

# Gender Differences in Drug Using Behavior for the Drug Offenders

Shu-Lung Yang<sup>1</sup>, Shu-Ping Tzeng<sup>2\*</sup>, Mein-Woei Suen<sup>3</sup>, and Chun-Lung Hsu<sup>4</sup>

<sup>1</sup> Department and Graduate Institute of Criminology, and the Director of Crime Research Center, National Chung Cheng University, Chia-Yi, Taiwan 621

<sup>2</sup> Department and Graduate Institute of Criminology, and the Researcher of Crime Research Center, National Chung Cheng University, Chia-Yi, Taiwan 621

<sup>3</sup> Department of Psychology, Asia University, and the President of Taiwan Society of Applied Psychology, Taichung City, Taiwan 41354

<sup>4</sup> Department and Graduate Institute of Criminology, and the Research Assistant of Crime Research Center, National Chung Cheng University, Chia-Yi, Taiwan 621

\* Correspondence: Shu-Lung Yang; crmsly2016@gmail.com

**Abstract:** Research on gender differences in substance abuse is prominent. This study surveyed 600 male drug offenders in treatment centers and 585 female offenders in the women's prisons in Taiwan in 2022. It aims to examine gender differences in drug use behavior, including characteristics, motives, multiple drug use, and mental health conditions among Category 1 and 2 drug offenders.

The results indicate that males exhibit a more favorable attitude towards drug use, while females demonstrate greater awareness of its adverse effects. Regarding motives, women are often influenced by others, while men tend to use drugs to cope with stress or seek sensations. Furthermore, peers and friends have a stronger impact on females' drug behavior compared to males. Female drug offenders also engage more in drug trafficking prior to imprisonment. Additionally, male users display more pronounced emotional responses and heightened emotional reactions to drug use.

The study proposes that correctional institutions could aid female drug users in fostering interpersonal skills and reinforcing their values to mitigate negative influences from intimate partners. Additionally, strategies to enhance coping skills, manage drug expectations, and encourage emotional expression are crucial for male drug users. Further implications of the study are elaborated upon.

**Keywords:** Category 1 and Category 2 drug offenders; drug use; gender differences; substance abuse

---

According to "Narcotics Hazard Prevention Act" in Taiwan, the term "Narcotics" refers to drugs that are habit-forming, prone to abuse, and pose a danger to society, as well as other substances that influence psychological behavior. Narcotics are classified into four categories based on their potential for habitual use, abuse, and societal risk. The categories are defined as follows:

1. Category One includes Heroin, Morphine, Opium, Cocaine, and their derivative products.
2. Category Two comprises Opium poppy, Coca, Cannabis, Amphetamines, Pethidine, Pentazocine, and their derivatives.
3. Category Three contains Secobarbital, Amobarbital, Nalorphine, and their derivatives.
4. Category Four encompasses Allobarbital, Alprazolam, and their derivatives.

This classification helps establish legal and regulatory measures to address the various risks associated with these substances, ensuring the protection of public health and safety.

## 1. Introduction

According to the 2021 Annual Report of Drug Abuse Statistics, the gender ratio of drug abusers reported by all organizations is 4.32, with 26,007 men and 6,014 women (Taiwan Food and Drug Administration, Ministry of Health and Welfare, 2022). However, the statistics do not provide insights into the gender differences in drug-using behaviors and perceptions of drug use, which leads to an incomplete program development and implementation for drug abuse prevention or rehabilitation for drug abusers. Studies on drug-using behaviors often consider gender as an important factor (Sajid, Tatlah, & Butt, 2020). Moreover, findings have revealed gender-specific differences in drug-using behaviors across different drug categories (Riley, Hempel, & Clasen, 2018; Simpson et al., 2016). Some studies have identified commonalities and some significant differences in drug abuse by gender (Sajid, Tatlah, & Butt, 2020; NIDA, 2020a). Thus, further research on gender differences in drug abuse is needed.

However, studies on gender differences in drug-using behaviors in Taiwan are relatively rare. Relevant research was published many years ago (Lin, Kuo, et al., 2009; Su, 2012). To avoid any oversight in the prevention and rehabilitation of drug abuse due to a lack of relevant research, this study further explores the gender differences in drug-using behaviors and their cognition of drug use among drug offenders to fill the gaps in the literature in Taiwan. This study aims to achieve the following objectives by conducting a survey on drug using behaviors of drug offenders in Taiwan.

1. To examine the gender differences in drug using behaviors.
2. To discuss the possible factors leading to gender differences in drug using behaviors.
3. To make recommendations on prevention or rehabilitation programs for drug offenders based on the findings as the reference for policy amendment.

## 2. Literature Review

### *Gender Differences in Drug Using Behaviors*

The relevant studies show that the study subject disproportionately leans toward male addicts. However, the biological, psychological, and social differences between men and women influence the occurrence, maintenance, and rehabilitation of drug-using behaviors (Greenfield et al., 2007; Cotto et al., 2010). Consequently, the importance of research related to both gender in drug abuse is gaining more attention (NIDA, 2020a), and the key gender differences in substance use disorders (SUDs) have become an emerging topic for researchers to explore (Mazure & Jones, 2015; Becker & Koob, 2016). Chen (2018) states that the relapse rate of SUDs is as high as 70%–80%, and that both mental state and emotions, including personal factors, interpersonal conflicts, and social stress, constitute risk factors that increase the likelihood of substance use. Studies on biology, epidemiology, and SUDs, have found significant gender differences in brain structure,

According to “Narcotics Hazard Prevention Act” in Taiwan, the term "Narcotics" refers to drugs that are habit-forming, prone to abuse, and pose a danger to society, as well as other substances that influence psychological behavior. Narcotics are classified into four categories based on their potential for habitual use, abuse, and societal risk. The categories are defined as follows:

1. Category One includes Heroin, Morphine, Opium, Cocaine, and their derivative products.
2. Category Two comprises Opium poppy, Coca, Cannabis, Amphetamines, Pethidine, Pentazocine, and their derivatives.
3. Category Three contains Secobarbital, Amobarbital, Nalorphine, and their derivatives.
4. Category Four encompasses Allobarbital, Alprazolam, and their derivatives.

This classification helps establish legal and regulatory measures to address the various risks associated with these substances, ensuring the protection of public health and safety.

endocrinology, metabolism, respectively, besides other biological factors (McHugh, Votaw, Sugarman, & Greenfield, 2018). For instance, elderly women with SUDs tend to develop depression; elderly men with SUDs are exposed to alcohol for the first time at an earlier age and have relative longer history of tobacco consumption than elderly women (Ros-Cucurull et al., 2018).

Additionally, previous studies reveal significant gender differences in the age of first drug use. Generally, men tend to initiate drug use earlier than women (Guimarães et al., 2017). The ratio of first use of addictive drug in men is close to that in women in adolescence, but the accelerating rate of using drug is faster in men. There are more adult male addictive drug users than females. Furthermore, studies have noted that, in terms of drug abuse process, from initial usage to the onset of SUDs, and then to seeking help for corrective rehabilitation, women users progress much faster than men (Hernandez-Avila, Rounsaville, & Kranzler, 2004); both the administration of cocaine (Kosten, Kosten, McDougle, et al., 1996; Haas & Peters, 2000) and cannabis (Khan, Okuda, et al., 2013; Lewis, Hoffman, & Nixon, 2014) exhibit such phenomenon. In other words, the propensity to develop serious drug abuse problems renders females more vulnerable than their male counterparts.

#### *Gender Differences in the Basic Personal Information of Drug Addicts*

Studies also suggest that the age of initial drug using falls between 10 and 20 years old, with women on average being younger than men (Lin et al., 2009). Lyu and colleagues (2008) find that the major drug categories used by adolescent inmates for the first time are ketamine and amphetamines. However, there are significant gender differences in the attributes of drug rehabilitation experience and reasons to use drugs: 41.8% of female students have experience in drug rehabilitation, which is significantly higher than male students (28.3%). For adult female addicts, the average age of initial drug use is  $25.3 \pm 6.6$  years old, with notable 81.0% by injection and only 19.0% by inhalation or oral consumption. Heroin (79.3%) and amphetamines (66.6%) are the most used drugs, followed by marijuana (5.4%) and ketamine (4.6%). Regarding motivations, research has showed disorders of anxiety and depression are relatively common in male and female addicts, respectively. The motives of male addicts are peer pressure, seeking stimulus, and enhancing emotional and sexual competence, while female addicts tend to use drug due to family problems and sexual abuse. It is important to identify gender differences in motivation and psychological status among drug addicts (El-Sawy et al., 2010).

Su (2012) finds that female drug addicts are younger than male addicts in initial drug use and their relatives and spouses have higher tendency in drug using behaviors than male addicts. For both male and female drug abusers, amphetamines are most often used at the first time, followed by heroin. Heroin, however, is the predominant drug used, followed by amphetamines. Moreover, women have a higher tendency than men to use mixed drugs. Women are more likely to take intravenous injection, which carries a higher risk of infection. Relapse in female drug abusers is triggered mostly by interpersonal influences such as spouses and partners, whereas relapse in men are related to multiple factors. Also, Su (2012) finds that, regardless of gender, the younger the age of initial drug use, the shorter the drug effect, the longer the duration of continuous drug use,

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

and higher tendency of to use heroin and amphetamine jointly, and the more likely the relapse would be triggered by family conflict, negative emotions, and drug exposure crises would be.

Furthermore, many studies on gender differences in drug administration have found that male partners are often the root cause for initial drug use in women (Mburu et al., 2019), but Doherty et al. (2000) highlighted that young women are more likely to initiate drug abuse because of same-sex friends and family. Doherty et al. (2000) also claim that the environments or social norms of using drugs among young users are changing, leading to a pattern change of initial use among young female drug abusers who gradually move away from submissive status and become more equivalent to male abusers.

Female drug addicts are more likely to report significant impairments in employment, family, medical, or psychiatric aspects as they engage in the treatment (Foster, Li, McClure, Sonne, & Gray, 2016; McHugh et al., 2013; Sherman et al. 2017), which further deteriorates their overall quality of life (Wu et al., 2010; Griffin et al., 2015). Additionally, NIDA (2020a) indicates that female drug addicts often use various illicit drugs, respond differently to illicit drugs from males, and face particular challenges to accept effective interventions, such as lack of appropriate childcare services, not being able to find time for rehabilitation, or being assigned in a treatment session that has not been fully assessed for effectiveness (for female drug addicts).

Hsu (2012) also has found some gender differences in initial drug using in Taiwan. Women have higher dependence on drugs, higher frequency of using drugs, and advanced propensity for depression before drug use than men. On the other hand, men generally have lower self-control, especially in risk-taking and self-centeredness, less tolerance of frustration, higher tendency in value deviation and worse moral perceptions, more likely to associate with deviant peers before drug use than women. Also, men have fewer negative recreational activities and more signs of withdrawal after using drugs, and are more inclined to have drug use relapse owing to weak family attachment, low self-control, and depression than women.

### *Psychological Factors Contributing to Gender Differences*

Prior research has suggested that substance use is often related to psychological needs and stress levels. For example, Huang (2010) indicates that the life stress is positively associated with the substance use among junior high school students. Cheng et al. (2016) also state that SUDs, depression disorder, and anxiety disorder often occur in tandem with each other. Wu (2010) finds that smokers reported higher levels of depression symptoms compared with non-smokers, and that the depression symptoms in adolescents are significantly correlated with alcohol and other substance consumption. Wu (2010) then contends that the relationships between substance use and depression symptoms among adolescents deserve further investigation.

Hsu's (2012) study also indicates that women are more dependent on drugs, have higher frequency of using drugs, and have higher propensity for depression before drug use than men. Additionally, NIDA (2020b) observes that women respond differently to drugs than men. For example, women may have a stronger desire for drugs and are more likely to relapse after receiving

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

rehabilitation; further, female drug addicts might be more susceptible to experiencing panic, anxiety, or depression than men.

Therefore, the prior studies indicate that gender differences in drug administration may be related to stress, anxiety, or depression, which is worthy of further investigation into the mechanisms of their effects. In the context of this study, when considering depression, anxiety, and stress concurrently, Osman and Augustine (2012) consider the Depression Anxiety Stress Scale-42 (DASS-42) as a common standardized instrument, emphasizing that anxiety and depression are usually an external form of stress. This constitutes a three-factor model of depression, anxiety, and stress. Stress in life often leads to depression, and depressed people are often subjected to the effects that deteriorate their ability and performance at work or in normal life. Anxiety refers to an individual's self-perception and can cause a sense of uncertainty and inexplicable fear in people's minds. Stress refers to a special relationship between an individual and people, things, and objects in their environment, as well as the negative subjective consciousness that arises from the physiological and psycho-emotional aspects of an individual's life in response to the continuous changes in the living environment and in adapting to the changes that occur.

Antony (1995) develops the Depression, Anxiety and Stress Scale-21 (DASS-21) (with 21 questions), the scope of which is expanded to include children, adolescents, and older adults. This scale has been translated into several languages and used worldwide owing to its simplicity, uniqueness, and rapidity of operation. In this study, the DASS-21 is also used to measure depression, anxiety, and stress levels to further examine the psychological mechanisms and possible gender differences in substance use.

The findings from prior studies have revealed significant gender differences in drug using behaviors, whereas recent studies on this subject in Taiwan are relatively scarce and fragmented with insufficient exploration in the mechanisms of psychological factors. Therefore, to complement the literature and provide specific and feasible countermeasures and suggestions to the relevant agencies, the topic of gender differences in drug using behaviors requires further empirical investigation.

### **3. Materials and Methods**

This study mainly adopts the methods of focus-group interview and self-reported survey. Based on the results of literature review, a preliminary questionnaire is developed, and six experts, including scholars of gender equality, addiction prevention and treatment physicians, and front-line practitioners of prisons are invited to conduct focus-group interviews to provide their professional opinions, to determine the focus of the survey, and to obtain the core validity of the "triangulation."

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

Further, a survey with the detainees from the rehabilitation centers in Xindian, Taichung, and Kaohsiung, and female inmates from Taoyuan, Taichung, and Kaohsiung, Taiwan, is conducted with the Chinese version of DASS-21 and scales developed by this study.

The drug using subjects in this study are selected from the rehabilitation centers and women's prisons in the northern, central, and southern Taiwan by intentional sampling process<sup>1</sup> (Table 1). Intentional sampling is a sampling method to select the required group of study subjects based on the research plan and research objective to acquire the data required to validate the research hypothesis. In total, 600 male and 585 female valid questionnaires are collected.

**Table 1**

<i>Sources of participants</i>				
Sampling Agency	Number of Samples	of	Number of questionnaires received	
Male N=600				
Xindian Drug Abuser Treatment Center	200		200	
Taichung Drug Abuser Treatment Center	200		200	
Kaohsiung Drug Abuser Treatment Center	200		200	
Female N=585				
Taoyuan Women's Prison	200		192	
Taichung Women's Prison	200		196	
Kaohsiung Women's Prison	200		197	

The questionnaire is adopted and revised from the scales and literature of prior studies. To understand the drug using behaviors of the Category 1 and Category 2 drug offenders, the questionnaire includes (1) relevant experience in drug administration, such as drug types, methods and locations of administration, duration of effect, age of initial use, the experience in using

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

particular drug one year before admission to a rehabilitation center or prison, experience in seeking medical assistance for drug abuse, experience in drug manufacturing or planting, and experience in selling and purchasing drugs; (2) Perception Scale for Drug Administration; (3) DASS-21; and (4) basic personal information, such as age, education, income, and their job before entering the facilities.

For the Perception Scale for Drug Administration, 17 questions are included. The reliability of the questions is tested through Cronbach's  $\alpha$  coefficient, using the data collected from the pretest. The overall Cronbach's  $\alpha$  value for drug administration perception is 0.714. According to Nunnally's (1978) suggestion, a Cronbach's  $\alpha$  value between 0.7 and 0.9 is considered highly reliable. Also, principal factor analysis is used to obtain the construct validity of this study, the results are pivoted with orthogonal axes and supplemented by Varimax, and the number of unrestricted factors with eigenvalues greater than 1 is taken as the selection criteria. After factor analysis, Item 16 (i.e., "I can get off drugs") is extracted as a separate factor and then eliminated. Further, four factors with eigenvalues greater than 1 are identified and named as negative impact, interpersonal relationship, positive gain, and social stigma. The eigenvalues and variances explained are 3.44 (21.49%), 2.45 (15.28%), 2.27 (14.22%), and 1.44 (9.02%), respectively, with a cumulative total variance explained ( $R^2$ ) at 60.01%.

## 4. Results

### 4.1 Basic Information of the Respondents

There are 1,185 respondents included in this study. Among them, 600 (50.5%) are men, and 585 (49%) are women. The majority age bracket of the respondents is 41 and 50 years old (45.9%), followed by 31 and 40 years old (26.1%). Junior high school (45.4%) and high school (43.7%) graduates constituted the majority of the sample. Regarding employment status, most respondents have stable full- and part-time jobs before entering the facilities, accounting for 67% of the total, while their income is mostly between NT\$30,000 and NT\$50,000. Table 2 presents the respondents' basic information.

### 4.2 Analysis of the Administration Experience of Various Drugs by Gender

Regarding the experience of administering various drugs, the respondents has ever used heroin (368 [47.6%] men; 405 [52.4%] women), morphine (35 [44.3%] men; 44 [55.7%] women), amphetamine (525 [48.9%] men; 548 [51.1%] women), marijuana (114 [31.7%] men; 246 [68.3%] women), MDMA ecstasy (90 [36.3%] men; 158 [63.7%] women), mixed drug coffee packets (82 [38.5%] men; 131 [61.5%] women), and New Psychoactive Substances (47 [37.6%] men; 78 [62.4%] women).

Particularly, amphetamines are the most used drug (90.5%), followed by heroin (65.2%) and marijuana (30.3%). Additionally, the results of Chi-square test show that there are significant

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

gender differences in drug using experience for all types of drugs except morphine. Women have more experience with all types of drugs than men (Table 3).

**Table 2** Background characteristics of participants (N = 1,185)

		N	(%)
Sex	Male	600	50.6%
	Female	585	49.4%
Age	18 - 30	133	11.5%
	31 - 40	303	26.1%
	41 - 50	532	45.9%
	51 - 64	182	15.7%
	65 Plus	9	0.8%
Education	Elementary School	59	5.2%
	Junior High School	516	45.4%
	High School	497	43.7%
	College	62	5.5%
	Advanced degree	3	0.3%
Annual income	Less than 24,000	196	17.7%
	24,000 ~ 29,999	274	24.8%
	30,000 ~ 49,999	414	37.5%
	50,000 ~ 79,999	135	12.2%
	Greater than 80,000	86	7.8%
Occupation	Unemployed	185	16.4%
	Full-time job	436	38.7%
	Stable part-time job	319	28.3%
	Unstable part-time job	186	16.5%

**Table 3** Drug-using experience by drug type and gender

		Male N=600 (%)	Female N=585 (%)	Total N=1185 (%)	$\chi^2$	P
Heroin	Yes	368 (47.6)	405 (52.4)	773 (65.2)	8.146	0.004**
	No	232 (56.3)	180 (43.7)	412 (34.8)		
Morphine	Yes	35 (44.3)	44 (55.7)	79 (6.7)	1.356	0.244
	No	565 (51.1)	541 (48.9)	1106 (93.3)		
Amphetamine	Yes	525 (48.9)	548 (51.1)	1073 (90.5)	13.198	.000***
	No	75 (67)	37 (33)	112 (9.5)		

<sup>2</sup>According to Article 10 of “Narcotics Hazard Prevention Act” in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.



Marijuana	Yes	114 (31.7)	246 (68.3)	360 (30.4)	74.415	.000***
	No	486 (58.9)	339 (41.1)	825 (59.6)		
MDMA	Yes	90 (36.3)	158 (63.7)	248 (20.9)	25.812	.000***
	No	510 (54.4)	427 (45.6)	937 (79.1)		
New Psychoactive Substances	Yes	47 (37.6)	78 (62.4)	125 (10.5)	9.496	0.002**
	No	553 (52.2)	507 (47.8)	1060 (89.5)		
Mixed drugs	Yes	82 (38.5)	131 (61.5)	213 (18)	15.299	.000***
	No	518 (53.3)	454 (46.7)	972 (82)		

\*\* :  $p < 0.01$ ; \*\*\* :  $p < 0.001$

#### 4.3 Analysis of Drug-Trafficking Behavior Before Admission (to Prison) by Gender

The gender differences in drug-trafficking behaviors before admission to prison and rehabilitation center are analyzed (Table 4). The findings show that male offenders of mixed drugs have a higher rate of drug trafficking (24.1%), while female offenders of amphetamines have the highest rate of trafficking (56.4%), followed by heroin offenders (49.5%). Further, the results of Chi-square test indicate significant gender differences in heroin and amphetamine offenders' trafficking behavior, with women having the higher rates of trafficking behaviors than men.

#### 4.4 Analysis of Drug Acquisition Sources by Gender

For both male and female offenders, friends and drug traffickers are the main sources of getting drugs (Table 5). The results of Chi-square test reveal a significant gender difference in drug acquisition sources. Particularly, men are more likely to obtain drugs from strangers, online friends, colleagues, and coworkers, while women are more inclined to get drugs from their friends.

#### 4.5 Analysis of Funding Sources for Drug Purchases by Gender

Regarding the funding sources of purchasing drugs, the results show that men are more likely to get money to buy drugs through income and theft, while women are more prone to get money to purchasing drug from spouse and drug trafficking (Table 6).

#### 4.6 Analysis of Motivation by Gender

The main reasons for men to use drugs involve frustration (15.2%), stress (14.6%), and recreation (13.6%), while women take drugs mainly due to curiosity (14.5%), frustration (14.3%), and for refreshment (13.6%) (Table 7). The results of Chi-square test and Bonferroni correction indicate that men are more likely to use drugs to increase sexual function and stimulation out of stress, whereas women tend to use drugs to lose weight.

#### 4.7 Analysis of Drug Using among Family and Friends by Gender

The results of Chi-square test tell a significant gender difference in the family members' drug using behaviors (Table 8). Overall, there are more female subjects whose family members have experience of using drug than the male subjects. A further post-test with Bonferroni correction

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

suggests that peers, partners, and juniors of female drug users are comparatively more likely to use drug than the male counterparts.

#### 4.8 Analysis of Drug Administration Perceptions by Gender

This study identifies four factors from the Drug Administration Perception Scale, including negative impact, interpersonal relationship, positive gain, and social stigma.

##### i) Negative Impact

As shown in Table 9, the mean scores of negative impacts for male and female are 3.42 and 3.59, respectively. The t-test results show a significant difference in the negative impact scores by gender ( $t = -4.888$ ,  $p < .001$ ), and that women have a significantly higher level of negative impact of drug use than men.

##### ii) Interpersonal Relationships

The mean scores of interpersonal relationships for men and women are 1.98 and 1.79, respectively (Table 9). The results of the t-test indicate a significant difference in the mean scores of interpersonal relationships by gender ( $t = 4.326$ ,  $p < .001$ ), with men having a significantly higher level of perceiving drug use as a method to enhance interpersonal relationships and improve quality of life than women.

**Table 4** Drug trafficking by gender

		Gender (%)		$\chi^2$	P
		Male	Female		
<b>Heroin</b>	Yes	51 (14.1)	198 (49.50)	107.849	0.000***.
	No	310 (85.9)	202 (50.5)		
<b>Morphine</b>	Yes	4 (11.4)	8 (20.5)	1.120	0.29
	No	21 (88.6)	31 (79.5)		
<b>Amphetamine</b>	Yes	86 (17)	298 (56.4)	169.971	0.000***
	No	419 (83)	230 (43.6)		
<b>Marijuana</b>	Yes	13 (11.1)	34 (14.7)	0.865	0.352
	No	104 (88.9)	197 (85.3)		
<b>MDMA</b>	Yes	15 (16.7)	34 (21.9)	0.988	0.32
	No	75 (83.3)	121 (78.1)		
<b>NPS</b>	Yes	9 (19.1)	23 (29.5)	1.646	0.2
	No	38 (80.9)	55 (70.5)		
<b>Mixed drug</b>	Yes	19 (24.1)	39 (30.5)	0.998	0.318
	No	60 (75.9)	89 (69.5)		

\*\*\*:  $p < 0.001$

**Table 5** Analysis of drug acquisition sources by gender

Gender (%)

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

Source	Male	Female	post test
	Classmates	21 (2.5)	15 (1.5)
Strangers	55 (6.6)	11 (1.1)	Male > Female
Family	3 (0.4)	11 (1.1)	
online friends	41 (4.9)	18 (1.8)	Male > Female
Acquire yourself	2 (0.2)	1 (0.1)	
friends	348 (41.6)	382 (38.6)	Female > Male
boy/girl friends	16 (1.9)	161 (16.3)	
sexual partners	15 (1.8)	31 (3.1)	
drug traffickers	263 (31.4)	303 (30.6)	Male > Female
Entertainment	33 (3.9)	28 (2.8)	
Colleagues	36 (4.3)	24 (2.4)	
Others	4 (0.5)	4 (0.4)	

$X^2=164.26, p<.001$

**Table 6** Analysis of funding sources by gender

Funding sources	Gender (%)		post test
	Male	Female	
Income	539 (75.3)	400 (50.4)	Male>Female
borrowing	38 (5.3)	29 (3.7)	
Spouse	32 (4.5)	85 (10.7)	Female> Male
prostitution	5 (0.7)	5 (0.6)	
Theft	22 (3.1)	9 (1.1)	Male >Female

<sup>2</sup>According to Article 10 of “Narcotics Hazard Prevention Act” in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

drug trafficking	54 (7.5)	243 (30.6)	Female>Male
robbery	7 (1.0)	1 (0.1)	
Others	19 (2.7)	22 (2.8)	

$$X^2=172.97, p<.001$$

**Table 7** Analysis of reasons of using drug by gender

	Gender (%)		post test
	Male	Female	
Frustration	221 (15.2)	214 (14.3)	
Restlessness	145 (10)	54 (10.3)	
Allure	155 (10.7)	137 (9.2)	
Curiosity	184 (12.7)	217 (14.5)	
No harm to the body	9 (0.6)	3 (0.2)	
Cheap	8 (0.6)	5 (0.3)	
Use by friends	27 (1.9)	56 (3.7)	Female>Male
Free	39 (2.7)	51 (3.4)	
Recreation	198 (13.6)	204 (13.6)	
Drug withdrawal	67 (4.6)	61 (4.1)	
weight loss	30 (2.1)	114 (7.6)	
popular	9 (0.6)	5 (0.3)	Male >Female
stress	213 (14.6)	175 (11.7)	
Will not be caught	8 (0.6)	4 (0.3)	Male >Female

<sup>2</sup>According to Article 10 of “Narcotics Hazard Prevention Act” in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

Not a crime	9 (0.6)	9 (0.6)	
Mis-eating	11 (0.8)	6 (0.4)	
Seeking Stimulation	53 (3.6)	40 (2.7)	
sexual aid	54 (3.7)	17 (1.1)	
Others	14 (1)	24 (1.6)	Female>Male

$$X^2=99.826, p<.001$$

**Table 8** Analysis of the difference between gender and the application of family and friends

	Gender (%)		post-testing
	Male	Female	
Non	530 (90.9)	371 (61.9)	Male >Female
Elders	11 (1.9)	14 (2.3)	
peer	26 (4.5)	70 (11.7)	Female> Male
Companion	10 (1.7)	129 (21.5)	Female> Male
Youngers	3 (0.5)	13 (2.2)	Female> Male
Others	3 (0.5)	2 (0.3)	

$$X^2=156.725, p<.001$$

### iii) Positive Gain

The mean scores of positive gains for men and women are 2.76 and 2.04, respectively (Table 9). The t-test results indicate a significant difference in the mean scores of positive gains by gender ( $t = 3.346, p < .01$ ), with men are more likely to perceive positive gain from drug use than women.

### iv) Social Stigma

The mean scores of social stigmas for men and women are 3.10 and 3.07, respectively (Table 9). The results of the t-test show that the mean scores of social stigmas are not significantly different between male and female subjects in this study ( $t = .620, p > .05$ ).

## 4.9 Correlation of Emotion Evaluation Scales

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

The correlation analysis is used to examine the relationships between the factors of “total emotion score,” “implicit emotion,” “explicit emotion,” and “age.” The results show that age is significantly and positively correlated with total emotion score ( $r = .078$ ,  $p < .05$ ), implicit emotion ( $r = .096$ ,  $p < .005$ ), and explicit emotion ( $r = .062$ ,  $p < .05$ ), implying that with increasing age of the drug offenders, their total, implicit, and explicit emotions are more pronounced (Table 10).

#### 4.10 Analysis of Emotional States by Gender

To understand if there are significant gender differences in respondents’ emotional states, one-way analysis of variance (ANOVA) is conducted (Table 11). The findings reveal a significant difference in the total emotion score ( $F[1,1050] = 11.58$ ,  $p < .001$ ,  $\text{Eta} = 0.011$ ) with male respondents scoring higher ( $M = 35.60$ ) than female respondents ( $M = 32.62$ ), indicating that emotional feelings in men are more obvious than in women. In addition, a significant difference ( $F[1,1050] = 15.36$ ,  $p < .001$ ,  $\text{Eta} = 0.014$ ) is observed for implicit emotions, where male respondents have higher score of implicit emotion ( $M = 12.42$ ) than females ( $M = 11.19$ ), indicating that men have higher level of implicit emotion than women. Finally, a significant difference ( $F[1,1050] = 8.52$ ,  $p < .01$ ,  $\text{Eta} = 0.008$ ) is found in the explicit emotions, in which male respondents score higher in explicit emotion scale ( $M = 23.18$ ) than females ( $M = 21.43$ ), suggesting that men have higher level of explicit emotions than women.

**Table 9** Analysis of drug administration perceptions by gender

	Gender (mean/SD)		t	P
	Male	Female		
Negative Impact	(n=574) 3.42/.618	(n=563) 3.59/.518	-4.888	.000***
Interpersonal Relationship	(n=579) 1.98/.799	(n=572) 1.79/.705	4.326	.000***
Positive Gain	(n=580) 2.76/.768	(n=571) 2.60/.745	3.346	.001**
Social Stigma	(n=588) 3.10/.82	(n=577) 3.07/.836	.620	.536

\*\* :  $p < 0.01$ ; \*\*\* :  $p < 0.001$

**Table 10** Correlation Analysis of Emotion Evaluation Scales

		total emotion score	implicit emotion	explicit emotion	age
Total emotion score	r	1	.921**	.979**	.078*
	p		.000	.000	.012
	N		1052	1052	1037
Implicit emotion	r		1	.822**	.096**

<sup>2</sup>According to Article 10 of “Narcotics Hazard Prevention Act” in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

	p	.000	.002
	N	1052	1092
Explicit emotion	r	1	.062*
	p		.044
	N		1058
Age	r		1
	p		
	N		

\*: p<0.05; \*\*: p<0.01

**Table 11** Gender Differences in Emotional States

		Mean	SD	N	F	p	Eta
Total emotion score	Male	35.60	14.68	530	11.58	.001***	0.011
	Female	32.62	13.67	522			
	Total	34.12	14.26	1052			
Implicit emotion	Male	12.42	5.24	530	15.36	.000***	0.014
	Female	11.19	4.90	522			
	Total	11.81	5.11	1052			
Explicit emotion	Male	23.18	10.12	530	8.52	.004**	0.008
	Female	21.43	9.31	522			
	Total	22.31	9.76	1052			

\*: p<0.05; \*\*: p<0.01; \*\*\*: p<0.001

## 5. Discussion

This study aims to investigate the gender differences in drug-using behaviors and their cognition of drug use among drug offenders in Taiwan. In particular, there is a growing body of theories and empirical research examining the differences in criminal behavior between males and females. For example, Agnew's general strain theory (GST, 1992) postulates that emotional differences related to gender may inhibit female offending while intensifying male offending. According to GST, strain leads to negative emotions, which can drive individuals toward criminal behavior. Research testing this theory indicates that both males and females respond to strain with emotions such as anger, guilt, and depression, but the overall impact of these emotions tends to result in higher rates of delinquent behavior among males than females (Broidy & Agnew, 1997; De Coster & Zito, 2010). Given the potential differences in the types, frequency, causes, and treatment needs of criminal behavior between the genders, this study explores the variations in drug abuse behaviors and experiences among male and female drug offenders. This research provides valuable insights into the relationship between substance abuse and gender, as well as implications for future treatment strategies.

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

By conducting a survey with the detainees from the rehabilitation centers in Xindian, Taichung, and Kaohsiung, and female inmates from Taoyuan, Taichung, and Kaohsiung, Taiwan, 600 male and 585 female valid questionnaires are collected. This study finds that a higher ratio of women than men have experience in drug trafficking before being sent to prison or rehabilitation centers, especially among heroin and amphetamine users. Moreover, 30.6% of women purchase their drugs with the money earned from drug trafficking, compared with only 7.5% of men. Similarly, this reflects that women are more likely to resort to drug trafficking to obtain the funds to purchase drugs and, thus, have more experience in drug trafficking than men.

The reasons for administering the Category 1 and 2 drugs include curiosity, refreshment, and alleviation of negative emotions, which corresponds with previous studies (e.g., Shapira et al., 2021). However, there is no significant gender disparity in most of the reasons for drug use, except that more women use drugs to lose weight, following their friends who do the same, while more men use drugs to increase sexual function and enhance the sexual experience. Regarding attitudes toward drug use, men hold more positive and optimistic attitudes than women, while women are more likely to reckon the negative impact of drug use. Similar to previous research (e.g., Langan & Pelissier, 2001), men have a more optimistic view on drug use as their initial perceptions and expectations of drug effects are positive. Conversely, female offenders show relatively stronger recognition of the negative impact of drug use as they use drug to alleviate their negative feelings rather than fundamentally reckoning the positive effects. Although men and women have different purposes for using drug, it is undeniable that they both have certain expectations from and intentions for drug use. Consequently, it is important to understand these needs and provide alternatives to them to eliminate drug dependence, in addition to helping drug users recognize that drug use may offer temporary satisfaction with serious detrimental impacts on their physical and psychological health and social relationships.

Further, this study find that 21.5% partners of female drug users also use drugs, compared with 1.7% of men, and 16.3% female drug users obtain drugs from their boyfriends and girlfriends, compared with 1.9% in male drug users. Compared with men, the tendency in women to have intimate friends using drugs is relatively higher. Women are often in a disadvantageous position in relationship in the Taiwanese social context; thus, interpersonal connections and maintenance are critical for women. Furthermore, women tend to use drugs to meet the expectations of their intimate friends or maintain their relationships under the encouragement and pressure from their friends (Li & Lin, 2011). It is important for women to build interpersonal management skills and proper values, so that they can perceive their power to be autonomous and know that appropriate interpersonal communication does not necessarily require submissiveness to gain the approval of others, thereby strengthening women's interpersonal skills and attitudes. From the social context, we should cultivate correct gender values from an early age and rectify the female stereotype of being submissive, such that the public can understand and respect the fundamentals and importance of gender equality and equal rights.

As opposed to previous studies (e.g., Hsu, 2012; NIDA, 2020b), this study observes that men have more pronounced feelings of depression, anxiety, and stress than women. This finding may

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.



be explained through the lens of gender-specific emotion norms (Hochschild, 1979). Generally, women are expected to express more positive or prosocial emotions (e.g., joy, affection, empathy) as well as powerless or internalizing negative emotions (e.g., sadness, fear, anxiety, guilt, and shame) to align with feminine roles of care and vulnerability. In contrast, men are expected to display more powerful or externalizing negative emotions (e.g., anger, disgust, contempt) to conform to traditional male-dominated and authoritative roles (Chaplin & Aldao, 2013; Fischer & LaFrance, 2015). Additionally, Lombardo et al. (2001) found that both male and female students cry equally when alone, but females tend to cry more in front of friends or family. This suggests that men suppress their emotions in the presence of others, while women are more inclined to express sadness due to the comfort and support available from family and friends. In particular, within Chinese culture, where men are expected to "not shed tears lightly," suppressed negative emotions may become particularly pronounced in a survey context where they are alone and not required to interact with others.

The results also suggest that, contrary to the focus on the female perspective in past studies (e.g., Zlotnick et al., 2008), it is equally important to pay attention to the emotional experiences of males and provide assistance and counseling support. Owing to social culture and traditional mindsets, in the past, people do not recognize men as showing their emotions or asking for help, thus neglecting their feelings. Accordingly, men choose to retreat their emotions, wrap themselves in secrecy, or use drugs to paralyze their emotions to resolve their problems. Nevertheless, men indeed have a need for assistance. But, if they are not willing to share their stories or their real status and feelings, staff members at rehabilitation centers will not be able to understand their needs and difficulties, making it challenging for them to effectively achieve the goals of treatment or counseling. Therefore, we can first design programs and sessions that allow male drug users to discuss their problems and share their stories. Through sharing, they can vent their stress and enhance their trust in others to reduce their emotional pressure and burden.

### **Authors' Contribution:**

*Conceptualization:* Shu-Lung Yang

*Data Collection:* Shu-Lung Yang, Shu-Ping Tzeng, Chun-Lung Hsu

*Data Analysis:* Shu-Ping Tzeng, Mein-Woei Suen

*Funding Acquisition:* Shu-Lung Yang

*Manuscript Writing:* Shu-Ping Tzeng, Mein-Woei Suen, Chun-Lung Hsu

*Manuscript Reviewing and Editing:* Shu-Lung Yang

*Project Administration:* Chun-Lung Hsu

### **Funding:**

**Ethic Approval:** All study procedures involving human participants were in accordance with the ethical standard of the fields of Human Research Ethics and researchers' institutions. The project was approved by Research Ethics Committee (IRB) at National Chung Cheng University in Japan (Reference No. CCUREC109123003).

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

### Data Availability and Release Statement:

Please use this section to provide details on where the data supporting the results can be found or who to contact for the data. Include any links to publicly archived datasets that was generated or analyzed throughout the study.

### Acknowledgements:

This study acknowledges the financial support from the National Science and Technology Council, Taiwan, as well as the assistance provided by the Agency of Correction, Ministry of Justice, and various correctional institutions in conducting the survey.

### Conflicts of Interest:

The authors declare no conflict of interest

### References:

- Agnew, R. (1992). Foundation for a general strain theory of crime and delinquency. *Criminology*, 30(1), 47-88.
- Becker, J. B., & Koob, G. F. (2016). Sex differences in animal models: Focus on addiction. *Pharmacological Reviews*, 68(2), 242-263.
- Broidy, L., & Agnew, R. (1997). Gender and crime: A general strain theory perspective. *Journal of Research in Crime and Delinquency*, 34(3), 275-306.
- Chaplin, T. M. & Aldao, A. (2013). Gender differences in emotion expression in children: A meta-analytic review. *Psychological Bulletin*, 139, 735-765.
- Chen, B-S. (2018). Care of substance-related and addictive disorders. In S-C Hsiao (Eds.) *Psychiatric Nursing* (pp. 438-459). New Taipei City, Taiwan: New Wun Ching Developmental Publishing.
- Chen, Y-S, Wu, T-H, & Lin, C-Y. (2017). Correctional treatments and needs for female drug inmates. *Journal of Substance Abuse Research*, 2(1), 85-112.
- Cheng, W-S, Huang, T-Z, Lee, M-B, & Liao, S-C. (2016). Assessment and management of geriatric depression and suicide. *Taiwan Geriatrics & Gerontology*, 11(1), 16-30.
- Cotto, J. H., Davis, E., Dowling, G. J., Elcano, J. C., Staton, A. B., & Weiss, S. R. B. (2010). Gender effects on drug use, abuse, and dependence: A special analysis of results from the National Survey on Drug Use and Health. *National Institute on Drug Abuse (NIDA)*, 12, 402-413.
- De Coster, S., & Cornell Zito, R. (2010). Gender and general strain theory: The gendering of emotional experiences and expressions. *Journal of Contemporary Criminal Justice*, 26(2), 224-245.
- Doherty, M. C., Garfein, R. S., Monterroso, E., Latkin, C., & Vlahov, D. (2000). Gender differences in the initiation of injection drug use among young adults. *Journal of Urban Health*, 77(3), 396-414. doi:10.1007/BF02386749
- Fischer, A., & LaFrance, M. (2015). What drives the smile and the tear: Why women are more emotionally expressive than men. *Emotion Review*, 7, 22-29.
- Foster, K. T., Li, N., McClure, E. A., Sonne, S. C., & Gray, K. M. (2016). Gender differences in internalizing symptoms and suicide risk among men and women seeking treatment for cannabis use disorder from late adolescence to middle adulthood. *Journal of Substance Abuse Treatment*, 66, 16-22.

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

- Greenfield, S. F., Brooks, A. J., Gordon, S. M., Green, C. A., Kropp, F., McHugh, R. K., & Miele, G. M. (2007). Substance abuse treatment entry, retention, and outcome in women: A review of the literature. *Drug and Alcohol Dependence*, 86(1), 1-21.
- Griffin, M. L., Bennett, H. E., Fitzmaurice, G. M., Hill, K. P., Provost, S. E., & Weiss, R. D. (2015). Health-related quality of life among prescription opioid-dependent patients: Results from a multi-site study. *The American Journal on Addictions*, 24(4), 308-314.
- Guimarães, R. A., de Oliveira Landgraf de Castro, V., do Valle Leone de Oliveira, S. M., Stabile, A. C., Motta-Castro, A. R. C., dos Santos Carneiro, M. A., & Teles, S. A. (2017). Gender differences in patterns of drug use and sexual risky behaviour among crack cocaine users in Central Brazil. *BMC psychiatry*, 17, 1-8.
- Haas, A. L., & Peters, R. H. (2000). Development of substance abuse problems among drug-involved offenders: evidence for the telescoping effect. *Journal of substance abuse*, 12(3), 241-253.
- Hernandez-Avila, C. A., Rounsaville, B. J., & Kranzler, H. R. (2004). Opioid-, cannabis-and alcohol-dependent women show more rapid progression to substance abuse treatment. *Drug and alcohol dependence*, 74 (3), 265-272.
- Hochschild, A. R. (1979). Emotion work, feeling rules, and social structure. *American Journal of Sociology*, 85, 551-75
- Hosam El-Sawy, Mohammed Abdel Hay, Adel Badawy. (2010). Gender differences in risks and pattern of drug abuse in Egypt. *The Egyptian Journal of Neurology, Psychiatry and Neurosurgery*, 47, 413-478.
- Huang, J-W. (2010). An investigation on the associations among life stresses, coping strategies, and substance use of junior high school students [Unpublished doctoral dissertation]. Kaohsiung Medical University.
- Khan, S. S., Secades-Villa, R., Okuda, M., Wang, S., Pérez-Fuentes, G., Kerridge, B. T., & Blanco, C. (2013). Gender differences in cannabis use disorders: results from the National Epidemiologic Survey of Alcohol and Related Conditions. *Drug and Alcohol Dependence*, 130 (1-3), 101-108.
- Kosten, T. R., Kosten, T.A., McDougale, C.J., Hameedi, F. A., McCance, E. F., Rosen, M. I., Oliveto, A. H., & Price, L. H. (1996). Gender differences in response to intranasal cocaine administration to humans. *Biological Psychiatry*, 39,147-148.
- Langan, N. P., & Pelissier, B. M. (2001). Gender differences among prisoners in drug treatment. *Journal of Substance Abuse*, 13(3), 291-301.
- Lewis, B., Hoffman, L. A., & Nixon, S. J. (2014). Sex differences in drug use among polysubstance users. *Drug and Alcohol Dependence*, 145, 127-133.
- Li, I-C., Lin, R-C. (2011). A study on the analysis of how the partners' intimate relationship influences female drug addiction process. *Hsuan Chuang Journal of Social Sciences*, 9, 89-112. <https://doi.org/10.29592/BGY.201111.0005>
- Lin, L-C, Kuo, S-C, Lu, Y-U, Lin, C-L, Hsieh, E-H, & Su, N-L. (2009). *Relationships among social-psychological characteristics, drug using behaviors, and cognition of the AIDS infection risk among the male and female illicit drug abusers (DOH98-NNB-1017)*. Ministry of Health and Welfare.
- Lombardo, W. K., Cretser, G. A., & Roesch, S. C. (2001). For crying out loud-The differences persist into the '90s. *Sex Roles*, 45, 529-547.
- Lum, P. J., Sears, C., & Guydish, J. (2005). Injection risk behavior among women syringe exchangers in San Francisco. *Substance Use & Misuse*, 40(11), 1681-1696.
- Lyu, S. Y., Peng, Y. J., Yang, J. J., Jheng, S. S. (2008). *Gender Analysis of Drug Abuse*. Ministry of Health and Welfare, Taiwan.
- Mazure, C. M., & Jones, D. P. (2015). Twenty years and still counting: Including women as participants and studying sex and gender in biomedical research. *BMC Women's Health*, 15(1), 1-16. doi:10.1186/s12905-015-0251-9
- Mburu, G., Limmer, M., & Holland, P. (2019). Role of boyfriends and intimate sexual partners in the initiation and maintenance of injecting drug use among women in coastal Kenya. *Addictive Behavior*, 93, 20-28.
- McHugh, R. K., DeVito, E. E., Dodd, D., Carroll, K. M., Potter, J. S., Greenfield, S. F., & Weiss, R. D. (2013). Gender differences in a clinical trial for prescription opioid dependence. *Journal of Substance Abuse Treatment*, 45(1), 8-43.

<sup>2</sup>According to Article 10 of "Narcotics Hazard Prevention Act" in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.

- McHugh, R. K., Votaw, V. R., Sugarman, D. E., & Greenfield, S. F. (2018). Sex and gender differences in substance use disorders. *Clinical Psychology Review*, *66*, 12-23.
- NIDA. (2020a, January 22), *Substance use in women drug facts*. Retrieved from <https://www.drugabuse.gov/publications/drugfacts/substance-use-in-women> on 2022, November 17.
- NIDA. (2020b, May 4). *Sex and gender differences in substance use*. Retrieved from <https://www.drugabuse.gov/publications/research-reports/substance-use-in-women/sex-gender-differences-in-substance-use> on 2022, January 7.
- Osman, A. (2012). The Depression Anxiety Stress Scales-21 (DASS-21): Further examination of dimensions, scale reliability, and correlates depression anxiety stress. *Journal of Clinical Psychology*, *68* (12), 1322-1338.
- Riley, A. L., Hempel, B. J., & Clasen, M. M. (2018). Sex as a biological variable: Drug use and abuse. *Physiology & Behavior*, *187*, 79-96.
- Ros-Cucurull, E., Palma-Álvarez, R. F., Daigre, C., Jacas, C., Perea, M., Sorribes-Puertas, M., Quesada, M., Martínez-Arias, R., Ros-Montalbán, S., Casas, M., Ramos-Quiroga, J. A., Roncero, C., & Grau-López, L. (2018). Sex differences in an old adult sample with substance use disorder: A 6 months follow-up study. *Psychiatry Research*, *270*, 1157-1165.
- Sajid, M. A., Tatlah, I. A., & Butt, I. H. (2020). Causes of drug abuse among university students in Pakistan: Variation by gender and drug type. *Pakistan Social Sciences Review*, *4*(1), 459-468.
- Shapira, B., Berkovitz, R., Rosca, P., Lev-Ran, S., Kapsan, A., & Neumark, Y. (2021). Why switch? Motivations for self-substitution of illegal drugs. *Substance Use & Misuse*, *56*(5), 627-638.
- Sherman, B. J., McRae-Clark, A. L., Baker, N. L., Sonne, S. C., Killeen, T. K., Cloud, K., & Gray, K. M. (2017). Gender differences among treatment-seeking adults with cannabis use disorder: Clinical profiles of women and men enrolled in the achieving cannabis cessation — evaluating N-acetylcysteine treatment (ACCENT) study. *The American Journal on Addictions*, *26*(2), 136-144.
- Simpson, J. L., Grant, K. M., Daly, P. M., Kelley, S. G., Carlo, G., & Bevins, R. A. (2016). Psychological burden and gender differences in methamphetamine-dependent individuals in treatment. *Journal of Psychoactive Drugs*, *48*(4), 261-269.
- Su, N-R (2012). *A study on gender differences in drug using behavior and relapse determination between male and female illicit drug abuser*. [Unpublished doctoral dissertation]. Hsuan Chuang University.
- Wu, C-Y. (2010). The relationship between adolescent substance use and depressive symptoms. *Essays on Criminal Policy and Crime Research*, *13*, 77-90.
- Zlotnick, C., Clarke, J. G., Friedmann, P. D., Roberts, M. B., Sacks, S., & Melnick, G. (2008). Gender differences in comorbid disorders among offenders in prison substance abuse treatment programs. *Behavioral Sciences & the Law*, *26*(4), 403-412.

<sup>2</sup>According to Article 10 of “Narcotics Hazard Prevention Act” in Taiwan, individuals convicted of using Category One narcotics face imprisonment ranging from six months to five years. Those convicted of using Category Two narcotics may receive a maximum sentence of three years. In cases involving offenses outlined in Article 10, the prosecutor must seek a court adjudication, or the juvenile court should first evaluate the case. Following this, the accused or juvenile offender may be ordered to attend a rehabilitation center for observation or treatment for up to two months. Since the rehabilitation centers only detain male drug offenders, all the male drug offenders of using Category 1 and Category 2 drugs in the study are sampled from three rehabilitation centers while female drug offenders are sampled from three Women Prisons.