationship between social influences and adolescents' substance use-related cognitions	Dastgerdi and Eslami (2018)	Iran	720 adolescents	14 – 18 years old	48.4% females	Quantitative survey
Normative perceptions of cannabis use among European university students: Associations of perceived peer use and peer attitudes with personal use and attitudes	Dempsey et al. (2016)	Europe (Belgium, Denmark, Germany, the Slovak Republic, Spain, Turkey, and the United Kingdom)	4131 students	Only mean age was available – 23.2 years old	Turkey: 52.5% females Germany: 59.1% females U.K.: 67.7% females Spain: 70.2% females Denmark: 78.0% females Belgium: 79.0% females Slovak Republic: 79.5% females	Baseline survey of the Social Norms Intervention for the prevention of Polydrug use (SNIPE) Quantitative survey

Person–environment fit, substance use attitudes, and early adolescent substance	Fisher et al. (2019)	U.S.	4228 middle school students	Grade 6 - 8	53% females	Quantitative survey
Young people's attitudes towards illicit drugs: A population-based study	Friis et al. (2017)	Denmark	3812 young people	16 - 24 years old	49% females	Quantitative survey
Religion in Russia: Its impact on university student medical cannabis attitudes and beliefs	Gritsenko et al. (2020)	Russia	828 medical and allied health profession students	Only mean age was available – 20.0 years old	56.0% females	Quantitative survey
Parents & cannabis: Adolescents' reports of parent-related factors associated with their attitudes about and intentions to use cannabis	Hust et al. (2024)	U.S.	350 youths	13 - 17 years-old	48.3% females	Online quantitative survey
Traditional gender roles and substance-use behaviors, attitudes, exposure, and resistance among early adolescents in large cities of Mexico	Kulis et al. (2018)	Mexico	4932 students	11 – 15 years old (This study was included, although the lower age limit was 11 years old because of the scarcity of studies in this area.	Not available	Quantitative survey

				Moreover, 85% of the sample population was between 12 – 13 years old, and the average age of the sample was 12.01 years for females and 12.07 years for males)		
Attitudes to cannabis use and public prevention information among young adults: A qualitative interview study with implications for prevention practice	Kvillemo et al. (2022)	Sweden	32 young people	18 - 29 years old	46.9% females	Qualitative interview
Behavioral analysis of new and young drug offenders	Ministry of Home Affairs (2015a; 2015b).	Singapore	Quantitative: 700 youths (237 users and 463 non-users) Focus groups: 137 youths (28 users and	12 – 29 years old	Quantitative Users: 24.5% females Non-users: 26.3% females Qualitative: Not available	Mixed methods: Quantitative survey Qualitative interview and focus group discussions

			109 non-users)			
Attachment to parents and adolescents' marijuana use, attitudes, and perceptions: Assessing the role of county-level dispensaries	Moscrop-Blake et al. (2024)	U.S.	47,572 youths	Grade 6 - 12	49.8% females	Florida Youth Substance Abuse Survey (2022) Quantitative survey
Being blunt about marijuana: Parent communication about marijuana with their emerging adult children	Napper et al. (2016)	U.S.	506 university students	Only mean age was available – 18.8 years old	57.7% females	Quantitative survey
Trends in cannabis-related attitudes and behaviors among cannabis-using adolescent and young adult outpatients following medical cannabis legalization in Massachusetts	O'Connell e al. (2022)	U.S.	273 cannabis-using youth	13 – 24 years old	32% females	Quantitative survey
Cannabis use, self-perceived risk, perceived peer approval and parental attitudes among youth at clinical high-risk for psychosis	Ristanovic et al. (2022)	U.S.	174 participants (87 youth-parent dyads) Consisting of 43 healthy youths (as control group) and	Only mean age was available – Control group: 17.5 years old CHR group: 18.3 years old	Control group: 41.9% females CHR group: 43.2% females	Mixed methods: Quantitative survey Qualitative interviews

			44 of those presenting with clinical high-risk (CHR) syndrome for psychosis			
The Impact of cannabis legalization in Canada on adolescents' perceptions	Robinson et al. (20200	Canada	398 pre-legalization 377 post-legalization	Grade 8	Pre-legalization: 50% females Post-legalization: 46.2% females	Qualitative questionnaire
Do meaning in life, ideological commitment, and level of religiosity, related adolescent substance abuse and attitude?	Wilchek-Aviad and Ne'eman-Haviv (2016)	Israel	1032 adolescents	14 – 19 years old	62.0% females	Quantitative survey
Penny for your thoughts? The protective effect of youths' attitudes against drug use in high-risk communities	Wright et al. (2016)	U.S.	1719 youths	9 – 20 years old (included as the mean age was 14 years old)	Not available	Project on Human Development in Chicago Neighborhood data Quantitative survey

*ATS: Alternative high school students are those who left traditional high schools due to negative behaviors such as poor academic performance, truancy, substance use etc.

Environmental Factors

Legalization of Cannabis

Chapter 2 presented the effects of the legalization of recreational cannabis and medical cannabis in different parts of the world and how it has affected the attitudes of youths about cannabis and other drugs over time (Arnarsson et al., 2018; Johnston et al., 2018; National Council Against Drug Abuse, 2020). These legalizations have also sparked off debate about the consequences of such laws on the attitudes of youths about cannabis and other drug use(Amroussia et al., 2020; Moscrop-Blake et al., 2024; O'Connell et al., 2022). However, evidence of the changes in legalization of cannabis laws on youth cannabis and drug use attitudes were not consistent across studies. Amroussia et al. (2022) found that youths believed that cannabis legalization made it less stigmatizing for them to consume the drug, especially since their families would be more accepting of it. In addition, legalization created a safe way for them to purchase cannabis since they did not have to purchase drugs from the black market and could buy drugs from the dispensaries that were state regulated. However, due to the age limit and lower price of the black market, youths admitted that they still turned to the black market to purchase drugs. Overall, Amroussia and colleagues (2022) found that youths perceived benefits in the legalization of cannabis since it provided a safer way for youths to purchase drugs from state dispensaries, resulting in lower crime rates linked to the illegal black market. Youths believed that this would help state tax revenue that was good for the economy. This perception was also found among Canadian youths in the study by Robinson et al. (2020) who perceived that the legalization of cannabis would benefit their society as it would reduce crime and boost their economy. On the other hand, students in the same study also expressed concern that cannabis legalization would make it easier for underage youths to get access to cannabis, leading to more use by them. This indicated that youths did not necessarily perceive that legalization was a positive move by the authorities.

Research also found that there were youths who were not affected by cannabis legalization. Moscrop-Blake et al. (2024) found that having cannabis dispensaries were only weakly and negatively associated with perceived harmlessness of cannabis among youths. Comparing students in pre- and post- cannabis legalization, Robinson et al. (2020) also found that both cohort of students were uncertain if cannabis legalization was positive or negative (Robinson et al., 2020). Similarly, O'Connell et al. (2022) also found that post-cannabis legalization there were no significant differences in the attitudes of the adolescents in a substance-use treatment programme across the years. In another study that compared youths who were at high risk for psychosis with healthy controls, cannabis risk perceptions did not change among both groups of youth post-legalization (Ristanovic et al., 2022). In other words, legalization might not necessarily affect youths' attitudes towards cannabis and other drug use.

Community and Neighborhood

The social disorganization theory suggests that neighborhoods with certain structural factors, such as low socioeconomic status, ethnic heterogeneity, and residential mobility (known as disorganized neighborhoods) tend to encourage crime and delinquency due to their inability to build formal and informal social controls and youth supervision (Porter et al., 2015). Extending from this theory, neighborhood norms can also influence youths' attitudes towards drugs use since youths living in disorganized neighborhoods can come to believe that drug use is normative while those living in organized neighborhoods intolerant of deviancy and drug use would discourage youths from adopting pro-drug attitudes (Wright et al., 2016). In fact, Wright et al. (2016) found that youths living in communities who were more tolerant to deviance perceived drugs as less harmful compared to youths living in communities that were less tolerant of deviance.

Friends, Peers and Social Influence

Peers have been found to be one of the strongest sources of influence when it comes to youth drug use (Allen et al., 2003; Hawkins et al., 1992; Koster et al., 2000; Liu & Iwamoto, 2007; Otsuki, 2003; Siqueira et al., 2001). Peers influence youth through shaping their beliefs (Maxwell, 2002), modelling and encouraging them to use drugs, as well as providing them with the drugs (Andrews et al., 2002; Bauman & Ennett, 1996; Kosterman et al., 2000, Maxwell, 2002). Studies on youth in Singapore indicated that school and neighborhood friends were their preferred drug use associates. Having peers that took drugs was one of the key factors that helped Singaporean youths gain access and opportunities to drug initiation (Ministry of Home Affairs, 2012; 2015a; 2015b).

Given the importance of friends and peers, it was found that youths' attitudes towards drugs were significantly associated with their peers' drug attitudes and drug use. In a study of European youths (Dempsey et al., 2016), it was found that youths' perception of their peers' cannabis use behaviors and attitudes towards cannabis were associated with youths' personal approval of cannabis use. This association between perceived peer attitudes and personal approval of cannabis use remained significant when youths' cannabis use was taken into account, indicating that the effect of peers on youths' attitudes was irrespective of youths' drug usage. Research evidence has shown that youths tended to overestimate their peers' approval and use of drugs as compared to their own (Dempsey et al., 2016). It was apparent that youths looked for peers and friends as they were seen as sources of reliable information. Peers provide credibility due to their similarities in age, life situation as well as their established friendships and interpersonal relationships (Kvillemo et al., 2022).

Family and Parenting

Families can affect youths' drug use in several ways, including modelling drug behavior and being the drug use associate, setting the injunctive norm, poor parenting

practices, and being the source of family conflict and stress (Hawkins et al., 1992; Kosterman, et al., 2000). In fact, Bronfenbrenner's ecological model stated that an individual's family is critical in influencing one's development since it is within one's immediate environment (Bronfenbrenner, 1979). Moreover, the Social Learning Theory also stated that youths learn their beliefs about drug use from their role models, especially their parents and close friends. (Akers, 1973). Parents play a key role within the family, especially in providing correct information about drugs (Kvillemo et al., 2022) and teaching children what is right and wrong. Research found that the frequency of parent-child communication could be fairly low, with conversations taking place about one to three times per year, with typical conversations about drugs being the risks of taking them, parental disappointment, and potential legal consequences (Napper et al., 2016). However, such communications were critical, as greater parent-child communication about cannabis risks was associated with students perceiving parents as being less approving of cannabis use. Conversely, more communication about cannabis use, and permissive communication by parents was associated with students having more positive attitudes towards cannabis. They also perceived their parents to be more approving of their cannabis use (Napper et al., 2016).

Increased parental monitoring was associated with youths holding more negative and less positive attitudes about cannabis. Hence, parental monitoring was a protective factor for youths (Hust et al., 2024). In addition, youths' perception of their parents' cannabis use was also associated with their attitudes towards cannabis use. Within the same study, Hust et al. (2024) found that youths who thought that their parents had used cannabis were more likely to hold more positive and less negative attitudes towards cannabis. It was also found that youths who were close to their cannabis-using mothers held more positive and less negative cannabis-related attitudes. On the other hand, those close to their mothers who were not using cannabis held less positive and more negative cannabis-related attitudes. Surprisingly, youths

who reported being close to their fathers held more positive attitudes towards cannabis. These findings suggested that youths' relationship with their non-drug using mothers could be a protective factor for cannabis use while the effect of their relationship with their father remained uncertain at this point and required further examination.

Public Figures and Public Information

Youths were also influenced by public information and famous personalities (Michaels, 2014). A study on Singaporean youths showed that they were highly influenced by what they read on the internet and social media and were convinced that cannabis was not harmful and Singapore's laws towards cannabis use were too harsh (Ministry of Home Affairs, 2015a; 2015b). Famous personalities and influencers could be strong sources of information for youths. While they might not be professionals in terms of the knowledge about drugs, youths identify with them and feel that they have an interpersonal relationship with these influencers (Kvillemo et al., 2022). These findings were consistent with past research of how influential famous people can be. Hearing influential people use drugs can provide youths with more confidence in using drugs (use self-efficacy) while listening to them talk about drug harms increases their tendency to believe that they can refuse drug use (refusal self-efficacy) (Petraitis et al., 1995).

Individual Factors

Gender

An individual's gender has been consistently shown to be associated with their drug attitudes, and males were found to have more permissive attitudes towards drugs as compared to females (e.g., Bull et al., 2017; Chung et al., 2022; Das et al., 2024; Sznitman & Lewis, 2018). For instance, Friis et al. (2017) found that males were twice as likely to have positive attitudes towards drug use compared to females (Friis et al., 2017). In a study of Colorado youths, Bull et al. (2017) found that fewer males compared to females perceived moderate or

high risk from weekly or daily consumption of cannabis as compared to females. Compared to females, males were also more likely to support cannabis legalization and believed that cannabis use was safe. In addition, males held more positive attitudes towards cannabis than females, despite similar rates of drug use among both groups (Barrett & Bradley, 2016). In fact, research found that even as females started to increasingly use more drugs, they were likely to hold less permissive attitudes towards their use. One possible reason could be that even as society evolves leading to more rapid changes in the behaviors of women compared to males, women might still be immersed in traditional cultural elements which supports gender double standards regarding drug use (Kulis et al., 2018).

Race, Ethnicity and Religion

Race refers to groups of people who biologically share certain distinctive physical traits. While ethnicity is a different concept from race, ethnicity broadly refers to groups of people who are categorised according to common racial, tribal, religious, linguistic, national, cultural origin or background (Blakemore, 2019). The primary socialisation theory argues that there are cultural norms within one's ethnic group that can affect one's attitudes about drug use, primarily transmitted through one's closest socialisation sources – the family, peers, and school (Oetting et al., 1998). While evidence on race and ethnicity on youths' drug use attitudes was rare, there was some evidence of their effects on youths' drug attitudes. For instance, evidence on how racial composition within the school setting can affect students' views on cannabis came from a study by Fisher et al. (2019). In this study, it was found that students in schools with a higher proportion of Black students viewed cannabis as being less harmful and reported higher levels of cannabis use. Compared to White students, Black students also viewed cannabis as less harmful. These findings were consistent with previous research where minority groups who feel less welcomed and perceived themselves as having

accorded less opportunities than other established groups created more identity confusion which can lead to more positive and less negative drug use attitudes (Grigsby et al., 2017).

Religion was shown also affect drug use attitudes among youths.. A study by Gritsenko et al. (2020) found that youths who had a religion had less permissive attitudes towards drugs. Students affiliated with a religion felt that cannabis use should not be legalised. They were also more likely to believe that cannabis was addictive and posed significant risk. Compared to those who were non-denominational, students affiliated with a religion tended to be less positive about medical cannabis' effectiveness in treating various physical illnesses such as chronic pain, cancer, fibromyalgia, insomnia and eating disorders.

Age

There were only two studies found that showed a relationship between the age of youths and their drug attitudes. Both studies showed evidential support that younger youths tended to be more supportive than their older counterparts when it came to drug use. In a study of Danish youths between 16 to 24 years old, it was found that youths of a younger age between 16 to 18 years old was associated with positive attitudes towards drugs (Friis et al., 2017). Similarly, Chung et al. (2022) found that while their sample of medical students were generally supportive of training and research for medical cannabis, younger students were more supportive than their older peers. The association between older age and more negative drug attitudes could be a consequence of older youths being more aware of the risks associated with drug use, and being more likely to have children than their younger counterparts (Friis et al., 2017).

Past Drug Use Experiences

Research indicated that youths' past experiences with drug use have significant impact on their drug attitudes. Youths who have used cannabis before tended to have more permissive attitudes than their non-user counterparts (Barrett & Bradley, 2016; Chung et al.,

2022; Das et al., 2024; Sznitman & Lewis, 2018). Youths who have experienced drug use were also likely to rate the same drugs as less risky than before (Friis et al., 2017). Those with cannabis use experience were also more likely to support non-licensed use and medical cannabis. In addition, having more experience with drug use was also associated with more permissive attitudes. For instance, most of the students who used cannabis more than ten times supported recreational cannabis use, compared to only a minority of students who only used cannabis once (Chung et al., 2022).

It seemed that prior experience with vaping and smoking could influence youths' subsequent attitudes towards illicit drugs (Boccio et al., 2020; Cappelli et al., 2021). These experiences with vaping and smoking act as a gateway for illicit drug use. It seemed that youths with a larger latitude of acceptance were more likely to accept persuasive arguments compatible with their own attitudes and shift their attitudes to the new position. Youths' latitude of acceptance of drugs were able to mediate between initial gateway drug use and eventual illicit drug use (Cappelli et al., 2021). For example, youths who have engaged in flavour-only vaping tended to lower their perceived risk of regular cannabis use and become more permissive of regular cannabis use. This recent engagement with flavour-only vaping caused youths to be more than 100% more likely of failing to perceive any risk of cannabis use and failing to disapprove of regular cannabis use (Boccio et al., 2020). Smoking was also positively associated with youths' attitudes towards medical cannabis (Sznitman & Lewis, 2018) and drug use (Friis et al., 2017). Similar to smoking, use of experimental cannabis was associated with more positive illicit drug use (Friis et al., 2017), indicating that youths might perceive cannabis like smoking rather than more dangerous drugs typically known as hard drugs.

Sensation seeking

Adolescence is a period where risky behaviors potentially take place (Arnett, 1992; Jessor, 1991). One of the reasons that underlie such risky behaviors is sensation-seeking, defined by the "seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experience" (Zuckerman, 1994, p. 27). Adolescents, as a group, are especially high in sensation-seeking and it has been linked to reckless behaviors such as dangerous driving, unsafe sex, and substance use including cannabis and alcohol (Arnett, 1992; Comeau et al., 2001; Martins et al., 2008; Ersche et al., 2010). Within a group of Singaporean youths, taking drugs for the thrill and to feel high were stated to be the key drivers behind their drug use (Ministry of Home Affairs, 2012; 2015a; 2015b). In another group of American youths, those who were high in sensation-seeking were also less likely to perceive cannabis as risky and more likely to engage in cannabis use (Barnum & Armstrong, 2019).

Meaning in Life

One of the explanations put forth in professional literature for drug use is an existentialist one, which argues that an individual engages in drug use due to a lack of meaning in life and "a sense of existential void." (Wilchek-Aviad & Ne'eman-Haviv, 2016, p. 262). Hence, youths' meaning of life was hypothesised to affect their drug attitudes and drug use. Research found that youths who have more meaning in life tended to be less willing to use psychoactive substances and were in fact lower in their level of drug use (Wilchek-Aviad & Ne'eman-Haviv, 2016).

Discussion

This review indicated a paucity of studies that examined factors that affected youths' attitudes towards drug use. One plausible reason could be that most studies focused on the factors associated with youth drug use, rather than youths' drug use attitudes. While the

Theory of Planned Behavior posits that an individual's drug attitudes can affect how an individual evaluates the drug and eventually creates an intention to engage in drug use (Ajzen, 1991), the behavior-intention gap (Sheeran & Webb, 2016) suggests that an individual's intention to take drugs might not always lead to eventual drug-taking behavior. Hence, most studies would focus on understanding the factors associated with actual youth drug use, rather than drug attitudes, which might not eventually lead to actual drug use behaviors.

Nevertheless, this review unveiled some key factors (both environmental and individual) associated with youths' attitudes towards drug use. It should be noted, however, that there are limitations in making conclusions about the associations between some these factors and youth drug use attitudes. Firstly, given the long history into the study of the effects environmental, familial and social factors on youth drug use (Allen et al., 2003; Hawkins et al., 1992; Koster et al., 2000; Liu & Iwamoto, 2007; Otsuki, 2003; Siqueira et al., 2001), there was a limited number of studies found in this review on the effect of these factors on youth drug attitudes.

For instance, parents could influence their children to adopt negative attitudes towards drugs, mainly through parent-child communication on drug risk (Napper et al., 2016), greater parental monitoring, and fostering a closer mother-child relationship. Nonetheless, father-child bonding failed to shield youths against developing permissive drug attitudes (Hust et al., 2024), indicating that further research is required to examine the effects of youths' relationship with their fathers (and parents) on drug attitudes. In addition, although youths' school environment and neighborhood remained important places where they conduct their activities, there was limited evidence on the impact these environments have on youths' drug attitudes. From this review, there was only one study found on how neighborhood norms were related to youth drug attitudes (Wright et al., 2016). The impact of schools focused on how racial composition within the school could affect drug attitudes (Fisher et al., 2019). However,

this could be an artifact that most studies would focus on studying the effect of peers and friends, who make up the interpersonal relationships and social circle of the youths within the school. In addition, the impact of cannabis legalization on youth drug attitudes remained uncertain due to inconsistent findings from various studies (Amroussia et al., 2020; Moscrop-Blake et al., 2024; O'Connell et al., 2022; Ristanovic et al., 2022; Robinson et al., 2020). Similarly, the influence of other individual factors, such as age, race, religion, sensation-seeking, and meaning of life on youth drug use attitudes were limited in terms of the extent of the conclusions that could be made from this review as most findings were limited to one to two studies' conclusions.

This review identified one study which found that famous personalities can potentially influence youths' drug use attitudes (Kvillemo et al., 2022). Despite the limited evidence in this area, this is an important area of research. With youths being more accustomed to the use of social media (Singapore University of Social Sciences, 2021), famous personalities and social influencers can become important sources of information dissemination compared to the past when youths rely more on their immediate social environment for information. However, more research in this area is required to arrive at more conclusive evidence about the extent and mechanisms of which how famous personalities can influence youth drug use attitudes.

Conclusion

This review suggested that there was a paucity of studies looking into the factors associated with youths' attitudes towards drugs. As mentioned earlier, it could be that most studies focused on the factors associated with youth drug use, rather than youths' drug use attitudes. While the present review holds promise in how environmental and personal factors can influence youth drug use attitudes, further research is required into most of the factors to make more definite conclusions about their relationships with youth drug use attitudes.

Regardless, this review unveiled some key factors associated with youths' attitudes towards drug use. Some factors such as gender and past experiences with drug use were consistently shown to be associated with youths' attitudes towards drug use (Barrett & Bradley, 2016; Boccio et al., 2020; Bull et al., 2017; Cappelli et al., 2021; Chung et al., 2022; Das et al., 2024; Friis et al., 2017; Sznitman & Lewis, 2018). Evidence from others such as the effect of legalization of cannabis on youth drug attitudes were inconsistent (Amroussia et al., 2020; Moscrop-Blake et al., 2024; O'Connell et al., 2022; Ristanovic et al., 2022; Robinson et al., 2020). Understanding these factors are important in the context of Singapore, where the tough drug laws and zero tolerance against drugs (Ministry of Home Affairs, 2024) would make it difficult to conduct drug use research among youths who might be reluctant to admit to drug use for fear of the legal repercussions.

Limitations of the Present Review

There are several limitations to the present review. The review is based on studies over the past ten years and this review would not contain an exhaustive list of individual and environmental factors that influence youths' attitudes towards illicit drugs. Moreover, the search string did not contain the keyword "perception" so despite exercising professional judgment in the hand search, some articles might inevitably be left out during the systematic search. The studies were also reviewed and coded by the main author and hence would not have interrater reliability on the eventual coded findings. Finally, it should be noted that the papers were not assessed for their quality since it is not a criterion of the scoping review process (Grant & Booth, 2009).

Chapter 4: Drug Attitudes Scales: A Scoping Review

Illicit drug use has been found to be a challenging problem among the youths (United Nations Office on Drugs and Crime, 2022). However, reviews suggested that there were fewer studies examining youth drug attitudes and these were concentrated in the U.S., with some in Canada, and a paucity of studies in Asia, especially Singapore. Most of the studies focused on cannabis attitudes as it was the most consumed drug internationally (United Nations Office on Drugs and Crime, 2023). Being widely exposed to social media and online information for drugs (Ministry of Home Affairs 2015a; 2015b; National Council Against Drug Abuse, 2020; Sarvet et al., 2018), drug legalization policies from other countries could also potentially affect Singaporean youths in their attitudes towards cannabis and drugs. While youths recognised both risks and benefits of taking cannabis, studies have shown that youths did not see cannabis use as problem behavior (Matson et al., 2023; MacDougall & Maston, 2023) and it was considered less harmful and addictive than tobacco (Berg et al., 2015; Ministry of Home Affairs 2015a; 2015b). The lack of knowledge about the what health complications cannabis can bring about (Leos-Toro et al., 2020; Kvillemo et al., 2022; MacDougall & Maston, 2023) and its potential as a gateway for other illicit drugs (Chia et al., 2023), indicates that there is a need to study drug attitudes among Singaporean youths. To critically examine drug attitudes among Singaporean youths, there is a need to identify a suitable scale to measure youth drug attitudes.

Present Study Aims

This paper aims to contribute to literature in two ways. Firstly, this research aims to establish the extent of the literature on the existing scales used to measure drug attitudes over the past ten years (January 2014 – June 2024). A 10-year time frame was chosen because the present thesis was based on data taken from the Task Force on Youth and Drugs that had begun its research work in 2014. Hence, this review was based on the period of January 2014

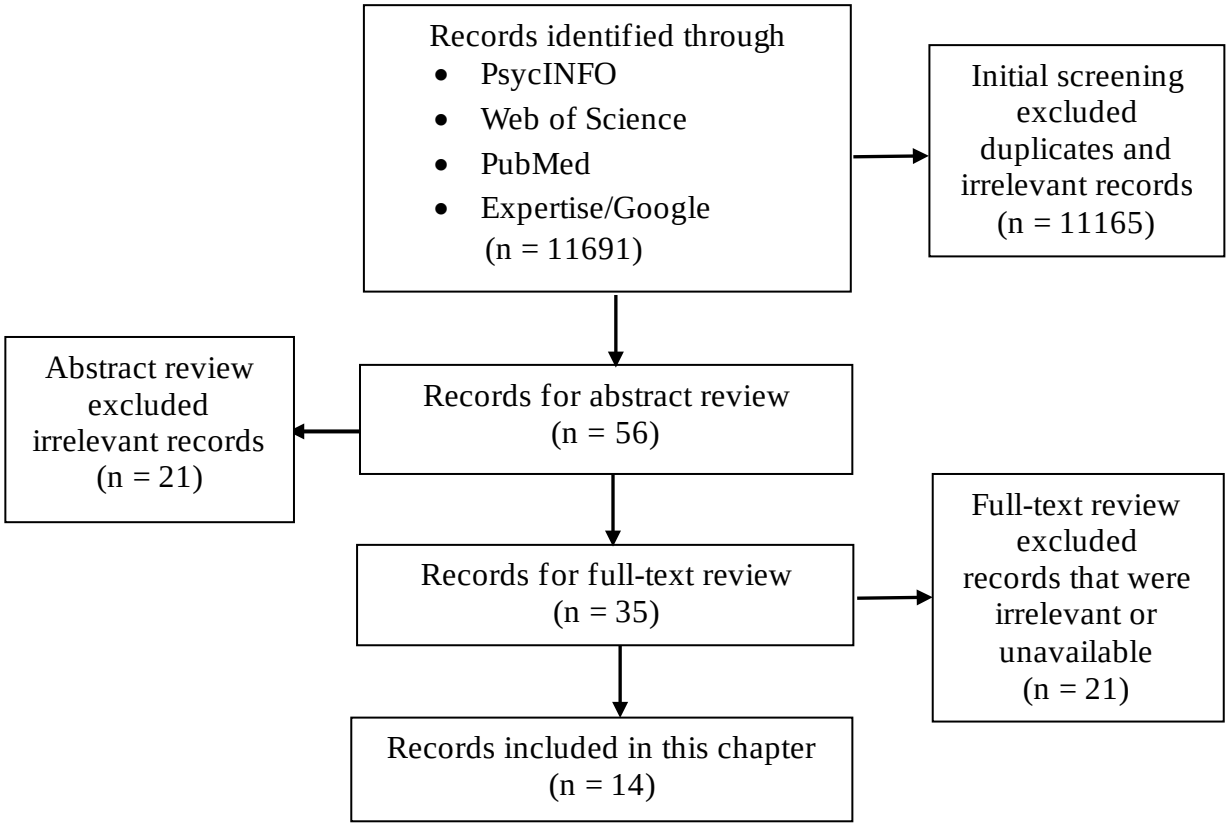
to June 2024 (present). Secondly, this review is timely so that youth drug attitudes in Singapore can be properly studied in light of the criticality of youth drug issues as mentioned earlier. Thirdly, as the intended period selected was for the last ten years, hence, it would likely include updated scales that contain recent drugs that were used by youths. Drugs, akin to fashion, undergo changes over time (Johnston et al., 2018). Drugs that might have been popular with youths in the past (e.g., MX pills, barbiturates, and tranquilisers) would no longer be as popular amongst present-day youths (United Nations Office on Drugs and Crime, 2023). Hence, scales developed in the past might possibly contain items that are no longer useful or "antiquated" (Stone, 2024. p. 495).

Review Methodology

The literature was reviewed systematically using a multi-step process (see Figure 4). English language articles were searched using the PsycINFO, Web of Science, and PubMed databases. Expert knowledge and google searches were also used to search for relevant articles. The search terms (and their derivatives) used were ("drug" OR "substance" OR "cannabis" OR "marijuana") AND ("attitude" OR "perception") AND ("scale" OR "questionnaire" OR "survey"). This scoping review focused on scales related to cannabis as it is the most widely used drug worldwide and among the youths (United Nations Office on Drugs and Crime, 2023). Among the Singaporean youths, cannabis is also among the top three drugs of choice. There was also an increase in the number of young cannabis users in the recent years (Central Narcotics Bureau, 2024). The exclusion criteria included records with irrelevant content (e.g., articles containing scales/questionnaires that were measuring drug use rather than attitudes, articles containing scales that were not measuring attitudes towards drugs or substances). As a dissertation research and the main author's key area of study, the records/studies were coded and reviewed by the main author.

Figure 4

Review Flow-chart



Review Results

Eleven thousand six hundred and ninety-one records were initially identified for review. After initial screening and removing duplicates, 56 records were left and screened by their titles and abstract. The abstract review resulted in 35 full-text records that were assessed for eligibility. After removing records that were not relevant and records which could not be found, 14 records were included in this review. Quality criteria were not used since it is not a criterion of the scoping review process (Grant & Booth, 2009). No primary data nor data from any human subjects were collected for this review. Details of each of the scales and the papers that were included in this review are presented in Table 3. Each of these scales will be described in turn and assessed for their content and psychometric properties. This review will

also aim to assess if these scales are suitable for use with Singaporean youths, the main research aim for this chapter.

This review found that research relating to drug attitude scales over the last ten years was scarce. The papers reviewed contained a range of measures of attitudes towards different substances, such as cannabis, alcohol, and tobacco. Most of the papers found were from the U.S., with two each from South America and Europe, respectively. There was one study from India, the only Asian study found, although this might be the result of the search for only English language articles. There were no studies found for Singapore.

Table 3

Articles included in the full review

Title	Author & Year	Country	N size	Name of Scale	Content of Scale	Reliability	Validity	Drug/s examined
Adolescent alcohol and cannabis use in Iceland 1995–2015	Arnarsson et al. (2018)	Iceland	European School Survey Project on Alcohol and Other Drugs (ESPAD) data: 19,865	Not applicable, part of ESPAD data	Single item How much do you think people risk harming themselves (physically or in other ways), if they smoke marijuana or hashish (cannabis) regularly Likert Scale: 'No risk', 'Slight risk', 'Moderate risk', 'Great risk' 'Don't know' *Note that the other item is related to drinking	Not available	Each category decrease in perceived risk of cannabis use increased the risk of cannabis use by 2.2-fold, 95% CI [1.75, 2.79].	Cannabis
Perceived harm, addictiveness, and social acceptability	Berg at al. (2015)	U.S.	2002	Not applicable,	3-item	Not available	Past 30-day cannabis use predicted	Cigarettes; cigar-like tobacco

of tobacco products and marijuana among young adults: Marijuana, hookah, and electronic cigarettes win				part of a study	1. How harmful to your health do you think each of the following products are? 2. How addictive do you think each of the following products are? 3. How socially acceptable among your peers do you think each of the following products are? Likert scale: 1 - Not at all to 7 – Extremely Overall favourability index of each of the tobacco products and cannabis calculated by subtracting the perceived harm		more favourable perceptions of cannabis ($p < .001$)	products (e.g., cigars, clove cigars, little cigars, cigarillos); smokeless tobacco (e.g., chewables, dissolvables); hookahs or waterpipes; electronic cigarettes; and cannabis

					and the perceived addictiveness scores from 7 respectively, and adding it to the social acceptability score Higher favourability score reflects lower perceived harm and addictiveness and higher perceived social acceptability			
Prescription Drug Attitudes Questionnaire: Development and validation	Bodenlos et al. (2014)	U.S.	310	Prescription Drugs Attitudes Questionnaire (PDAQ)	19-item Factors: 1. Recreational (11 items) 2. Achievement-oriented (8 items) 6-point Likert scale: 0 - Strongly disagree to 6 Strongly agree	Total scale: α =.94 Factor 1: α = .92 Factor 2: α = .89	Significantly correlated with: Alcohol problems through the "College Alcohol Problems Scale Revised (CAPS-R)" total scale (*r* = .37) and the Social (*r*	Prescription drugs

							= .48) and Personal (*r* = .16) sub-scales Significant correlations with: Alcohol use (*r* = .44) Illicit drug use (*r* = .36) Marijuana use (*r* = .32) However, not correlated with prescription drug use (*r* = .04)	
Marijuana risk perceptions are associated with past-month marijuana use among Black first-year college students at a historically Black university	D'Silva et al. (2022)	U.S.	Baseline data from the Prevention Works Initiative: 213	Not applicable, part of the Preventive Works Initiative data	Single item How much do people risk harming themselves physically and in other ways when they smoke marijuana once or twice a week?	Not available	Cannabis risk perceptions associated with past 30-day cannabis use ($p < .001$) Cannabis users more likely to report no risk associated with cannabis	Cannabis

					Likert scale: 1 = no 2 = slight 3 = moderate 4 = great risk don't know/can't say		use compared to nonusers (50.0% versus 20.2%) and less likely to report great risk (9.1% versus 22.9%) compared to non-users	
Young people's attitudes towards illicit drugs: A population-based study	Friis, et al. (2017)	Denmark	2013 Danish health and morbidity survey called 'How Are You?' data: 3812	Nil	4-item 1. It is okay to take drugs if they make you feel good and give you good experiences 2. People who take drugs live their lives to the full 3. People who take drugs have mainly good experiences of it 4. Taking drugs is just about having fun 5-point Likert scale:	Internal consistency: $\alpha = .70$	Factor analysis showed a 1-factor structure Regular cannabis and/or other illicit drug use showed strongest association with positive attitudes to illicit drug use (Adjusted odds ratio, AOR = 6.0)	General substances

					Strongly agree to strongly disagree			
Adolescent marijuana use and perceived ease of access before and after recreational marijuana implementation in Colorado	Harpin et al. (2018)	U.S.	Healthy Kids Colorado Survey (HKCS) Data: 24,171	Not applicable, part of the HKCS data	2-item 1. How much do you think people risk harming themselves (physically or in other ways), if they use marijuana regularly? Likert scale: No risk Slight risk Moderate risk Great risk 2. How wrong do you think it is for someone your age to use marijuana? Likert scale: Very wrong Wrong A little bit wrong Not wrong at all	Not available	Not available	Cannabis

Monitoring the Future national survey results on drug use, 1975-2017: Overview, key findings on adolescent drug use	Johnston et al. (2018)	U.S.	Monitoring the Future (MTF) Data: 44,500	Not applicable, part of MTF data	Single item: How much do you think people risk harming themselves (physically or in other ways), if they…" try or use a drug—for example, "…try marijuana once or twice? Likert scale: No risk Slight risk Moderate risk Great risk Can't say, drug unfamiliar	Not available	Not available	General drugs, including drugs such as cannabis, cocaine, LSD etc.
Attitudes, subjective norms, and perceived behavioral control associated with age of first use of cannabis among adolescents	Korn et al. (2021)	U.S.	NEXT Generation Health Study: 1848	Not applicable, part of NEXT data	3-item I decide whether or not to use marijuana because: 1. it makes me feel good 2. my friends will like me better	Internal consistency $\alpha = 0.75$	Early initiators were more likely to endorse pro-drug attitudes than the never users (AOR [adjusted odds ratio] = 2.39,	Cannabis

					3. it is personally important to me Likert scale: From “not at all true” to “very true.” Items are summed and the score dichotomised at the median, contrasting more and less positive attitudes toward use.		95% CI [1.27, 4.50].	
Trends in use of marijuana and attitudes toward marijuana among youth before and after decriminalization: The case of California 2007–2013	Miech et al. (2015)	U.S.	Monitoring the Future (MTF) Data: 320,809	Not applicable, part of MTF data	Single item How much do you think people risk harming themselves (physically or in other ways) if they smoke marijuana regularly? Likert scale: No risk Slight risk Moderate risk	Not available	Not available	Cannabis

					Great risk			
Standardization of scale for measuring attitudes towards substance use	Nanda and Verma (2017)	India	748	Scale for measuring attitudes towards substance use	22-item Example of item: When I feel sad, I feel the need to do something like consuming alcohol, cigarettes, or drugs that take me away from worries. Likert scale: Strongly agree Agree Undecided Disagree Strongly disagree Score of 5, 4, 3, 2, 1 given for positive statements, and 1, 2, 3,4, 5 for negative statements Factor 1: Substance use as defense	Total scale: α = 641 Factor 1: α = 741 Factor 2: α = .615 Factor 3: α = .513 Factor 4: α = .756 Factor 5: α = .512 Factor 6: α = .545 Split-half = .64	Approval by experts on the nature of the content covered by the statements on substance use attitudes	General substances: Alcohol, tobacco, cigarettes, drugs

					mechanism (5 items) Factor 2: Substance use as fashion (3 items) Factor 3: Social approval of substance use (2 items) Factor 4: Strong disapproval of substance use (7 items) Factor 5: Peer pressure (2 items) Factor 6: Physically & psychologically weak (3 items)			
Perceived risk and social norms associated with alcohol, tobacco, and marijuana use in Argentinean teenagers	Pilatti et al. (2023)	Argentina	378	Not applicable, part of a study	4-item "How much do you think adolescents risk harming themselves physically, in their health, or	Internal consistency Cannabis use: $\alpha = 0.87$	Perceived risk of cannabis use was also significantly correlated with frequency of	Cannabis, alcohol, tobacco

					in other ways by using cannabis (a) once or twice (b) occasionally (less than once per month) (c) regularly (1–3 times per month), (d) frequently (⩾ 1 per week). Likert scale 1 = no risk to 5 = high risk and summed up to represent the perceived risk associated for cannabis use.	Alcohol use: $\alpha = 0.78$ Tobacco use: $\alpha = 0.74$	30-day and 12-month drug use in both boys and girls (ranging from $r = .19$ to $r = .45$)	
Investigating how perceived risk and availability of marijuana relate to marijuana use among adolescents in Argentina, Chile, and Uruguay over time	Schleimer et al. (2019)	Argentina Chile Uruguay	Data from National Surveys on Drug Use Among Secondary School Students Total: 700,178 Argentina: 293,433	Not applicable, part of National Surveys on Drug Use Among Secondary School Students data	Single item How much risk do you think people face by smoking marijuana frequently? Responses categorised into “no risk” or “low risk” versus	Not available	The lesser the perceived risk, the more likely a person will use cannabis	Cannabis

			Chile: 244,364 Uruguay: 46,872		"moderate risk" or "great risk" versus "don't know"			
Development of the Enthusiastic Substance Use Attitudes Scale: Preliminary evidence of a novel maintenance factor	Stone (2024)	U.S.	198	Enthusiastic Substance Use Attitude Scale (ESUAS)	18-item 2 general factors, with 9 domains, each domain 2 items: 1. Substance-induced emotion regulation factor containing domains: a. boredom b. enjoyment c. relaxation d. life processing e. sociability f. mental health 2. Substance-based assistance, containing domains: a. physical health b. performance enhancement c. personal growth	Internal consistency Substance-induced emotion regulation: $\alpha = .93$ Substance-based assistance: $\alpha = .90$ Nine domains: $\alpha = .79$-$.92$	Content validity index (S-CVI): 0.96 using average method; 0.83 using universal agreement method ESUAS subscales and scale scores significantly positively correlated with measures of substance use such as the Drug Use Disorders Identification Test (DUDIT), the Drug Abuse Screener Test (DAST), and poly-substance use	General substances including alcohol

					Example of item “Substances helps me make friends” Likert scale: 1= not at all 2 =a little bit 3 =moderately 4= quite a bit 5= very much.		Also correlate positively with subscales in the “Difficulty in Emotion Regulation Scale”, such as difficulty with goal-directed behaviors, poor impulse control, and emotion regulation challenges, suggesting that individuals with emotion regulation problems use substances to regulate their emotions and promote goal-directed behaviors	

							Correlations that should not correlate with the ESUAS were non-significant, such as unawareness of emotions, relationship quality of life, and conscientiousness. ESUAS was negatively correlated with satisfaction with life and quality of life	
The influence of parent and peer disapproval on youth marijuana use mediated by youth risk perception: Focusing on the state comparison	Yang et al. (2022)	U.S.	National Survey of Drug Use and Health (NSDUH) Data: 2293	Not applicable, part of NSDUH data	2-item 1. How much do people risk harming themselves physically and in other ways when they smoke	Internal consistency $\alpha = .87$	Youth cannabis risk perception negatively correlated to cannabis use ($r = -.219$)	Cannabis

					marijuana once a month? 2.How much do people risk harming themselves physically and in other ways when they smoke marijuana once or twice a week?			

Attitude items included as part of a study

Many of the measurements surrounding drug attitudes occur in large scale studies where attitude questions occur as part of the surveys to collect drug-related data of the population. Examples of these studies include the Monitoring the Future (MTF) Survey in the U.S. (e.g., Johnston et al., 2018; Keyes et al., 2016) or the European School Survey Project on Alcohol and Other Drugs (ESPAD) study within Europe (Arnarsson et al., 2018). Just like population-based surveys, such large-scale surveys like the MTF and the ESPAD measure a large number of items. Hence, the measurement of youth attitudes was often conducted using a single item to prevent survey fatigue (Cheung & Lucas, 2014). Identical across most studies, single items read "How much do people risk harming themselves physically and in other ways when they smoke (name of drug, usually marijuana)…(frequency)?" and was rated on a Likert scale which usually ranged from "No risk", "little risk" to "moderate risk" and "high risk" (e.g., Arnarsson et al., 2018; Johnston et al., 2018; Keyes et al., 2016; Miech et al., 2015). However, since the focus of the research was not on the attitude measure, the item reliability and validity were thus not reported in the research. Moreover, conventional measures of reliability that rely on internal consistency (e.g., the Cronbach's alpha) cannot be used on single-item measures, making it difficult to report reliability of such measures (Cheung & Lucas, 2014). Despite this, studies found that using a single-item measure of youth drug attitudes was correlated with actual youth drug use (Arnarsson et al., 2018; D'Silva et al., 2022; Keyes et al., 2016; Schleimer et al., 2019), showing that such single-item measures did have criterion validity.

Apart from studies which had questionnaires or surveys containing a single-item attitude question, this review found several studies employing a small number of questions to measure youth attitudes, which often reported the Cronbach's alpha, providing some indication of the scale's reliability. Yang et al. (2022) used two items similar to the items

used in studies such as the MTF ("How much do people risk harming themselves physically and in other ways when they smoke marijuana once a month?" and "How much do people risk harming themselves physically and in other ways when they smoke marijuana once or twice a week") to form the drug attitude scale. The researchers found that youth cannabis risk perception was negatively related to cannabis use. Another study by Pilatti et al. (2021) used four similar items (with varying frequencies of using cannabis) to measure the perceived risk of cannabis use to form the perceived risk scale. In their study, perceived risk of cannabis use was also significantly correlated with frequency of 30-day and 12-month drug use in both boys and girls (Pilatti et al., 2021). Korn et al. (2021) used three items (e.g., "I decide whether or not to use marijuana because it makes me feel good", "my friends will like me better", and "it is personally important to me to assess attitudes towards cannabis"). These items were slightly different from other studies, with a component of how friends would perceive cannabis use since it is a study of attitudes and perceived social norms. This study found that youths who started using cannabis earlier (early initiators) were more likely to endorse pro-drug attitudes than those who had never used cannabis before. Friis et al. (2017) used four items to assess youths' attitudes towards drug use in a population-based study to explore the characteristics of youths who had more positive attitudes towards drug use. This study found that regular cannabis and/or other illicit drug use had the strongest association with positive attitudes towards illicit drug use. On the other hand, there were studies which used multiple questions to assess youths' attitudes towards drug use and some did not report reliability (Berg et al., 2015) while others did not report both based on the objectives of the studies (Harpin et al., 2018). It is important to note that the focus of these studies was not on the attitude measure itself, but to understand the effects of different factors such as legalization, age, and gender on attitudes. Hence, apart from criterion validity and reliability measures, these studies did not conduct other validation measures, such as construct or

criterion validation, except for Friis et al. (2017) who conducted factor analysis. Apart from these, the scales were also not validated across different samples, limiting their generalizability.

Full Drug Attitudes Scales

While there was a paucity of drug attitude scales in general, there were a few scales that were found to be developed for the purposes of measuring attitudes towards drugs. Nanda and Verma (2017) developed a scale to assess attitudes towards substance use. The authors tested the content validity of the scale through seeking opinions from educational experts on whether the scale adequately covered content on substance use attitudes. While this scale was developed specifically to assess attitudes towards substance use and tested on college students, a sample relevant for the current research, there were some issues in using this scale for the purposes of this research. Firstly, as this scale was developed to assess attitudes towards substance use, including drinking, smoking, and other substances, 14 out of 22 items within the scale assess either smoking and/or drinking. Hence, more than half of the items were not relevant for use for the current research on illicit drugs. Secondly, the internal consistency of the full scale was less than .70, which was only adequate but not considered good (Field, 2000). Thirdly, Factor 3 ("social approval of substance use") and Factor 5 ("peer pressure") had only two items each, which was less than the recommended minimum number of three items per factor (Fabrigar et al., 1999). This limitation was also mentioned by the authors who explained that these items were included in the final scale as the factor loadings of the items were above .60 (Nanda & Verma, 2017). In addition, while the scale was tested for content validity, it was not further tested for other measures of validity. Hence, it is uncertain if the scale was correlated with other tests of drug attitudes, tests of drug screening or actual drug use. Having tested the scale on only one population of college students also limited its generalizability.

Another test, the Enthusiastic Substance Use Attitude Scale (ESUAS) was developed recently by Stone (2024). The ESUAS was developed as a scale to assess the positive "expectancies, motives, and attitudes" towards substance use. The author believed that typical drug attitude measures did not capture the "enthusiastic attitude toward the perceived benefits of substance use exhibited by those who use substances regularly in informal settings." (Stone, 2024, p. 494). The scale was heavily tested for its content, construct and discriminant validity and might possibly be adapted for use with Singaporean youths with certain considerations in mind. Firstly, the scale was tested on only one sample of U.S. college students, and this limits its generalizability to the Singaporean youth population. Secondly, the purpose of the scale was to create positively toned items to reflect the enthusiasm towards the benefits of drug use. In the case of Singapore, however, while youths use drugs because of their perceived benefits, they also do not use drugs because of the perceived repercussions or fear of negative consequences, such as the legal and health consequences (Ministry of Home Affairs, 2015b). Hence, a comprehensive drug attitude scale for Singaporean youths should include not only positively toned items that reflect the benefits of taking drugs, but also negatively toned items to reflect the harms of drug use.

The Prescription Drugs Attitudes Questionnaire (PDAQ) was developed to measure attitudes towards nonmedical use of prescription drugs for recreational- and achievement-oriented purposes (Bodenlos et al., 2014). The scale was shown to have excellent internal consistency. Results also indicated convergent validity through its significant positive correlations with measures of alcohol problems and actual alcohol and illicit drug use, although the measure did not correlate with actual prescription drug use as expected. The authors attributed this to the low levels of prescription drug use in the sample or under-reporting by the students on their prescription drug use. Despite being a scale with excellent reliability that was validated on college students, this scale's focus was on assessing attitudes

towards nonmedical use of prescription drugs, which was not the focus for the present research.

Discussion

This review showed that scales intended to assess drug attitudes were scarce. Most of the items intended to assess attitudes towards drugs and/or drug use, especially for youths, were commonly included in studies involving measures assessing a larger number of variables. Many of the drug attitude measures were often included in large scale studies such as the Monitoring the Future, European School Survey Project on Alcohol and Other Drugs, and the Healthy Kids Colorado Survey (e.g., Arnarsson et al., 2018; Harpin et al., 2018; Johnston et al., 2018; Keyes et al., 2016). In such studies, drug attitudes might be one of the many variables studied, and controlling the survey length might be key to ensure participant well-being and prevent survey fatigue. Many of these studies contained a single drug attitude item. While single-item measures have been found to be as valid as multiple-item measures in scales (e.g., life satisfaction measures) it should also be noted that single-item measures might be less sensitive, especially those with few response options (Cheung & Lucas, 2014). Similarly, there were also studies which contained multiple drug attitude items within the studies. As discussed earlier, the focus of these studies was not on assessing attitudes towards drugs (Berg et al., 2015; Friis et al., 2017; Harpin et al., 2018; Korn et al., 2021; Pilatti et al., 2021). Hence, full validation was often not reported or possibly not explored. Hence, the development of full-scale measures remained an imperative due to the need to increase a drug attitude measure's sensitivity, reliability, and validity.

There were only three full drug attitude scales found within the time frame of this review. These were the scales to assess attitudes towards substance use (Nanda & Verma, 2017), the ESUAS (Stone, 2024) and the PDAQ (Bodenlos et al., 2014). Each of these scales had their strengths but the items on the PDAQ, and more than half the items on the scale to

assess attitudes towards substance use were not relevant for the current research. While the ESUAS was the most relevant scale for use, the nuancing of the scale to only contain positively toned items limited its use for the Singapore context, which is a country with zero tolerance for drugs and youths' fear for repercussions of the law could affect their attitudes towards drugs (Ministry of Home Affairs, 2024).

Conclusion

As part of the review for drug attitudes scales from 2014 to 2024, this research found a paucity of drug attitude scales developed over the last ten years. Most of the drug attitude measures were items included as part of large-scale, usually population-based studies, where the measures were single items or at best a few items. There was little information regarding these measures' validity and/or reliability as this information was generally not available or not explored by the researchers. Based on findings from the present review, a newly developed measure would be required for the purposes of the present research.

Limitations of the Present Review

There are several limitations to the present review. The review is based on studies over the past ten years and this review would not contain an exhaustive list of drug attitude scales that has been developed thus far. In addition, this review focused on scales related to cannabis as it was the most widely used drug worldwide and among the youths (United Nations Office on Drugs and Crime, 2023). Hence, the review might have inadvertently left out some scales that focus on other drugs such as ice or heroin. As the studies were also reviewed and coded by the main author, there would not be interrater reliability on the eventual coded findings. Finally, it should be noted that the papers were not assessed for their quality since it is not a scoping review process criterion (Grant & Booth, 2009).

Chapter 5: Study 1 Method

This research employed both quantitative and qualitative research methods. The first two studies used a quantitative research method, where a survey methodology was used to collect large scale data. The aim of the first study was to develop and validate the Singapore Youths' Drug Attitudes Scale (SYDAS).

Participants

Data were collected from 694 youths consisting of 449 non-users and 245 drug users from January to March 2015. The mean age of the drug users was 22.3 years old (*SD* = 3.3) while the mean age of non-users was 19.8 years old (*SD* = 2.7). This data was part of the data collected from the research study conducted by the "Task Force on Youths and Drugs (TFYD)" set up in November 2014. Participants from the non-user group were students studying in various educational institutions ranging from secondary schools to universities as well as those serving their full-time National Service. While youths in this study were defined as 12 – 30 years old, the participants recruited were 13 – 30 years old as minimal criterion for recruitment was secondary school education. This was except for one participant who was 12 years old at the time of the study. For the drug users, they were recruited from drug users arrested by the authorities and placed in the various rehabilitation centers and programs - the Drug Rehabilitation Center, the Community Rehabilitation Center and the Youth Enhanced Supervision Scheme, full-time national servicemen detained under a drug charge by the Singapore Armed Forces (SAF) for the first time, and national servicemen who confessed to drug use under the SAF Amnesty Scheme. While non-users were not arrested for drug use, they could possibly be also drug users. However, any admission of drug use was based on self-report. There were proportionately less drug users than non-users within this sample since it was difficult to recruit drug users for this study as the number of youths arrested for drug use was not high. Drug users could be arrested for drug use of one or more drugs such as

cannabis, ice, heroin etc. The sample was stratified based on gender as disproportionately more males were drug users compared to females (Ministry of Hone Affairs, 2015a). Where possible, stratified sampling was also used to ensure that the different categories of race, socioeconomic status, and educational levels were represented. Approximately 30% of the participants within both the drug users and non-users group had household income of $3000 and below. The descriptive statistics of the sample are reported in Table 4. The principal investigator was working as a psychologist in the Central Narcotics Bureau, Singapore, when the team conceptualized and carried out the study in 2014 to 2015.

Table 4

Gender, Ethnicity, Educational Qualification and Household Income of the Sample who participated in Study 1.

	Drug Users	Non-users
Gender		
Males	185 (75.5%)	331 (73.7%)
Females	60 (24.5%)	118 (26.3%)
Ethnicity		
Chinese	66 (26.9%)	294 (65.5%)
Malays	141 (57.6%)	83 (18.6%)
Indians	19 (7.8%)	47 (10.5%)
Others (e.g. Eurasian, Arabs, Filipino etc.)	19 (7.8%)	25 (5.6%)
Highest Education Level		
Primary School	16 (6.6%)	11 (2.4%)
Secondary School	134 (54.7%)	98 (21.8%)
Institute of Technical Education (ITE)	49 (20.0%)	51 (11.4%)
Polytechnic/ Junior College or equivalent	45 (18.4%)	256 (57.7%)
University	1 (0.4%)	30 (6.7%)

Table 4 continued

	Drug Users	Non-users
Household Income		
$1000 and below	30 (12.2%)	22 (4.9%)
$1001 to $3000	52 (21.2%)	102 (22.7%)
$3001 to $5000	31 (12.7%)	58 (12.9%)
$5001 to $7000	9 (3.7%)	34 (7.6%)
$7001 to $9000	6 (2.4%)	22 (4.9%)
$9001 to $12000	6 (2.4%)	23 (5.1%)
More than $12000	5 (2.0%)	29 (6.5%)
Missing	106 (43.3%)	159 (35.4%)
Total	245 (100%)	449 (100%)

Note: PSLE refers to the Primary School Leaving Examination Qualifications.

Measures

Drug Attitudes Scale (SYDAS)

The SYDAS was developed by a local team of psychologists (including the principal investigator) at the Ministry of Home Affairs, Singapore, to examine the attitudes of youths towards drugs and drug use (Ministry of Home Affairs, 2015a). This scale (shown in Table 5) was the scale that the principal investigator aimed to validate in this current study. The scale consisted of 22 items exploring youths' attitudes towards illicit drug use, especially within the context of Singapore laws, and views on the harmfulness of drugs. The smoking/drinking items were included for purposes of making the scale more comprehensive initially, but also to not cause unnecessary concern to students that they were asked to participate on a study on illicit drugs. "If there were no laws against drug-taking, I will be likely to take drugs" was an example of a positively-worded item. "Drug-taking is harmful" was representative of a negatively-worded item. Each item was rated on a 4-point Likert scale from "0=Strongly

Disagree, 1=Disagree, 2=Agree, and 3=Strongly Agree." Reverse scoring was used for negatively-worded items. Participants' scores on the scale were summed across all items. Higher scores indicate more pro-drug attitudes.

Assessment of Risk of Drugs

Participants were asked about their perceptions of different drugs. For this, participants were given a list of drugs (heroin, cannabis, synthetic cannabis, ice, tobacco and alcohol) and asked to indicate "how harmful…" and "how addictive…" they perceived these drugs to be. The scores ranged from "1=Not harmful" to "5=Very harmful" and "1=Not addictive to "5=Very addictive". Those who did not know what the drugs are will indicate their response as "Not sure". For this study, only responses to ice, cannabis, synthetic cannabis, and heroin will be included in the scoring as this study was concerned about illicit drugs used by local youths (Central Narcotics Bureau, 2024). Responses were coded from 1 to 5. The responses to "Not sure" would be coded as missing data and will not be included in the scoring. Higher scores indicate higher perceptions of risk.

Procedure

Ethical clearance for the research was obtained as part of the TFYD 2014 research study from the Ministry of Home Affairs. Researchers (consisted of both psychologists and research assistants) went to the different locations to conduct the survey. Research assistants underwent training on survey administration by the psychologists. The researchers explained the purpose of the study and obtained informed consent. Participants were told that answers would be confidential and there would not be individual identifiers in the final report. Participants were also told that participation was voluntary, and they could withdraw their participation at any point. The researchers administered the survey to the participants in groups. Participants were thanked for their participation after completion.

Table 5

SYDAS developed in Singapore intended for Validation in the Current Study.

Item Number	Item Description
1	If there are no laws against under-age smoking/drinking, I believe young children will smoke/drink
2	Drug-taking is harmful
3	Drug-taking causes no harm to other people
4	To take drugs is my own lifestyle choice
5	I believe I can stop drug-taking any time I want
6	If there are no laws against drug-taking, I will be likely to take drugs
7	I think I can avoid arrest by CNB officers/police even if I take drugs
8	Taking some club drugs occasionally is alright
9	I think under-age children (<18 yrs old) can avoid arrest by the police if they want to smoke/drink
10	I think it is okay to take drugs
11	Many people say that drug-taking is good
12	Drug-taking is addictive
13	Drug use can be prevented
14	Drug prevention education is useful
15	I am able to obtain drugs if I want to
16	If I were to take drugs, my peers will approve of it
17	It is easy to buy or get drugs in Singapore
18	I have wanted to try taking drugs when I was overseas
19	I think I will not be caught by CNB upon return to Singapore if I take drugs overseas
20	A drug like Cannabis, which comes from plants, is not harmful
21	A criminal record is important to deter drug abusers
22	Taking drugs will ruin one's future at studies, work, and in life

Note: CNB refers to the Central Narcotics Bureau

Data Analysis

Reliability Analysis

Two tests will be used to test for internal consistency of the scale - the inter-item consistency, represented by the Cronbach's alpha and the split-half reliability analysis, which is done by comparing the results of either odd-numbered items to the even-numbered items or a random half to another half (Mohajan, 2017). According to Field (2000), values of 0.7 to 0.8 indicate that the scale has good reliability.

Validity Analysis

Face validity is the minimum indicator for content validity that should be done. For the present study, the psychologists and researchers developing the scale assessed the face validity of the scale based on their expertise and familiarity with the subject matter.

Factor analysis will be conducted to test for construct validity (Mohajan, 2017). Carpenter (2018) suggested that prerequisite statistical tests (e.g. Barlett's Test of Sphericity, Kaiser-Meyer-Olkin, KMO) to be conducted before applying factor analysis to the data. A KMO value of 0.5 is the bare minimum (between 0.7 to 0.8 is considered good), while the Bartlett's test of sphericity must be significant for the factor analysis results to be useful (Field, 2009). In addition, selecting the right factor analysis method is important. While the Principal Components Analysis (PCA) is the most common method used for data analysis, it is not a factor analysis method, neither is it the most useful method (Costello & Osborne, 2005). The PCA is a data reduction method. It does not discriminate between the shared variance and unique variance of the variables. Hence, when factors are uncorrelated with low communalities, the PCA can erroneously include too many components since the sizes of components are inflated due to the inclusion of error variance (Carpenter, 2018; Costello & Osborne, 2005). Comparatively, factor analysis, a common factor model, can yield a similar solution as PCA (other things being equal), without inflating the variances of components since it partials out the shared variance of a variable from its unique and error variance (Costello & Osborne, 2005; Fabrigar et al., 1999).

To determine the construct validity of the scale, the data was randomly split into half and one half of the data was analyzed using EFA while the other half of the data was analyzed using CFA. As SYDAS was a drug attitudes scale for Singaporean youths, the data was not split and analyzed by drug users versus non-users, despite the hypothesis that drug users might have more pro-drug attitudes than non-users. The EFA is the first analysis to be

used to determine the number of common factors that exist within the scale. The EFA method for this study will be the Principal Axis Factoring (PAF) with Promax rotation based on best practices (Carpenter, 2018; Costello & Osborne, 2005; Fabrigar et al., 1999).

To determine the number of factors to extract, researchers commonly retain a factor if it has an eigenvalue greater than one. However, this is generally not a recommended approach as it can lead to over- or under-extraction of factors since "the number of factors with eigenvalues above one is greatly related to the total number of variables included in a model" (Carpenter, 2018, p. 36). Moreover, Fabrigar et al. (1999) argue that it is arbitrary to cut off at one since there is no clear rationale to accept factors that are slightly above one (e.g., 1.01) and reject those slightly below one (e.g., 0.99). The other method to determine the number of factors to retain is known as Parallel Analysis. This method compares the eigenvalues from the results to eigenvalues from a random dataset. Factors with eigenvalues greater than those from the random dataset will be retained (Carpenter, 2018). Research indicates that the ideal number of variables per factor should be four to five (Carpenter, 2018; Costello & Osborne, 2005). Literature also supports factor loadings between .30 to .40 (Carpenter, 2018) and a cut-off of .32 was suggested with items that load onto a single factor or have minimal cross-loadings with other factors (Costello & Osborne, 2005).

After conducting the EFA, a CFA will be conducted where the number of factors to be extracted will be specified based on the results from the EFA (Fabrigar, 1999). The Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) of more than .90 indicates an acceptable fit, and more than .95 a good fit. In addition, Root Mean Square Error of Approximation (RMSEA) value closer to zero is of better fit and values less than .08 of a reasonable fit and less than .05 indicative of a good fit (Kyle, 1999; Xia & Yang, 2019).

Criterion validity of the scale will also be assessed through the correlation between participants' scores on the SYDAS and their scores on two measures. Firstly, the correlation

between their drug attitudes and how harmful they assess the illicit substances, including heroin, cannabis, synthetic cannabis, and methamphetamine, will be considered. Secondly, the correlation between their drug attitudes and how addictive they assessed these substances will be determined. The correlational analysis used will be the Pearson Product-Moment Correlation. The known-groups validity will also be ascertained using the t-test to determine if there is a difference between the drug attitudes of users versus non-users.

Study 2 Method

Study 2 was conducted with different objectives. The purpose of Study 2 was to determine if youths with different risk factors (Malays, males, lower educational attainment, family's criminal and drug history, close friends' drug history) were more likely to hold more pro-drug attitudes. These factors were based on the hypotheses that were formulated when this research was conceptualised and later confirmed during the scoping review which found that these factors were worthy of further research. Although educational attainment did not surface as one of the factors that influenced drug attitudes of youths, this factor was retained for study to see if it would affect the youths' attitudes in Singapore due to the heavy focus on preventive drug education in Singapore schools (Government of Singapore, 2024b). In addition, prior drug use experience (classified by whether the youth was a drug user or non-user) was included as a variable for study since it surfaced as a significant factor associated with youth drug attitudes. Study 2 was also intended to determine if the pathway from attitudes to intention and intention to drug use as postulated by the Theory of Planned Behavior (Ajzen, 1991) would be found within this sample of Singaporean youths. The data from Study 2 was a sub-set (85 drug users and 376 non-users) from Study 1 as some cases were deleted due to missing data (explained in the "Data Analysis" section below). The mean age of the drug users was 22.0 years old (SD = 3.1) while the mean age of non-users was 20.4 years old (SD = 2.1). The descriptive statistics for the sample were presented in Table 6.

Table 6

Gender, Ethnicity, and Educational Qualification of the Sample who participated in Study 2.

	Drug Users	Non-users
Gender		
Males	67 (78.8%)	301 (90.1%)
Females	18 (21.2%)	75 (19.9%)
Ethnicity		
Chinese	21 (24.7%)	242 (64.4%)
Malays	48 (56.5%)	75 (19.9%)
Indians	8 (9.4%)	42 (11.2.%)
Others (e.g. Eurasian, Arabs, Filipino etc.)	8 (9.4%)	17 (4.5%)
Highest Education Level		
Institute of Technical Education (ITE)	45 (52.9%)	58 (15.4%)
Polytechnic/ Junior College or equivalent	40 (47.1%)	292 (77.7%)
University	0	25 (6.6%)
Missing	0	1 (0.3%)
Total	85 (100%)	376 (100%)

Measures

Demographics and Personal History

The "Demographics and Personal History" section collected participants' demographic data (e.g., age, gender, ethnicity) and personal history in areas such as their education, family, and social life. The data in this section was collected to determine if youths' drug attitudes could be influenced by demographic variables such as gender, ethnicity, educational attainment, and family and peer influences.

Educational Attainment

To ascertain their highest educational level, participants were asked to indicate their highest education attained. Responses ranged from primary school, secondary school, Institute of Technical Education, polytechnic/junior college or equivalent, and university Participants were also asked about their average Secondary School National Examination (GCE 'O' Levels and GCE 'N" Levels) grades. Results were graded from A to F. Participants who did not participate in these exams or were not sure of their results could endorse "not sure/not applicable" and these were treated as missing values.

Parental Monitoring and Number of Family Members with a Criminal and Drug History

The influence of parental monitoring was measured using the question "How often does at least one of your parents know what you are doing when you are away from home when you were 13 – 19 years old?" The responses range from never, rarely, sometimes, often, and always. As mentioned earlier, all participants recruited were 13 – 30 years old, with the exception of one participant who was 12-year-old. For this participant, this question was not answered and treated as a missing response. The influence of family was also measured by asking participants two questions, if they had any family members (either parent, sibling and/or other relatives, e.g., uncle, aunt, cousins) "who have ever been arrested or charged for criminal offences" or "who have ever been arrested or charged for drug-related offences?" Participants were asked to indicate the appropriate number or none if they did not have any family members with any such history.

Number of Close Friends with a Drug History

The influence of close friends was determined using the question "How many of your close friends had previously and/or are currently engaged in drug activities?" Participants were asked to indicate the appropriate number or zero if they had no such friends.

Drug Use Intention

To assess drug use intention, participants were asked the question, “Have you ever thought of taking drugs?” The response for this question was coded as either “Yes” or “No”. If yes, they were asked about the age in which they started thinking about taking drugs.

Actual Drug Use

To assess actual drug use, participants were asked if they had ever tried any of the drugs listed (Ice, cannabis, synthetic cannabis and ecstasy) and if yes, the age at which they first used those drugs.

Procedure

As the sample for Study 2 was a sub-set from Study 1, the data for this study was collected at the same time as Study 1.

Data Analyses

T-test and One-way ANOVA

To determine if there are significant differences in the drug attitudes between the different groups, the independent samples t-test and the one-way ANOVA will be used. The independent samples t-test will be used to ascertain the difference in drug attitude scores between males and females. The one-way ANOVA and post-hoc Tukey HSD would be used to ascertain the difference between multiple groups. This includes differences between groups of different ethnicities, educational attainment, and parental monitoring.

Correlation Analysis

A series of Pearson product-moment correlations would also be conducted to test for correlations between youths’ drug attitudes and the number of their family members with a criminal history, the number of their family members with a drug history, as well as their number of close friends with a drug history.

Regression Analysis

The forward stepwise multiple regression would be used as this method helps to ascertain the subset of variables within the nine variables of interest that best predicts youth drug attitudes. The nine variables that would be entered into the multiple regression would be the youths' gender, ethnicity, average secondary school examination grades, highest educational qualification, prior drug use experiences, parental monitoring, family's criminal history, family's drug history and close friends' drug history.

Prior to conducting the regression, the Little's Missing Completely at Random (MCAR) Test (Little, 1988) would be used to ascertain if the any data is missing completely at random. In this case, a non-significant chi-square test would suggest that the missing data was completely random and the expectation-maximisation method could be used to replace the missing values (Dong & Peng, 2013). On the other hand, if the data was systematically missing, the data would be scanned through and cases with systematic missing data would be deleted. Following this, the following assumptions need to be fulfilled before the regression analysis can be conducted (Field, 2000; Keith, 2006).

1) Ratio of cases to the number of predictor variables - the minimum data sample size needs to be more than or equal to 104 plus the number of predictor variables (i.e., 8).
2) Multivariate outliers – there should not be multivariate outliers and this could be calculated using the Mahalanobis distance, which is the distance of a case from its multidimensional mean, given the distribution's covariance. Any case which is a multivariate outlier (i.e., cases with probability associated with its D^2 of 0.001 or less) should be removed from the dataset.
3) Multicollinearity – two or more of the predictor variables should not be highly correlated with one another. To ensure that there is no multicollinearity, the

correlations between the predictor variables should not be more than .80. In addition, tolerance values of less than 0.1 and variance inflation factor of more than 10 would also indicate multicollinearity.

4) Normally distributed residuals – this can be checked through visual inspection of the histogram plot of the standardised residuals and the Q-Q plots of the expected residual values against the observed residual values.
5) Linearity – the relationship between variables should be linear. A random scatterplot of the predicted values against the residuals would indicate linearity.
6) Homoscedasticity – occurs when the residuals appear to be constant across all levels of the predictor variables. Like linearity, homoscedasticity can be assumed when the scatterplot of the predicted values against the residuals shows a random and scattered pattern.
7) Independence of residuals – this assumption ensures that the residuals of the regression model are independent of one another and that autocorrelation of residuals does not occur. The Durbin-Watson test is used to test for autocorrelation and a value close to 2 suggests independence.

Overall, the dependent variable in the regression analysis must be a continuous variable. The predictor variables could be continuous or categorical. However, for categorical predictor variables with more than two categories, dummy codes must be created for these groups. In the case of the present data, dummy variables were created for the following variables, gender, ethnicity, average secondary school examination grades, highest educational qualification, prior drug use experiences and parental monitoring (Field, 2000; Keith, 2006).

Mediation Analysis

While the ideal method was to test if youths' drug attitudes, drug use intention (if they ever thought of taking drugs "yes/no"), and eventual drug use (ever took drugs "yes/no"), all

non-users responded “no” to the question on eventual drug use. This response was understandable given the harsh punishment for drug use in Singapore law. Due to the consistent responding to the drug use question, an additional analysis was put in place. This analysis was to test for the relationships between youths’ drug attitudes, drug use intention (measured by the age of first thought of drug use), and eventual drug use (measured by the age of first drug use). The purpose of this mediation analysis to determine if youths whose drug attitudes affected their age in which they first used drugs and if this relationship would be mediated by when they first thought of using drugs. A 95% confidence interval and 5000 bootstrapping samples will be set for each mediation analysis. The drugs of interest that will be tested within each of the mediation analyses will be ice, ecstasy, cannabis and synthetic cannabis.

Study 3 Method

To compliment the quantitative research findings and to obtain a richer understanding of the youths’ attitudes towards drugs and drug use, Study 3 using qualitative methods was conducted. Data from this third study was also collected as part of the research from the TFYD 2014 research project. Ethical approval for this study was also obtained from the Ministry of Home Affairs as part of the TFYD 2014 research study. In this study, individual case history interviews were conducted with youths and the data collected from the interviews were analyzed.

Participants

Study 3 participants consisted of a different sample from Study 1 and 2, comprising 66 youths (36 drug users and 30 non-drug users). Like the quantitative surveys, the participants from the non-drug user group were recruited from students studying in various educational institutions ranging from secondary schools, junior colleges, polytechnics, and universities. While non-users were not arrested for drug use, they could possibly be also drug

users. For the drug users, they were recruited from drug users arrested by the authorities and placed in the various rehabilitation centers and programs – the Drug Rehabilitation Center, the Community Rehabilitation Center and the Youth Enhanced Supervision Scheme, full-time national servicemen detained under a drug charge by the Singapore Armed Forces for the first time, and national servicemen who confessed to drug use under the SAF Amnesty Scheme or who were caught and placed in the Detention Barracks. The drug users were arrested for using either one or more drugs such as cannabis, ice, heroin etc. Purposive sampling was used for the selection of participants for the in-depth interviews. The mean age of the drug users was 20.6 years old (*SD* = 2.6) while the mean age of non-users was 17.0 years old (*SD* = 1.7). The distribution by gender and ethnicity between the users and non-users are listed in Table 7.

Table 7

Gender and Ethnicity of Interviewees Differentiated by Drug Use.

	Number and Percentage	
Groups	Drug Users	Non-users
Gender		
Males	28 (77.8%)	16 (53.3%)
Females	8 (22.2%)	14 (46.7%)
Ethnicity		
Chinese	12 (33.3%)	19 (63.3%)
Malays	12 (33.3%)	9 (30.0%)
Indians	7 (19.5%)	2 (6.7%)
Others (E.g., Eurasians, Arabs, Filipinos etc.)	5 (13.9%)	0 (0%)
Total	36 (100%)	30 (100%)

Measures

The interviews were conducted using a semi-structured interview protocol. As a qualitative measure, this interview consisted of open-ended questions intended to yield verbal descriptions and a rich source that aims to understand the thoughts, feelings, and how the youths understood the topic of interest (Braun & Clarke, 2006). As this study was intended to develop a deeper understanding of the issues obtained from the first two studies, similar data and information were also collected from the interview.

As part of the "Demographics and Personal History", participants' demographic data such as their age, gender, and ethnicity were obtained. The focus of this interview was about the youths' thoughts and perception about drugs and drug use. Hence, the interviews obtained information on how much both groups knew about illicit drugs, their attitudes towards drugs and drug use, drug users' reasons for drug use versus what non-users thought were reasons for drug use by the drug users, as well as their perceptions about preventive education in Singapore. The objective was to recommend effective preventive education and enhancing drug prevention for Singaporean youths. Appendix A presents the interview questions.

Procedure

The interviews for the drug users were conducted on a one-to-one basis, with a main interviewer and the participant. For the non-users, the interviews involved one interviewer to two participants. This was to maximize the number of interviews that could be completed within the stipulated time for data collection. Based on a study by Guest et al. (2017), group interviewees did not perform differently from one-to-one interviewees when they generated information about their health-seeking behaviour at an event level. While individual interviews were more effective in generating a broader range of items when comparing on a per-person (rather than per event) basis, the authors also found that certain sensitive and personal disclosures were more likely in a group than one-to-one interview setting. Hence, it

was concluded that a one-two interview setting for the non-users were not likely to affect the interview results. However, the conditions of the drug users' arrest or incarceration were not ideal for interviews to be conducted with more than one participant at one time. Interviewers were either psychologists or researchers trained in interviewing who went to the different locations to conduct the interviews. Interviewers explained the purpose of the study. There were a total of ten interviewers for this study. The interviewers obtained informed consent. Participants were also told that answers would be confidential and there would not be individual identifiers in the final report. Participants were assured that participation in the interview was voluntary and they could withdraw their participation at any point. They could also choose not to answer specific questions. The interviews were conducted, and participants were thanked for their participation. Whenever possible, the participants' responses were taped recorded and later transcribed by the psychologists. Some locations did not allow recording, and the participants' responses were written on paper and later transcribed.

Data Analysis

Framework Analysis

The data from the in-depth interviews with both groups of participants would be analyzed using "Framework analysis." This is a qualitative thematic analysis that analyzes the textual data from the interview transcripts to identify and report patterns and themes within the data (Braun & Clarke, 2006; Gale et al., 2013). While the framework approach has its origins in social policy research, it has become popular as an approach in health and medical research, as well as research involving mixed methods, such as psychology, sociology, and nursing.

The framework approach involves charting data into a matrix where the researcher develops a spreadsheet through organising participants by rows and thematic codes in columns. Codes that are developed often align with the questions asked according to the

qualitative interview guide that was used in the data collection process. Eventually, participants' comments would be keyed into spreadsheets (presented in Table 8). Although the framework method can both be inductive (codes and themes are generated based on the data collected and refined as analysis progresses) and deductive (codes and themes are predetermined based on theories and literature review), this study would be predominantly the deductive approach where codes and themes would be predetermined based on the existing literature. Hence, the developed semi-structured interview guide questions were also closely aligned to the desired predetermined themes (Klingberg et al., 2024).

Using this approach, the interview data will be keyed into two Excel spreadsheets, one for the drug users and one for the non-users. In each spreadsheet, the rows would represent participant identification (one per row) and the columns would be key elements such as participant demographics and the codes according to the predetermined themes, including reasons for why youths took drugs, where they obtained drug-related information, families' and peers' influence on drug use, and perception towards preventive education. This will result in a matrix where one can read across a row to see each participant's comments and down each column to compare all participants' perception on a particular theme. Being a thesis study, all the qualitative data was coded only by the principal investigator. Using the matrix, both data within individual cases and across different cases would be compared to identify similarities, differences, themes and patterns within the data to understand the phenomenon under study (Rosen et al., 2023).

Table 8
Sample of the Spreadsheet showing Participants' Qualitative Comments

S/N	Ethnicity	Gender	Age	Reasons youth take drugs	Where did you get info about drugs?	Where do you prefer to get drug info?	How would you prefer the school to disseminate drug info?	Type of drug info obtained	What is effective drug info?	Current drug campaign adequate?
1	Chinese	Male	14	"They are sometimes feeling too stressed out in their examinations and they want to relieve their stress." "They end up taking drugs even though they know that there is side effects they cannot resist. The temptation of trying out new things because teenagers love to try out new things."	Talk to parents, police talks, TV or movies portrays drugs as a normal thing, only if you watch educational shows they show drugs as being bad.	Personal email for your eyes only, will turn to teachers.	Kinesthetic activities - people move around or do activities, release monthly newsletters.	Consequences of drug effects	Consequences for taking drugs	Adequate, satisfied. Need to create awareness for these materials - DanceWorks sounds nice.

2	Malay	Male	16	depressed peer pressure	SANA drug abuse course, assembly talks in the school, counsellor advice, crime watch, internet - go to friends' blog and see what they blog about, also different websites about drugs, TV shows punishment of taking drugs, tv always shows convicts suffer from drugs.	Messaging you like how some companies will be messaging you about their advertising products, will turn to teachers because teachers are more trained in dealing with such issues in school.	Drug abuse games - "so that the games might show us, might be fun at the same time when it is fun you will be able to not be boring, it won't be boring and you will be more interested in finding instead of having assembly talks, advertisements social media cos teenagers are mostly surfing the net.	Consequences of drug effects, punishment for taking drugs	Dangers of drugs	Adequate, satisfied. Need to make the magazines and materials more attractive to teenagers ("more illustrations so I will be more interested to read them") have more games – "you get to play them well and at the same time you know what is drug abuse."

Summary

This chapter described the sample characteristics, procedure, and measures used in the three studies for the present research. Study 1 is a quantitative study using a survey methodology. The first study aims to validate the SYDAS that has been developed for Singaporean youths. Study 2 utilized a sub-set from Study 1 with the aim of ascertaining if having certain risk factors would result in youths having more pro-drug attitudes. Additionally, Study 2 also aims to determine if the hypothesized pathway according to the Theory of Planned Behavior (Ajzen, 1991) will materialize in this present sample. Study 3 is a qualitative study using interviews. This study aims to determine if youth drug users are different from non-users regarding drug-related attitudes, knowledge and sentiments towards preventive education. Eventually, this research hopes to contribute to research, preventive drug education and drug policymaking in Singapore.

Chapter 6: Study 1 Results

The first study was a quantitative research study involving a survey which collected data from 694 youths (449 non-users and 245 drug users). The focus of the first study was to validate the 22-item SYDAS that was developed. The descriptive statistics of each of the 22 items are presented in Table 9. All items have a minimum of 0 and maximum of 3.

Validation of the Drug Attitudes Scale (SYDAS)

Exploratory Factor Analysis (EFA)

The IBM SPSS Statistics Version 29. 0. 2. 0 (20) was used to conduct the EFA. The EFA was conducted using Principal Axis Factoring (PAF) with Promax rotation and the analysis was conducted seven times to arrive at a one-factor model. The specific details of why the EFA was conducted seven times and the steps for the EFA are documented below. Prior to conducting the EFAs, the preliminary tests of Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and the Barlett's Test of Sphericity were considered. All the Barlett's Test of Sphericity were significant, $p < .001$ and KMO values ranged from .87 to .90 (considered great) (Field, 2000).

Table 9

Mean and Standard Deviation for each of the 22 Items in the Drug Attitudes Scale

Item Number	Item Description	Drug Users		Non-users	
		M	*SD*	*M*	*SD*
1	If there are no laws against under-age smoking/drinking, I believe young children will smoke/drink	2.4	0.7	2.3	0.8
2	Drug-taking is harmful	2.4	0.6	2.8	0.5
3	Drug-taking causes no harm to other people	1.1	0.9	0.6	0.8
4	To take drugs is my own lifestyle choice	1.6	0.9	1.4	1.0
5	I believe I can stop drug-taking any time I want	2.4	0.9	1.2	1.1
6	If there are no laws against drug-taking, I will be likely to take drugs	1.5	1.0	0.5	0.8
7	I think I can avoid arrest by CNB officers/police even if I take drugs	0.9	0.8	0.5	0.7
8	Taking some club drugs occasionally is alright	0.8	0.8	0.4	0.6
9	I think I under-age children (<18 yrs old) can avoid arrest by the police if they want to smoke/drink	1.1	0.9	0.9	1.0
10	I think it is okay to take drugs	0.8	0.8	0.3	0.6
11	Many people say that drug-taking is good	0.9	0.8	0.5	0.7
12	Drug-taking is addictive	1.8	1.0	2.3	1.0
13	Drug use can be prevented	2.1	0.9	2.4	0.8
14	Drug prevention education is useful	2.0	0.8	2.3	0.8
15	I am able to obtain drugs if I want to	1.4	0.9	0.8	0.9
16	If I were to take drugs, my peers will approve of it	0.8	0.7	0.4	0.7
17	It is easy to buy or get drugs in Singapore	1.3	0.9	0.6	0.8
18	I have wanted to try taking drugs when I was overseas	1.0	0.9	0.5	0.7
19	I think I will not be caught by CNB upon return to Singapore if I take drugs overseas	0.7	0.8	0.5	0.7
20	A drug like Cannabis, which comes from plants, is not harmful	1.5	1.1	0.7	0.8
21	A criminal record is important to deter drug abusers	1.5	1.0	2.0	1.0
22	Taking drugs will ruin one's future at studies, work, and in life	2.3	0.8	2.4	0.9

Note: CNB refers to the Central Narcotics Bureau.

The first EFA that was conducted with all 22 items in the scale resulted in a six-factor solution. A parallel analysis was conducted using the Monte Carlo PCA for Parallel Analysis (Watkins, 2006). The parallel analysis suggested a three-factor solution. Hence, the EFA was conducted a second time with all 22 items specifying three factors to extract. As item 2 "drug-taking is harmful" and item 22 "taking drugs will ruin one's future at studies, work, and in life" loaded negatively onto factor 1, they were removed from subsequent analyses. The third EFA was conducted using a three-factor solution. As the results indicated that there were less than two items on factor 2 (the minimum number of items for each factor was fixed at four), these two items (item 15 "I am able to obtain drugs if I want to" and item 17 "it is easy to buy or get drugs in Singapore") were removed. The EFA was repeated with no specified number of factors imposed within the solution. This EFA generated a five-factor solution. A subsequent parallel analysis that was conducted suggested a two-factor solution. The fifth EFA was conducted with 18 items specifying a two-factor solution. As there were less than four items in factor 2, the three items that loaded onto factor 2 (item 12 "drug-taking is addictive", item 13 "drug use can be prevented" and item 21 "a criminal record is important to deter drug abusers") were removed from subsequent analyses. In addition, item 1 "if there are no laws against under-age smoking/drinking, I believe young children will smoke/drink", item 5 "I believe I can stop drug-taking any time I want" and item 14 "drug prevention education is useful" were also removed as they failed to load onto any factors. The EFA was conducted a sixth time without specifying the number of factors and the solution generated a three-factor model.

A final parallel analysis suggested a one-factor model and the EFA was conducted a seventh time using a one-factor solution with the 12 remaining items (3, 4, 6, 7, 8, 9, 10, 11, 16, 18, 19 and 20). This solution explained 41.0% of the variance. This variance was acceptable although Carpenter (2017) suggested that a scale should minimally explain 50% of

the variance. The loadings of each item can be seen in Table 10. All 12 variables were retained for the subsequent CFA as they had factor loadings of more than .32 (Costello & Osborne, 2005).

Table 10

Factor Loadings of the Final One-Factor Solution in the EFA

Item Number	Item Description	Factor Loadings
3	Drug-taking causes no harm to other people	.37
4	To take drugs is my own lifestyle choice	.44
6	If there are no laws against drug-taking, I will be likely to take drugs	.72
7	I think I can avoid arrest by CNB officers/police even if I take drugs	.59
8	Taking some club drugs occasionally is alright	.71
9	I think I under-age children (<18 yrs old) can avoid arrest by the police if they want to smoke/drink	.45
10	I think it is okay to take drugs	.77
11	Many people say that drug-taking is good	.61
16	If I were to take drugs, my peers will approve of it	.54
18	I have wanted to try taking drugs when I was overseas	.68
19	I think I will not be caught by CNB upon return to Singapore if I take drugs overseas	.55
20	A drug like Cannabis, which comes from plants, is not harmful	.63

Note: CNB refers to the Central Narcotics Bureau.

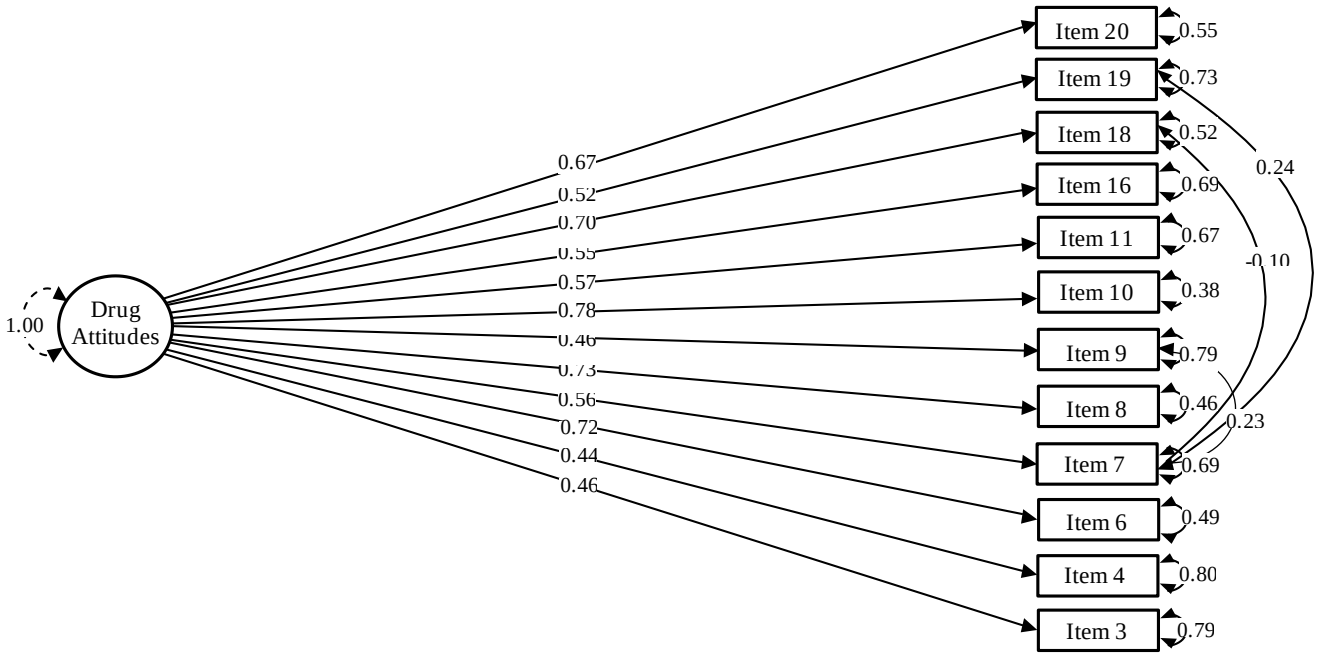
Confirmatory Factor Analysis (CFA)

The JASP 0.19.0 version was used to analyse the results for the CFA. Two CFAs were conducted. The first CFA had an acceptable CFI index of .90 but a TLI of .88 and a RMSEA of .09, 95% CI [.07, .10] which were not acceptable. The second CFA was conducted as the modification indices showed that the model fit can be improved by allowing the residuals to correlate. The second CFA was conducted by allowing the errors to correlate, one at a time, starting from the ones with the largest modification indices (item 7 “I think I can avoid arrest by CNB officers/police even if I take drugs” and item 19 “I think I will not be caught by CNB upon return to Singapore if I take drugs overseas”, modification index = 38.37, followed by item 7 and item 9 “I think under-age children (<18 yrs old) can avoid

arrest by the police if they want to smoke/drink", modification index = 28.12, finally item 7 and item 18 "I have wanted to try taking drugs when I was overseas", modification index = 15.96). The residuals of these items were allowed to correlate because they belong to the same factor and because these items centred on "not being arrested for taking drugs." The second CFA improved the model fit with the CFI and TLI indices upgraded to .95 and .94, respectively. The RMSEA also reached an acceptable value of .06, 95% CI [.05, .08]. The final model from the CFA is presented in Figure 5.

Figure 5

Standardized Estimates for the Final Confirmatory Factor Analysis Model



The final drug attitudes scale had 12 items. The drug attitude scores of the participants were computed based on the summation of their responses on the scale. To test the reliability of the 12-item scale, the Cronbach's alpha was used. The scale had good internal consistency, with $\alpha = .87$. The scale also had good split-half reliability, with both the Spearman-Brown Coefficient and Guttman Split-half Coefficient being at .85. Results from the Pearson product-moment correlation showed that youths' drug attitudes were negatively correlated

with their assessment of the illicit drugs' harmfulness, $r(488) = -.61$, $p < .001$ and addictiveness, $r(444) = -.41$, $p < .001$. The independent samples *t*-test was also performed to determine youths' own drug use on their drug attitudes. Results showed that drug users ($M = 12.43$, $SD = 6.46$) had higher mean drug attitude scores than non-drug users ($M = 7.01$, $SD = 5.68$), $t(449.95) = 10.97$, $p < .001$.

Study 2 Results

Test of Predictors Affecting Drug Attitudes

The first part of Study 2 was to determine the factors that predicted youth drug attitudes. The IBM SPSS Statistics Version 29. 0. 2. 0 (20) was used to conduct the analyses. Little's MCAR test (Little, 1988) was completed to determine if the data were missing completely at random. The results from the test suggested that the missing data were not completely random, $X^2(9) = 95.08$, $p < .001$. Inspection of the data indicated that information such as parenting and average secondary school results were consistently missing. The missing cases were deleted from the data before proceeding with any analysis. The descriptive statistics are presented in Table 11.

An independent samples *t*-test showed that males had higher drug attitude scores ($M = 9.62$, $SD = 6.40$) than females ($M = 5.98$, $SD = 5.30$), $t(161.46) = 5.59$, $p < .001$. A one-way ANOVA showed that there was a significant effect of youths' ethnicity on their drug attitudes, $F(3,451) = 5.12$, $p < .05$. A post-hoc Tukey's HSD test suggested that the Chinese had lower drug attitude scores ($M = 8.14$. $SD = 5.81$) compared to the other ethnicities ($M = 12.92$. $SD = 7.34$), $p < .05$. The one-way ANOVA showed that there were no differences in drug attitudes between youths with different educational qualifications (ranging from secondary school, Institute of Technical Education, junior college/polytechnic, to university), $F(3, 450) = .885$, $p = .449$ and between those with different average secondary school examination grades (ranging from grades A to F), $F(5, 449) = 1.78$, $p = .115$.

Table 11

Descriptives of Drug Attitudes by Gender, Ethnicity, Educational Attainment, Family's Criminal and Drug History and Close Friends' Drug History.

	Drug Attitudes			
Groups	*M*	*SD*	Min	Max
Gender				
Male (*n* = 364)	9.61	6.40	0	29
Female (*n* = 91)	5.98	5.98	0	21
Ethnicity				
Chinese (*n* = 260)	8.14	5.81	0	24
Malays (*n* = 122)	9.41	6.61	0	26
Indians (*n* = 48)	9.52	7.22	0	27
Others (e.g. Eurasian, Arabs, Filipino etc.) (*n* = 25)	12.92	7.34	1	29
Highest Education Level				
Secondary School (*n* = 102)	9.59	6.68	0	29
Institute of Technical Education (ITE) (*n* = 71)	9.06	6.85	0	27
Polytechnic/ Junior College or equivalent (*n* = 257)	8.73	6.09	0	24
University and above (*n* = 24)	7.46	6.23	0	24
Missing Values (*n* = 1)	N.A.	N.A.	N.A.	N.A.
Average Secondary School Examination Grade				
A (*n* =110)	8.00	5.97	0	23
B (*n* = 214)	8.93	6.21	0	27
C (*n* = 104)	9.38	6.60	0	29
D (*n* = 17)	11.71	7.78	2	26
E (*n* = 5)	11.20	8.26	3	20
F (*n* = 5)	4.80	6.53	0	16
Drug Use Experience				
Yes (*n* = 85)	11.36	6.57	0	27
No (*n* = 370)	8.32	6.18	0	29

Table 11 Continued

	Drug Attitudes			
Groups	*M*	*SD*	Min	Max
Parental Monitoring				
Never (*n* = 11)	9.36	8.96	0	23
Rarely (*n* = 47)	11.53	7.38	0	29
Sometimes (*n* = 118)	9.78	6.63	0	26
Often (*n* = 170)	8.46	5.71	0	21
Always (*n* = 109)	7.39	5.85	0	24
Number of Family with a Criminal History				
1 (*n* = 415)	8.73	6.37	0	29
2 (*n* = 8)	8.5	4.96	0	15
3 (*n* = 1)	17	N.A.	17	17
4 (*n* = 23)	12.57.0	5.82	4	26
6 (*n* = 8)	7.75	4.80	0	15
Number of Family with a Drug History				
1 (*n* = 438)	8.72	6.26	0	29
2 (*n* = 6)	14.33	9.58	2	26
3 (n = 3)	12.33	2.89	9	14
4 (n = 8)	12.88	7.70	3	26
Number of Close Friends with Drug History				
0 (*n* = 377)	7.63	5.74	0	26
1 (*n* = 23)	14.87	5.07	4	23
2 (*n* = 26)	14.27	6.47	2	29
3 (*n* = 9)	15.78	2.33	12	19
4 (*n* = 7)	15.14	6.41	4	24
5 (*n* = 9)	15.44	7.09	2	23
7 (*n* = 2)	21.0	8.49	15	27
8 (*n* = 1)	12.00	N.A.	12	12
9 (*n* = 1)	14.00	N.A.	14	14

A further one-way ANOVA showed that there was an effect of parental monitoring on youths' drug attitudes, $F(4, 450) = 4.45$, $p < .05$. The post-hoc Tukey's HSD test suggested that youths who indicated that their parents always knew when they were away from home during their teenage years ($M = 7.39$. $SD = 5.85$) had lower drug attitude scores compared to those whose parents sometimes knew ($M = 9.78$. $SD = 6.63$), $p < .05$ and rarely knew ($M = 11.53$. $SD = 7.38$), $p < .05$ they were away from home. The post-hoc Tukey's HSD also showed that youths whose parents often knew they were away from home ($M = 8.46$. $SD = 5.71$) had lower drug attitude scores compared to those whose parents rarely knew they were away ($M = 11.53$. $SD = 7.38$), $p < .05$. A series of Pearson product-moment correlations showed that youth drug attitudes was positively correlated with the number of their family members with a criminal history ($r = 0.093$, $p < .05$) and drug history ($r = .159$, $p < .001$), as well as their number of close friends with a drug history ($r = .342$, $p < .001$). Details of the correlations are presented in Table 12.

Table 12

Intercorrelations of Drug Attitudes and Family's and Peers' Forensic History

Variables	1	2	3	4
1. Drug Attitudes	1	.093*	.159**	.342**
2. Number of Family Members with a Criminal History	.093*	1	.315**	.236**
3. Number of Family Members with a Drug History	.159**	.315**	1	.124**
4. Number of Close Friends with a Drug History	.342**	.236**	.124**	1

A forward stepwise multiple regression was conducted to determine the subset of variables within the nine variables that could better predict youths' drug attitudes. These nine variables were gender, ethnicity, highest educational qualification, average secondary school examination grades, prior drug use experience, number of family members with a criminal

history, number of family members with a drug history, number of close friends with a drug history and the amount of parental monitoring. Prior to conducting the regression analysis, several assumptions were tested to ensure that regression analysis results were valid. To determine if there were multivariate outliers, cases with a probability associated with its Mahalanobis distance of 0.001 or less were removed from the dataset. The total number of cases left for the regression analysis was 461. The correlations between the predictors did not show that they were highly correlated with one another (i.e., >.80). In addition, all the tolerance values were greater than 0.9 (hence fulfilling the criteria of > 0.1) and variance inflation factor values were hovering around 1.0 (hence < 10), indicating that there was no multicollinearity between the predictors. Visual inspection of the histogram plot and the Q-Q plot of the expected residual values against the observed residual values suggested that the residuals were normally distributed. The scatterplot of the predicted values against the residuals showed a random pattern, indicating that the assumptions of linearity and homoscedasticity were also met. Lastly, the Durbin-Watson value was 1.94 (near to 2), indicating that the residuals were independent of one another.

All the nine variables of interest were entered into the regression model to conduct the stepwise regression: Gender (0 = female and 1 = male), ethnicity (reference category: Chinese), highest educational qualification (reference category: Secondary school education), average secondary school examination grades (reference category: Grade A), prior drug use experience (0 = non-user and 1 = drug user), amount of parental monitoring (reference category: Always knew the youth's whereabouts), number of family members with a criminal history, number of family members with a drug history, and number of close friends with a drug history. The most predictive model consisted of five variables which explained 21.5% of the variance in youths' drug attitudes, $F(5, 449) = 24.59$, $p < .001$. The number of close friends with a drug history was the most important significant predictor (*beta* = 0.32, *p*

< .001) followed by gender (*beta* = 0.19, *p* < .001), then by youths who were of other ethnicities (non-Chinese, non-Malays, non-Indians) (*beta* = 0.12, *p* < .05), those who had prior drug use experience (*beta* = 0.12, *p* < .05), and finally if they were rarely monitored by their parents (*beta* = 0.09, *p* < .05). It should be noted that in arriving at the conclusion that close friends with a drug history was the most important predictor, the regression analysis was conducted without being able to control for all potential covariates. However, the covariates included in the regression were chosen based on prior literature review. These were outlined in the scoping review Chapter 3.

Test of Relationship Between Drug Attitudes, Drug Use Intention and Actual Drug Use

The mediation analysis was used to examine if the relationship between drug attitudes and actual drug use was mediated by drug use intention. There were two analyses that were used to test for this relationship. The first was the relationship was between the independent variable of drug attitudes, the mediator of drug use intention represented by whether youths ever thought of using drugs (yes/no) and the dependent variable of actual drug use (yes/no). The second analysis was between the independent variable of drug attitudes, the mediator of intention represented by the age of first thought of drug use, and the dependent variable of drug use represented by age of first drug use.

The Mplus Version 8.11 Demo (Muthén & Muthén, 2025) was used to conduct the first mediation analysis. To ensure that there were no multivariate outliers, cases with a probability associated with its Mahalanobis distance of 0.001 or less were removed from the dataset. Tests of model fit showed that the Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) of the generated models were 1.0, while the Root Mean Square Error of Approximation (RMSEA) values were 0, all indicating perfect fit. The results of the first mediation analysis showed that there was a significant indirect effect of drug attitudes on drug use through intention, *b* = 0.025, 95% CI [.022, .028]. This was a partial mediation

effect as the direct effect of drug attitudes on drug use was significant, *b* = -.008, *p* <= .005, 95% CI [-.012, -.004].

The second analysis was to determine if the relationship between the independent variable of drug attitudes and the dependent variable of the age of first drug use (drug use) was mediated by the age of first thought of drug use (intention), All the assumptions of the regression analysis using the IBM SPSS Statistics Version 29. 0. 2. 0 (20) were assessed prior to conducting the mediation analysis to ensure the results would be valid. All the relationships of the dependent variables – age when they started using ice, ecstasy, cannabis and synthetic cannabis, to the independent variable – drug attitudes were tested for the following assumptions to ensure they were valid prior to conducting the analyses. To ensure that there were no multivariate outliers, cases with a probability associated with its Mahalanobis distance of 0.001 or less were removed from the dataset. Inspection of the histogram plots and the Q-Q plots of the expected residual values against the observed residual values suggested that the residuals were normally distributed. The various scatterplots of the predicted values against the residuals also showed random patterns, fulfilling the assumptions of linearity and homoscedasticity. The Durbin-Watson values ranged from 1.87 to 2.11 (close to 2), indicating that the residuals were independent of one another.

The Process v4.2 (Hayes, 2025) model 4 was used to conduct the mediation analysis. Results showed that there was a significant indirect effect of drug attitudes on age of first use of ice through intention, *b* = -.229, 95% CI [-.252, -.122]. This was a full mediation effect as the direct effect of drug attitudes on age of first ice use was not significant, *b* = -.044, p = .154, 95% CI [-.104, -.017]. The same analysis was conducted for ecstasy. Results indicated that there was a significant indirect effect of drug attitudes on age of first ecstasy use through intention, *b* = -.053, 95% CI [-.111, -.006]. This was a full mediation effect as

the direct effect of drug attitudes on age of first ecstasy use was not significant, *b* = -.020, p = .641, 95% CI [-.106, -.066]. For cannabis, there was no indirect effect of drug attitudes on age of first cannabis use through intention, *b* = -.049, 95% CI [-.110, .006]. There was also no direct effect of drug attitudes on age of first cannabis use, *b* = -.022, p = .541, 95% CI [-.095, .050]. Similarly, there was no indirect effect of drug attitudes on age of first synthetic cannabis use through intention, *b* = .018, 95% CI [-.019, .092]. There was also no direct effect of drug attitudes on age of first synthetic cannabis use, *b* = -.021, p = .820, 95% CI [-.201, -.160]. Refer to Table 13 for a list of the total, direct, and indirect effects.

Table 13

Results from the Mediation Analysis

Relationship	Total Effect	Direct Effect	Indirect Effect	Boot Confidence Interval		Conclusion
				Lower Bound	Upper Bound	
Drug attitude -> Age of first thought -> Age of first ice use (*n* = 151)	-.229	-.044	-.185	-.252	-.122	Full mediation
Drug attitude -> Age of first thought -> Age of first ecstasy use (*n* = 65)	-.073	-.020	-.053	-.111	-.006	Full mediation
Drug attitude -> Age of first thought -> Age of first cannabis use (*n* = 100)	-.071	-.022	-.049	-.110	.006	Nil
Drug attitude -> Age of first thought -> Age of first synthetic cannabis use (*n* = 44)	-.002	-.021	.018	-.019	.092	Nil

Summary

This chapter presented the results of Studies 1 and 2. Study 1 performed the EFA and CFA to validate the Singapore Youths' Drug Attitudes Scale (SYDAS). The final SYDAS had 12 items, with good reliability and validity. As expected, drug users had higher drug

attitude scores than non-users. Youths who had more positive attitudes towards drugs also assessed illicit drugs as being less harmful and addictive. Study 2 ascertained if the various demographic and risk factors such as gender, ethnicity, educational attainment, prior drug experiences, close friends' drug history, parental monitoring, family members' criminal and drug history influenced youths' drug use. This study found five factors that significantly predicted youths' drug attitudes. The number of close friends with a drug history was the most important significant predictor, followed by gender, then by youths who were of other ethnicities (non-Chinese, non-Malays, non-Indians), those who had prior drug use experience, and finally if they were rarely monitored by their parents.

As this study was also based on the Theory of Planned Behavior (TPB) mentioned in Chapter 1 (Ajzen, 1991), the study also tried to establish if there was a relationship between youths' drug attitudes, drug use intention, and actual drug use. The drug attitudes of youths were measured using the SYDAS. The results showed that the effects of youths' attitudes on age of first ice and ecstasy use were mediated their drug use intention. Apart from these, consistent with the TPB, the findings also showed that direct effect of drug attitudes on age of first ice and ecstasy use was not significant. While there were no indirect effects from youth attitudes to cannabis and synthetic cannabis use, the direct effects of drug attitudes to cannabis and synthetic cannabis use were also non-significant. These results suggested that the SYDAS was useful in measuring youths' drug attitudes and ascertaining the pathways from attitudes to actual behaviour as postulated by the TPB.

Chapter 7: Study 3 Results

As described in Chapter 5, the qualitative data were analyzed using Framework Analysis where data were keyed according to pre-determined themes and separated according to users and non-users. The following were themes that were analyzed to identify similarities and differences between the users and non-users: Reasons for why youths took drugs, where they obtained drug-related information, families' and peers' influence on drug use, and perception towards preventive education. The following results present the themes that were identified from both groups.

Attitudes, Knowledge and Sources of Drug-related Information

Drug Users

Many users obtained their drug-related information from their drug-using friends. Almost 60% of drug users first obtained information from their drug-using friends. Most drug users obtained drug-related information through seeing their friends use them and some through friends sharing the effects of drugs. Drug users also obtained information from the internet. Some mentioned that they became curious after seeing their friends use drugs and went to do further research online. One drug user shared that after googling, he read that the effects of cannabis were only "short term memory (loss), getting hungry and overdose….and it actually cures skin cancer." He smoked it after his N Levels because "I don't want to affect my studies." Like non-users, drug users also obtained information from television, videos and famous personalities such as Wiz Khalifa and Snoop Dogg.

Like non-users, some drug users recognized the harm of drug use. However, they proceeded to take drugs due to various reasons such as stress or lack of meaning in life. Others showed a more accepting attitude towards drugs, thinking that drugs might not be harmful or less harmful if not injected. Some would differentiate between cannabis and other more "harmful" drugs, rationalizing that cannabis was not harmful or even beneficial for

health. These attitudes were exemplified through the following quotes, “marijuana looks like a relaxant during movies”, “it is okay to take weed as long as you do it moderately”, “marijuana is helping my health. It cures asthma too. It reduces stress and cure people who have chronic disease”, “(cannabis) it is a safe drug unlike heroin/ice”, “personal theory is that a person needs to try the drug once to know the feeling. Don’t believe can get addicted after one use. If you are a drug enforcer, you will have to take it also to automatically know the feeling”, “…weed is fine. There are certain drugs that make you think better and absorb information faster, and then why not take?”

Non-users

Most of the non-users get their information about drugs from the movies, television such as documentary films (e.g., National Geographic), television series (e.g., The Family Guy, Skins) news, and Crime Watch. They also obtain information from online sources such as Google, social media platforms such as Facebook and Twitter. As these data were collected in 2015, a popular platform such as TikTok was not mentioned as it was only launched in 2016 (Hardy, 2023). Non-users also obtained drug-related information from school talks (e.g., the Central Narcotics Bureau), although they seldom obtain such information from teachers. Non-users rarely obtain information from forums and blogs as they were worried about the veracity and objectivity of the information from these sources. Some non-users also obtained information from their family. Compared to almost 60% of the users, only 25% of the non-users obtained information from friends who had ever tried drugs. A small number also obtained information from famous personalities such as Rihanna.

There were generally two types of information that were obtained by non-users. Non-users shared that movies and television series often portrayed people taking drugs to be in a state of relaxation, getting high and feeling happy. However, some shared that television series also showed the consequences of taking drugs, such as “people take drugs and family

kick them out", "TV always shows convicts suffer from drugs." Non-users recognized that accurate information about drugs was often obtained from documentary series, news, school talks, and family members who were medically trained (e.g., nurses, doctors). In general, non-users could differentiate between illicit drugs and medicines. They understood that illicit drugs "harm the body" and were usually "not prescribed by the doctors", while medicines were "approved….and prescribed by a doctor" to "help you when you are sick." They understood that drugs were generally harmful, but medicines could also become drugs if one overdosed on them. Hence, most of the non-users articulated that they had never thought of taking drugs for fear of the harmful effects. It should be noted, however, that while non-users were able to recognize the harms of drugs, a minority find drugs "cool" but chose not to take them due to the harm drugs could bring about.

Reasons for Drug Use

Drug Users

Most of the drug users shared that they first took drugs out of curiosity. These were exemplified by quotes such as "I took because I was curious. I just wanted to try, something like that. Of course I wanted to know how it feels like", "I was curious what the hype is all about" and because the drugs were made available to them by their friends and peers so youths would accept the offer by their friends, "they ask me then I take", "friends offered for free." These drugs were offered during gatherings with friends or in clubs and during parties. Some were offered drugs by other family members such as cousins, spouse, or god siblings. For those who took Ice, they believed that "Ice can enhance energy level" and could help them lose weight. One user shared that he was "…quite chubby at 70 kg and lost 20 kg" through the consumption of Ice. For those who took cannabis, they believed that cannabis "makes me more creative and I feel bold" and was not harmful, "I stick with cannabis because it's the best in terms of effects", "not as bad as other drugs." Some drug users took

drugs for “fun” during their gatherings with friends, “I wanted the happy feeling”, “Ice is fun” and believed that drugs can help them cope with stress. One user shared that he “want[s] to forget parents’ fighting at home and the incident where my father took out the knife.”

Non-users

Like the drug users, the non-users understood that drug users took drugs out of curiosity, “they just want to know, because like the more someone tells them no, the more they want to find out why it is no”, “people are curious” and peer influence, “peer pressure cos they want to be with their friends”, “don’t want to lose their friends, they want fame, want to be popular.” However, they also believed that drug users took drugs because they had to cope with family problems and stress from other sources such as school and to escape from reality, illustrated by quotes such as “drugs can solve their problem mah (slang), because really like somehow relax their mind but actually it’s not. Cause it makes them like more high, then cause more damage, but to them is really a fun thing to do ah (slang)”, “they are sometimes feeling too stressed out in their examinations and they want to relieve their stress", “the chase of endless high. They want to get higher and higher.” Non-users also believed that drug users were sad, had low self-esteem and drug users could have mental health or physical health issues, “their minds could be twisted”, “maybe they are sick;” Some believed that users took drugs also to look cool and to have fun, “oh it's really cool”, “the fun they get out of it.” Some thought that users took drugs because “they don’t really have this deep understanding and more mature thinking towards drugs.” Some non-users shared how they felt that users went ahead to take drugs as they perceived that they could overcome the law. Several users shared how they felt about users’ perceptions “they think they won’t get caught”, “the psychic of a drug addict, he wants to do it regardless of how harsh the penalties, even if it's death penalty”, “There's always a way to overcome the law, always.” Hence,

despite not having experienced drug use, non-users seemed to have a fairly good understanding of drug users' motivations and reasons for using drugs.

Peer and Family Influence

Drug Users

Almost all (95%) of the drug users had at least one drug-using peer. As discussed earlier, drug users obtained information and drugs from their drug-using peers. In this regard, drug users' peers were enablers of drug use, showing great influence in their drug use. This influence is exemplified through quotes such as, "took with friends at friends' house", "took with friends cos it is more fun." Similarly, some drug users were encouraged to take drugs and even obtained drug supply through their family members, "want to be with the cousins", "will take ice in a group (e.g., wife, friends, wife's sister), "I always take with my cousins and her friends", "provided by husband."

Non-users

Compared to the drug-users, less than half of the non-users (40%) knew a friend or someone in their social circle who was using drugs. Unlike users, non-users had less access to drug-using peers. Hence, non-users' peers were not as influential in providing drug information or access. Non-users shared that they were discouraged by their families to take drugs and were able to obtain more accurate information about drugs from their family members who were medically trained or when they read about drugs from the news. Non-users were worried that their friends and family members would be disappointed with them if they took drugs. Some shared that "parents will tell me to stop. If not disown me", "parents will be extremely disappointed that's one thing, and friends probably", "parents will call the police. Friends will help me out."

Preventive Education

Drug Users

Most of the drug users (80%) did not seem to have a very positive view towards preventive education. Some "never attended drug education" while others were, "unable to recall the drug education" or "remember there is someone coming down to talk about drugs. Some found preventive education "not really effective, because that time, I am not interested in all these so I won't listen to all these", "I don't know because I never listen." Many also found the preventive education "useful for people who had not started yet", "but not useful for those who already started." In fact, drug users found that drug talks had increased their curiosity about the effects of drugs, "attended a session by … society and it triggered my drug cravings", "the talks create curiosity for me." Drug users did not find posters or television advertisements useful, "everyone is looking at their phones, nobody would notice a poster", "seen posters before, but vague recollection", "television advertisements are not as effective too as it may increase awareness it would not translate into any concrete actions". Additionally, fewer people watch TV nowadays." Drug users suggested getting former drug users to share their experiences, the harms of drugs and using "scare tactics" where youths needed to be warned about the legal consequences of taking drugs, such as being arrested and having to spend time in the drug rehabilitation center and prison. They also suggested providing counselling and helplines to youths who might be thinking about taking drugs due to the problems and stress they were facing in life.

Non-Users

Non-users were divided when it came to perceptions about preventive education. Fifty percent of the non-users were satisfied with the preventive education and found the current preventive efforts adequate, while the other 50% thought that Singapore's preventive education was not adequate nor was it effective. It should be noted that while 50% of non-

users were generally receptive to preventive education, a fair number agreed that there should be an increase in the awareness of such education for the youths. Most of these youths also found the school talks “boring” and “just not appealing” as the talks “always (talked about) the same old things – say no to drugs.” Some youths felt that “youths have decided to take it (drugs) already” and “teenagers don’t like to listen to people”, rendering any type of preventive education fruitless. Others felt that preventive education needed to be enhanced with more refreshing changes. This could take the form of injecting more interactive and kinesthetic components within the campaigns, such as having more games and sports (mentioned more by the males) where they could play and learn about drugs at the same time. “Danceworks” (an annual dance competition organised by The National Council Against Drug Abuse and Central Narcotics Bureau) was also mentioned by some to be useful. Non-users shared that they preferred to receive drug-related information from social media platforms such as Facebook, posters, flyers, school talks where ex-drug users talk about their experiences. The salient quotes from the users and non-users are presented in Table 14.

Table 14

Key Quotes from the Youths from the Interviews

	Drug Users	Non-users
Category	Key Quotes	
Attitudes	Positive Effects Effects of cannabis only short-term memory (loss), getting hungry and overdose….and it actually cures skin cancer Marijuana look like a relaxant during movies It is okay to take weed as long as you do it moderately Marijuana is helping my health. It cures asthma too. It reduces stress and cure people who have chronic disease (Cannabis) it is a safe drug unlike heroin/ice Personal theory is that a person needs to try the drug once to know the feeling. Don't believe can get addicted after one use. If you are a drug enforcer, you will have to take it also to automatically know the feeling Weed is fine. There are certain drugs that make you think better and absorb information faster, and then why not take?	Negative Effects People take drugs and family kick them out TV always shows convicts suffer from drugs Harm the body Looks cool but (chose not to take because drugs harm the body) Not prescribed by the doctors
Reasons for Use	Curiosity I took because I was curious. I just wanted to try, something like that. Of course I wanted to know how it feels like	Curiosity They just want to know, because like the more someone tells them no, the more they want to find out why it is no

I was curious what the hype is all about

Stress coping
Want to forget parents' fighting at home and the incident where my father took out the knife

Fun/sensation-seeking
I wanted the happy feeling

Ice is fun

Specific effects
Ice can enhance energy level

(Ice can help them lose weight) quite chubby, at 70 kg and lost 20 kg

(Cannabis) It makes me more creative and I feel bold

I stick with cannabis because it's the best in terms of effects

(Cannabis) Not as bad as other drugs

People are curious

Stress coping
Drugs can solve their problem mah (slang), because really like somehow relax their mind but actually its not. Cause it makes them like more high, then cause more damage, but to them is really a fun thing to do ah

They are sometimes feeling too stressed out in their examinations and they want to relieve their stress

The chase of endless high. They want to get higher and higher

Fun and sensation-seeking
The fun they get out of it

Oh it's really cool

Mental Issues
Mental and/or physically Ill
Their minds could be twisted

Maybe they are sick

Unaware of/lack of regard for consequences
They don't really have this deep understanding and more mature thinking towards drugs

They think they won't get caught

		The psychic of a drug addict, he wants to do it regardless of how hash the penalties, even if it's death penalty There's always a way to overcome the law, always
Parental/Family and Peer Influence	Peers (Friends) They ask me then I take Friends offered for free Family Want to be with the cousins Will take Ice in a group (e.g., wife, friends, wife's sister) I always take with my cousins and her friends Provided by husband	Peers Peer pressure cos they want to be with their friends Don't want to lose their friends, they want fame, want to be popular Parents Parents will tell me to stop. If not disown me Parents will be extremely disappointed that's one thing, and friends probably Parents will call the police. Friends will help me out
Preventive education	Appeal/Usefulness I don't know because I never listen Useful for people who had not started yet But not useful for those who already started Seen posters before, but vague recollection Everyone is looking at their phones, nobody would notice a poster	Appeal/Usefulness Boring Just not appealing Always (talked about) the same old things – say no to drugs Mindset Youths have decided to take it (drugs) already Teenagers don't like to listen to people

Television advertisements are not as effective too as it may increase awareness it would not translate into any concrete actions. Additionally, lesser people watch TV nowadays

Attendance/Recall

Never attended drug education

Unable to recall the drug education

Remember there is someone coming down to talk about drugs. Not really effective, because that time, I am not interested in all these so I won't listen to all these

Generated curiosity

Attended a session by … society and it triggered my drug cravings

The talks create curiosity for me

Publicity/Attractiveness

Need to create awareness for these materials

Adequate but not enough publicity

"Danceworks" sounds nice

Need to make the magazines and materials more attractive to teenagers

Have more games - you get to play them well and at the same time you know what is drug abuse

Summary

This chapter presented the results of Study 3. This study consisted of the qualitative analyses of the youths' attitudes and knowledge towards drugs, reasons for drug use, family and peer influences and perceptions towards Singapore's preventive drug education. The results showed that both drug users and non-users go to similar sources for drug information. However, users tended to focus on its benefits or reasons to rationalize the use of drugs while non-users focused on information to prevent them from drug use. In addition, the influence of peers was greater for users than non-users as users knew a larger number of peers and friends who were using drugs. Both groups shared that there was a need to improve preventive education. Salient quotes from the interviewees were also presented in the findings.

Chapter 8: Discussion

The SYDAS was also a new scale with items developed to based on the understanding of the Singapore context. The SYDAS was validated with the EFA and the CFA and the eventual scale consisted of 12 items with good reliability. Due to the EFA and CFA conducted, the eventual scale did not have separate subscales, although the items could potentially belong to separate categories relating to peer approval, drug harms, as well as law enforcement and legalisation of drugs (due to the zero tolerance drug policies in Singapore) (Ministry of Home Affairs, 2019). The scale's items were similar, but distinctive from other established items and scales that assessed youth drug attitudes that were presented in Chapter 3. For instance, most large-scale studies such as Monitoring the Future (MTF) used the item "How much How much do you think people risk harming themselves (physically or in other ways) if they smoke marijuana regularly?". While this item was similar to some items in SYDAS such as "Many people say that drug-taking is good", and "Drug-taking causes no harm to other people", there were distinctive differences between SYDAS and the item used in MTF and other large-scale studies. Firstly, SYDAS used multiple items to assess the same dimension of drug harm. Secondly, SYDAS assessed drug harm to "other people" and to "self", through the item "I think it is okay to take drugs". The SYDAS was also distinctly different from the Enthusiastic Substance Use Attitudes Scale (ESUAS) (Stone, 2024) was developed as a scale to assess the positive "expectancies, motives, and attitudes" towards substance use, while SYDAS captured the peer approval, law enforcement climate and expected Singaporean youths' perspectives towards drug harms. Two of the items in the SYDAS had Singapore's drug enforcement agency mentioned within the item and this is unique to the SYDAS scale.

The scale also demonstrated construct, criterion, and known-groups validity. The results showed that youths' drug attitudes were negatively correlated with youths' assessment of the illicit drugs' harmfulness and addictiveness (Hypotheses 1 and 2 supported). These

findings were consistent with past research where youths who had positive perceptions about drugs, especially cannabis, and viewed it as being less harmful and addictive (Berg et al., 2015; Chomchoei et al., 2019; Fennell et al., 2022; MacDougall & Maston, 2023). Study 1 also showed that drug users' scores on the SYDAS were significantly higher than non-users scores on the SYDAS (Hypothesis 3 supported). These results were consistent with prior evidence where users were found to be more positive about drugs than non-users (D'Silva et al., 2020; Fennell et al., 2022; Friese, 2017; Kannan et al., 2024; Leos-Toro et al., 2020). These psychometric properties suggested that this is a valid, internally consistent, and useful scale to measure the drug attitudes among the general youth population in Singapore.

Study 2 consisted of two parts. Part 1 aimed to determine the variables that were predictive of youth drug attitudes. The regression analysis showed that there were five variables that were most predictive of youth drug attitudes. These were, in order of importance, the number of close friends youths had with a drug history, their gender, being of other ethnicities (non-Chinese, non-Malays, non-Indians), having prior drug use experience, and if they were rarely monitored by their parents. The number of close friends with a drug history was positively correlated with youth drug attitudes. Hence, Hypothesis 4 which stated that youths with close friends with a drug history are more likely than youths without close friends with a drug history to show pro-drug attitudes was supported. In fact, based on the qualitative comments from the youths in Study 3, friends were found to have a significant influence on youths' attitudes and drug use, especially for the drug users. For the users, friends were the key source of information, drug use associates, drug suppliers and motivators for drug use. Even for the non-users, there was approximately 40% of them who knew a peer who took drugs. These findings attested to the importance of how youths' friends form a significant part of their social circle and how youths do look to their friends and peers with prior drug use experience for information which can affect their attitudes (Kvillemo et al., 2022). As postulated by the

social learning theories, youths acquire their beliefs about drug use from their role models such as their close friends and parents (Petraitis et al., 1995). Moreover, the Theory of Planned Behavior (TPB) also suggested that one's attitude towards drug use is also affected by the subjective norm, which is the attitude of one's important referent groups such as their friends (Ajzen, 1991). Prior research on the influence of peers was heavily focused on how youths' friends influence their drug use (Allen et al., 2003; Hawkins et al., 1992; Kosterman et al., 2000; Liu & Iwamoto, 2007; Otsuki, 2003; Siqueira et al., 2001) and evidence on how friends influence youths' attitudes were limited. This present study added to the evidence in this area that close friends' drug history did have a significant effect on youths' drug attitudes.

Youths' gender was found to be the second most important predictor of their drug attitudes. Similar to previous findings (Barrett & Bradley, 2016; Bull et al., 2017; Chung et al., 2022; Das et al., 2024; Friis et al., 2017; Sznitman & Lewis, 2018), the present research also found that males held more permissive drug attitudes than females, supporting Hypothesis 8 that males are more likely than females to show pro-drug attitudes. These findings were not surprising given that there were more male than female youth drug users in Singapore (Central Narcotics Bureau, 2024) and drug use attitudes and actual drug use were interlinked (Armitage et al., 1999; Conner et al., 1998; Conner & Mcmillan, 1999; Mcmillan & Conner, 2003; Mousavi et al., 2014; Orbell et al., 2001). In addition, prior research also found that despite females showing increasing use of drugs, they would still subscribe to traditional values which support a gender double standard about drug use (Kulis et al., 2018).

Having prior drug use experience and being of other ethnicities (non-Chinese, non-Malays, non-Indians) were found to be the third and fourth most important predictors. Youths with prior drug use experience were found to have more pro-drug attitudes than youths without prior drug use experience. These results further reinforced the findings from Study 1 and prior research where drug use experience and drug users tended to have more pro-drug attitudes than

non-users (D'Silva et al., 2020; Fennell et al., 2022; Friese, 2017; Kannan et al., 2024; Leos-Toro et al., 2020). This also reinforced the TPB, which suggested that the perceived behavioral control - one's perception of the level of difficulty in performing a task, also affected their attitude towards it (Ajzen, 1991). In this case, having prior experience in drug use would reduce the level of perception of difficulty in using drugs, leading to more positive attitudes towards it.

Youths who were of other ethnicities (non-Chinese, non-Malays, non-Indians) were found to be significantly predictive of their attitudes towards drugs. They were also found to have more pro-drug attitudes than the Chinese youths. In Singapore, these youths were from ethnic groups such as the Eurasians, Arabs, Filipinos etc. and form the minority of the Singapore population This was aligned to the study by Grigsby et al. (2017) which found that minority groups who perceived themselves as being given less opportunities than other established groups created more identity confusion, leading to more pro-drug attitudes. This study did not find evidence to support Hypothesis 10 which hypothesised that the Malays are more likely than the Chinese to show pro-drug attitudes. One possibility could be that both groups have a high ethnic identity which resulted in the adoption of negative drug attitudes which were congruent with the cultural groups' beliefs against drug use (Zapolski et al., 2016). As there was little prior research on race and ethnicity and youth drug attitudes in Asian communities, and evidence in this area is still scarce (Blakemore, 2019; Fisher et al., 2019), more research in Singapore needs to be conducted with these ethnic groups, focusing on the measurement of their ethnic identity to further ascertain its effects on drug attitudes.

Youths who were rarely monitored by their parents was found to be the final variable predictive of youths' drug attitudes. Furthermore, parental monitoring was found to have a significant effect on youth drug attitudes, with youths who had parents who rarely knew or sometimes knew they were away from home having more permissive attitudes than those

whose parents always knew they were away. Youths whose parents often knew they were away from home also had less permissive drug attitudes compared to those whose parents rarely knew they were away. These findings supported the hypothesis that youths with less parental monitoring are more likely than youths with more parental monitoring to show pro-drug attitudes (Hypothesis 5). Parents and significant family members play an important role in youths' lives. Study 3 showed that users' parents encouraged drug use while non-users' parents not only discouraged drug use but put in strict disciplinary measures and would even threaten legal repercussions if youths engaged in drug use. As discussed earlier, the social learning theories suggested that youths acquire beliefs from their significant others like their parents. According to the conventional commitment and social attachment theories, rejection by and weak bonds with parents who have conventional anti-drug values result in the lack of proper socialisation for youths (Hawkins & Weis, 1985; Petraitis et al., 1995). While family members with a drug or a criminal history were not found to be significant predictors in the regression model, significant positive correlations were found between drug attitudes and the number of family members with a drug history, and between drug attitudes and the number of family members with a criminal history. Both findings supported the hypotheses that firstly, youths with family members with a drug history are more likely than youths without family members with a drug history to show pro-drug attitudes (Hypothesis 6). Secondly, youths with family members with a criminal history are more likely than youths without family members with a criminal history to show pro-drug attitudes (Hypothesis 7). Prior research showed that parents' drug use and their attitudes towards drugs having significant effects on youths' drug use (Hawkins et al., 1992). In this regard, further research would have to be conducted to ascertain if parents' drug and/or criminal history do influence youths' drug attitudes.

Consistent with the lack of previous research on the effects of education on drug attitudes, Study 2 also failed to find any evidence for the impact of education on youths' drug

attitudes. Hence, Hypothesis 9 which stated that youths with lower academic achievements are more likely than youths with higher academic achievements to show pro-drug attitudes was not supported. This finding did not support the social control theory, which states that youths who are frustrated by the perceived lack of opportunities to achieve their aspirations, which are likely to be restricted by the lack of educational qualifications, have a higher chance of being attached to deviant peers, encouraging drug use (Hirschi, 1969). One possibility could be that the impact was not with regards to their educational attainment, but the amount of preventive education they receive or level of accuracy of the information they have about drugs. Youths could be misinformed by online and social media, leading to misperceptions about drugs (Ministry of Home Affairs, 2015a; 2015b).

Using part of the TPB (Ajzen, 1991), this study also aimed to replicate previous research findings (Armitage et al., 1999; Conner & Mcmillan, 1999; Mcmillan & Conner, 2003) to determine if there was a link between youth drug attitudes, their drug use intention, and eventual drug use. This study found that there was a significant indirect effect of drug attitudes on drug use through intention. Furthermore, it was also found that youths' drug attitudes influenced when they started thinking about drug use and this eventually influenced when they started taking ice and ecstasy. These results were consistent with the TPB (Ajzen, 1991) and past research on the influence of attitudes on intention and intention on behavior (Conner et al., 1998; Mcmillan & Conner, 2003; Orbell et al., 2001). It should be noted that this present research only tested one path of the TPB and the two other components in the theory (i.e. subjective norm and perceived behavioral control) that affects intention and drug use, were not tested. A comprehensive understanding of youth drug use might need to consider all three parts of the antecedents in the model rather than just one single component of it. Contrary to expectations, no relationship was found between drug attitudes, intention and eventual age of first cannabis and synthetic cannabis use. One possible reason for the lack of

relationship between attitudes, intention and age of first cannabis and synthetic cannabis use could be how youths perceive cannabis as a soft drug and being less harmful compared to other drugs such as ice (Ministry of Home Affairs, 2015a; 2015b). Like smoking, experimental cannabis use was associated with positive attitudes towards illicit drugs (Friis et al., 2017) indicating that cannabis use could act as a gateway for use of other drugs rather than be seen as an illicit drug on its own (Secades-Villa et al., 2016). However, the assertion of cannabis being a gateway to other drugs would require further examination due to mixed findings in the literature (Noel & Wang, 2018).

While Study 3 reinforced the findings from the previous two studies about the differences between users and non-users and about how different environmental influences can affect youths' drug attitudes, such as the influence of significant others (e.g., parents, peers), this study also showed that other intrapersonal factors such as stress coping abilities, sensation-seeking, and lack of consequential thinking can affect drug attitudes and drug use. These results supported not only the social learning theories, but also the theories where intrapersonal factors play a role (Petraitis et al., 1995; Simons et al., 1988) Both users and non-users obtained information about drugs from similar sources, such as the internet, social media, school, family and friends. However, both groups also attended to and processed the information they obtained differently. Users tended to focus on the positive effects of drug use and rationalized the use of drugs while non-users focused on the negative effects and convinced themselves about the reasons against drug use. As discussed earlier, the majority of the drug users had friends who were using drugs while less than half of the non-users knew a friend or someone in their social circle who were drug users. Hence, users tended to obtain information about drugs from their drug-use friends compared to non-users who tended to obtain information from other sources. Unfortunately, users obtained information about drug use from friends which might not be necessarily accurate, while non-users tended to obtain

more accurate information from medically trained family members. Non-users also fear being reprimanded or punished by their family for engaging in drug use. These results reinforced the importance of obtaining accurate information and associating with the right people such as family and friends who could exert significant influence on youth drug use (Hawkins et al., 1992; Maxwell, 2002). Both users and non-users articulated similar reasons for drug use among youths in Singapore, indicating that while non-users did not take drugs, they had good knowledge about the reasons for why their counterparts took drugs. Consistent with prior research, the most common reasons for drug use were curiosity, stress-coping, fun or sensation-seeking, and for specific effects the drugs could bring about (e.g., ice for energy and weight loss, cannabis for creativity) (Comeau et al., 2001; Ersche et al., 2010; Martins et al., 2008; Morojele et al., 2002; Siqueira et al., 2001; Wills et al., 2001; 2006; Wu, 2010).

Implications of the Findings

The SYDAS was the first attempt to develop a full drug attitudes scale for use on Singaporean youths. This was an important step towards further understanding youths' attitudes towards drugs and drug use. Prior to this, attempts at understanding youth drug use was through a few question items, rather than scales (e.g., National Council against Drug Abuse, 2017; 2020). Hence, the items were not examined for their validity and reliability in measuring the attitudes of the youths. Having a validated scale to examine youths' drug attitudes in Singapore is important for a few reasons. Firstly, the scale is an important step in advancing youth drug research. Given the scarcity of drug attitudes scales developed for the youth population, this scale adds to the literature of usable scales for measuring youth drug attitudes. In addition, the scale consisted of a range of items consistent with previous research that were indicative of youths' concern about drugs, such as positive and negative effects of drugs (Alvarez-Roldan et al., 2023; MacDougall & Maston, 2023; Matson et al., 2023; McKenzie et al., 2022; Nguyen et al., 2022), the legal implications (Amroussia et al., 2022;

Robinson et al., 2020), and peer influence (Dempsey et al., 2016; Maxwell, 2002). Secondly, understanding youths' attitudes towards drugs is useful for policymaking. As mentioned in Chapter 2, youths perceived that they should have a voice in deciding the legal status of drugs like cannabis (Alvarez-Roldan et al., 2022) and Singaporean youths also perceived that Singapore's laws against cannabis were too strict (Ministry of Home Affairs, 2015a; 2015b). Understanding such perceptions are critical as youths may become more vocal in their opinions about drugs as they approach adulthood, and such opinions will affect how they receive the policies that are implemented. Thirdly, the scale can help to provide an estimate of the attitudinal changes over time so that necessary policy changes or communications can be made. Fourthly, the scale is also useful for the assessment of who are those youths who may be more open to using drugs. This can be used in conjunction with the significant predictors of drug attitudes found within Study 2 to identify higher risk groups for more targeted preventive education. In addition, as parental monitoring is an important factor in influencing youths' drug attitudes, existing online resources and programs for parents (Government of Singapore, 2024b) can consider incorporating information about the importance of parental monitoring for youths. Programs can also teach parents effective parenting skills to enhance their relationship with their children since parents who provide good relationships (Brook et al., 2001; Kogan et al., 2005), positive monitoring (Arat et al, 2017; Wu et al., 2010) and proactive household management can reduce the likelihood of their child initiating drug use (Kosterman et al., 2000).

Study 2 also explored the relationship between drug attitudes, drug use intention and eventual drug use. Based on the data received from the non-users, none had admitted to drug use, even though they were promised confidentiality during the data collection process. While it was possible that none of those within the non-user group had ever taken drugs, the other possibility is that they feared the legal repercussions of admitting to drug use, given the policy

of zero-tolerance against drugs in Singapore (Ministry of Home Affairs, 2024). This has important implications for research. For research, it means that direct questions about drug use are unlikely to render any useful results from the community youths, and alternative ways of asking the question is required. In this project, youths were asked about their drug attitudes to assess their openness to drug use, and this was found to be significantly linked to intention. This can be used as a proxy for estimation of eventual drug use based on the TPB. In fact, this relationship between attitudes, intention, and behavior was ascertained within this study for ice and ecstasy, two of the most used drugs among Singaporean youths in 2023 (Central Narcotics Bureau, 2024).

Study 3 results showed that both users and non-users went to the same sources for drug information. While non-users were able to attend to the correct information to prevent them from initiating drug use, the drug users could not. In fact, some drug users reported becoming more curious about drugs after attending preventive education. Most of the users and half of the non-users did not express positive sentiments about Singapore's preventive education. Regardless, the results from the interviews indicated that there was a need to increase the publicity of the existing preventive education and ways to increase the youths' attention and engagement for the preventive education. In Singapore, there are numerous preventive education activities catered to youths within and outside school. Within schools, there are school publications, radio roadshows, anti-drug montage and video competitions, and preventive education messages incorporated into the school syllabus. Public events include static exhibitions and outreach events and spreading anti-drug messages through sports such as cycling and futsal games (Government of Singapore, 2024b). Added together, these results indicated that preventive efforts should not only focus on increasing quantity but also focus on ensuring quality. Effective communication involves capturing youths' attention and filtering the right information from these activities to prevent them from becoming more curious about

drugs after attending preventive education. Public figures, influencers and social media were found to be important sources of information, both from past research (Kvillemo et al., 2022; Ministry of Home Affairs, 2015a; 2015b) and from the present study. In addition, youths from this study also suggested having more rehabilitated drug users sharing their personal experiences about the harmful effects of drugs. This is also consistent with the Social Cognitive Learning Theory (Bandura, 1977; 1986) which posited that influential figures could affect youths' beliefs in their ability to refuse the social pressure to take drugs (refusal self-efficacy) (Petraitis et al., 1995). This suggests that effective preventive education can make use of influential figures and effective media platforms to capture youths' attention and increase the retention of such information. Portrayal of cannabis on the media should also be carefully considered (Barrett & Bradley, 2016), as youths may erroneously interpret cannabis as being not harmful. In addition, youths from this study also suggested injecting more interactive and kinesthetic components within the campaigns, such as having more games and sports where they could play and learn about drugs at the same time. This can be another effective means of increasing retention of preventive drug education information among the youths.

Current preventive efforts also tend to focus on communicating health risks related to drug use rather than social risks (e.g., making family or friends disappointed, getting into trouble with the school). However, such health outcome-focused preventive education strategies may not always be effective for youths (Nguyen et al., 2022). As decriminalization of cannabis continues to happen in other countries, preventive messages can also challenge what youths perceive is the convention that society is accepting of cannabis and drug use. Misperceptions should also be corrected as they might also overestimate the number of people and their peers taking drugs (Dempsey et al., 2016; Petraitis et al., 1995).

Limitations and Future Directions

One of the limitations for the present study was that the data was derived from the 2015 TFYD study and the time lapse between the data collection and the findings may be limited due to environmental changes. However, the SYDAS is a generic scale which is not time-bound and drugs examined within this study are still among the top three drugs of choice for Singaporean youths in 2024. In addition, while the items within the SYDAS seemed to cluster within several dimensions associated with themes such as peer approval, harms, enforcement and legalisation of drugs, the eventual scale was not separated into subscales due to the final output from the EFA and CFA analyses. This lack of a separation of the scale into different factors from a theoretical perspective was recognized to be a potential weakness of this scale. Another limitation is with regards to the sample who are all Singaporean youths, limiting its generalizability to populations of other nationalities and cultures. The number of non-users was also far higher than the number of drug users due to the difficulty in recruiting drug users for this study. Future studies could consider a more equitable sample proportion of drug users versus non-users within the study. There was also significant data drop from Study 2 compared to Study 1 due to systematic missing data. However, this could not be prevented as the respondents were either not comfortable in endorsing or could have forgotten those information (e.g., average secondary school results). Due to resource limitations and time constraints, the present study collected all data concurrently. This included drug use intention and actual drug use. In addition, the conclusions about the prediction of drug attitudes could be limited since the cause and effect cannot be established in a cross-sectional design of the present study. For instance, while prior drug use experience can potentially cause youths to have more positive attitudes towards drug use, the cross-sectional nature of the present study does not rule out the possibility that youths with more positive attitudes would use more drugs. Similarly, while youths with more close friends with a drug history were found to have more positive attitudes,

this does not preclude the possibility that youths with more positive drug attitudes tended to associate themselves with peers who took drugs. Despite the cross-sectional nature of the study, the mediation analyses enabled the identification of a pathway of youth drug attitudes to their drug use intention and eventually drug use, proving the usefulness of the TPB on youths (Ajzen, 1991). Regardless, using the mediation analysis to identify the pathway from drug attitudes to intention to drug use enabled the establishment of a pathway In addition, future study should consider collecting data longitudinally. For instance, drug use data should be collected after the collection of drug intention data. Finally, the present research only explored the number of family members with prior criminal and drug history but did not explore the influence of the type of family member on youths' drug attitudes. For example, Brook et al. (1988) found a greater effect of older brother's modelling of drug use on their younger brother than parental modelling. On the other hand, Myers (2013) found a greater effect with adult antisocial behaviors on youths' drug use, compared to siblings' antisocial behaviors. As prior research evidence in this area was not conclusive, future research can consider exploring the effect of the type of family member's criminal history on youths' drug attitudes and behavior.

Conclusion

This thesis was a novel attempt to develop and validate a youth drug attitudes scale, the Singapore Youths' Drug Attitudes Scale (SYDAS) for Singaporean youths. The final scale consisted of 12 items which showed reliability and validity. This research also found that the number of close friends youths had with a drug history, their gender, being of other ethnicities (non-Chinese, non-Malays, non-Indians), having prior drug use experience, and if they were rarely monitored by their parents were significantly predictive of their drug attitudes. Using part of the Theory of Planned Behavior, this research also found that youths' drug attitudes influenced the age of their first thought for drug use. This eventually influenced the age in which they first engage in ice and ecstasy use. This thesis further embarked on qualitative

research to gain a deeper understanding on youths' perception of drugs and preventive education. The findings indicated that while both drug users and non-users had the same sources of information for drugs, non-users were able to attend to the correct information to prevent drug use. Both users and non-users expressed concerns about the preventive education. Implications of the findings from the present research and limitations were discussed.

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Appendix A

Questions for Qualitative Interview

Demographic Questions

- Gender
- Age
- Ethnicity

Reasons for Drug Use

Users

- Why did you start using drugs?
- What was happening in your life at that time that led you to try drugs?
- What made you continue to use drugs all this while?
- Throughout your drug history, why did you try/did not try out different drugs?

Non-users

- Why do you think some young people abuse drugs even if they know the danger of… they know it is bad for them?

Attitudes towards Drugs

Users

- Before you started taking drugs, what were your thoughts regarding drug-taking?
- In your opinion, why do you think drug users continue to take drugs?
- What were your personal negative outcomes from drug-taking? Why have you continued to take drugs despite these outcomes?

Non-users

- What do you think is the difference between drugs and medicines?
- What do you think are the consequences of drug use?

Friends and Family Influence

Users

- Did you usually consume your main drug alone or with others (specify relationship e.g., neighborhood friends)? Why did you prefer to use your main drug alone or with others?

Non-users

- Is there anyone in your social circle using drugs?
- What would you do if a friend or family member ask you to try drugs that you knew was bad for you?
- How would your parents or friends react if they know that you were taking drugs?

Sources of Information and Preventive Education

- What are some of the sources that you usually obtain drug related information from?

- How would you prefer to receive information about drugs and drug use prevention such as updates or upcoming programs
- Do you think that there is currently sufficient information about drugs and drug abuse available to youth?
- How effective do you think anti-drug messages, campaigns or events are in stopping people from taking drugs?