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If it walks like a duck...is it a duck?: A mixed methods investigation of differences between
Machiavellian and non-Machiavellian substance users

By

Daniel Pillersdorf

A Dissertation

Submitted to the Faculty of the Graduate Studies through the Department of Psychology in
Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy at the University
of Windsor

Windsor, Ontario, Canada

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If it walks like a duck...is it a duck?: A mixed methods investigation of differences between
Machiavellian and non-Machiavellian substance users

By

Daniel Pillersdorf

APPROVED BY:

Béla Birkás, External Examiner
University of Pécs

E. Donnelly
School of Social Work

K. Soucie
Department of Psychology

D. Jackson
Department of Psychology

C. Langton, Advisor
Department of Psychology

April 14, 2023

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ABSTRACT

Machiavellianism is a set of personality traits characterized by a cold and callous nature, a belief in engaging in manipulative tactics for personal gain, a cynical and distrusting view of others, and pragmatically moral stance. Behaviors and views of individuals with elevated Machiavellian traits can be seen to have a marked similarity with several behaviours and views of individuals with substance use issues, making it difficult to differentiate between them. Using a mixed-methods approach, this study sought to determine what distinguishes individuals who are high in Machiavellianism from those who are low in Machiavellianism but appear high in this set of personality traits due to their addictive behavior. Discerning this difference has ramifications for substance use treatment planning and delivery. Substance using undergraduate students, who were both high (N = 251) or low (N = 254) in Machiavellianism, completed a series of questionnaires related to attachment style, social connectedness, coping styles, motivation for treatment, readiness for change, and treatment expectations. Participants also completed 14 open-ended questions that elicited responses related to the nature of participants' substance use, the situations in which use occurs, motivations for use, concerns related to use, the mental and physical impacts of use, the impacts of use on users' relationships and life, attitudes toward substance use treatment, and alternative coping strategies. A significant and positive linear relationship was found between Machiavellianism and alcohol use, though no relationship was found between Machiavellianism and drug use. Having an avoidant coping style, autonomous or controlled motivation for stopping to use substances, and low treatment outcome expectancies, were significant predictors of Machiavellian grouping. Individuals who were high in Machiavellianism were more likely to feel less socially connected to others and to have an anxious-pre-occupied attachment style. Stage of readiness to change did not differ between those

high and low in Machiavellianism. Qualitative accounts highlighted that those high in Machiavellianism reported accounts consistent with a higher likelihood of using alcohol alone to manage emotional distress, with having more pre- and post-use anxiety and depression, with having a higher likelihood of using leisure activities or sleep to distract themselves when substances are not available, and with a higher likelihood of being opposed or ambivalent towards treatment, compared to those low in Machiavellianism. Qualitative accounts of those low in Machiavellianism were consistent with using substances alone to relax during leisure time, with a higher likelihood of adjusting naturally to not using, when substances are not available, and to viewing the prospect of treatment more favorably, compared to those high in Machiavellianism. Consistency of quantitative and qualitative findings are discussed, and treatment implications of these findings are reviewed. Recommendations of modified dialectical behavioral therapy, motivational interviewing, and building a strong therapeutic alliance are made in the context of substance use treatment for those high in Machiavellianism.

DEDICATION

This dissertation is dedicated to everyone who has had to make sacrifices to accomplish something that was important or meaningful to them. Keep working hard, run your own race, and you will get to where you want to be in the end.

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CHAPTER I

General Discussion

This dissertation project involved an examination of the differences between substance users found to be high in Machiavellianism and substances users found to be low in Machiavellianism. A mixed-methods approach was employed to determine if there was convergence of key qualitative and quantitative findings. Though both approaches were important in yielding results that may contribute to the extant literature, the qualitative results were particularly important in providing new direction for future research.

The concept of Machiavellianism will be reviewed comprehensively below, though it is noted here that individuals displaying Machiavellian traits tend to engage in strategic or instrumental interpersonal behaviour, possess a cynical view of others, and are oriented towards low moral standards (Christie & Geis, 1970). Machiavellianism is one component of the Dark Triad (Paulhus & Williams, 2002), which is a group of personality traits characterized by callousness, maliciousness, and anti-social qualities. Though the relation between Dark Triad traits more closely associated with psychopathy and narcissism and substance use has been well explored, the relation between Machiavellianism and substance use has been investigated comparatively less and requires further research (Jauk & Dieterich, 2019). This dissertation endeavored to fill the gap in this literature.

Maladaptive personality traits are associated with severe and ongoing problematic substance use (Goretti et al., 2017). Substance use is costly to individuals and society because of the significant and negative economic, social, and especially health related consequences. Short-term health issues associated with substance use include disruptions to the user's appetite, sleep patterns, heart rate, and blood pressure, as well as substance-induced psychosis and overdose

(NIDA, 2017), whereas long-term health consequences of substance use may include the development of mental illness, heart disease, lung disease, cancer, hepatitis, and HIV/AIDS (NIDA, 2017). According to the most recent World Drug Report (UNDOC, 2019), an estimated 585,000 deaths occurred in 2017, and 42 million years of “healthy” life was lost, due to misuse of various substances. Effective treatment of substance-using individuals with personality dysfunction has been found to require more intense intervention relative to substance-using individuals without personality dysfunction (e.g., Nielson et al., 2007; Parmar & Kaloiya, 2018). In distinguishing between substance users with high levels of Machiavellian traits and those with low level of these traits, it may be possible to inform efforts to identify individuals who require more intense or modified treatment in order to benefit from such interventions.

First, the literature about both general personality traits and personality disorders, and these characteristics’ respective relations with substance use, is reviewed. Subsequently, all three facets of the Dark Triad are discussed, and a comprehensive review of Machiavellianism is provided. Next, the similarities between Machiavellian behaviour and maladaptive behaviour among substance users are outlined and the rationale for the current study is explained. Particular attention is devoted to the implications for treatment planning and provision of Machiavellian traits in substance users. Various predictors of successful treatment for Machiavellian and non-Machiavellian substance users are considered. Finally, the dissertation hypotheses, methodology, procedures, data analyses, and results, are described and discussed.

Personality Traits and Substance Use

Clear evidence supports a link between specific personality traits and substance use (Belcher et al., 2014; Kotov et al., 2010). For example, traits that comprise the Five Factor Model of Personality, namely Neuroticism, Extraversion, Agreeableness, Conscientiousness, and

Openness to Experience (Costa & McCrae, 1992), have been found to be associated with problematic substance using behaviour. Neuroticism is defined as the tendency to experience psychological distress (Costa & McCrae, 1992). High trait neuroticism (being prone to experience negative emotions) is more likely to be positively associated with substance use disorders (Benotsh et al., 2013; Kotov et al., 2010; Papachristou; et al., 2016; Prisciandro et al., 2011) and with greater risk for developing mood or anxiety disorders (Griffith et al., 2010) than low trait neuroticism. Highly neurotic individuals tend to abuse substances as a means to cope with such internalizing psychopathology (Kuntsche et al., 2006). Extraversion is considered to represent a constellation of sociality, activity, and the tendency to experience positive emotions, such as joy (Costa & McCrae, 1992). Facets of extraversion such as high sensation seeking (Hittner & Swickert, 2006; MacPherson et al., 2010; Terracciano et al., 2008) or being uninhibited and more outgoing in social environments (Walton & Roberts, 2004) are also positively associated with increased substance use. Past research has found a link between those high on extraversion and both tobacco, alcohol use, and illicit drug use (Hampson et al., 2006; Munafò et al., 2007; Watson et al., 2019).

Individuals who are trusting, sympathetic, and cooperative are considered to be high in agreeableness (Costa & McCrae, 1992). Individuals found to be lower in agreeableness, encompassing characteristics such as hostility, antagonism, and aggression, have been found to be more likely to engage in alcohol, tobacco, and cannabis use across numerous studies (e.g., Hampson et al., 2007; Malouff et al., 2007; Terracciona et al., 2008; Turiano et al., 2012). Similarly, those lower on conscientiousness, encompassing characteristics such as being lackadaisical, lax, disorganized, and impulsive (Costa & McCrae, 1992), have also been found to be more likely to engage in problematic substance use (Kubička et al., 2001; Turiano et al.,

2012). Terracciona et al. (2008) found that having lower trait conscientiousness was associated with problematic cannabis, cocaine, heroin, and tobacco use. Lower trait conscientiousness is understood to be predictive of substance use over significant periods of time in longitudinal periods (Hampson et al., 2006). In fact, behaviours considered to be highly conscientious, such as being diligent and organized, appear to be protective against problematic substance use. Highly conscientious individuals appear to engage in more pro-social activities, related to work or family (Lodi-Smith & Roberts, 2007), which appears to be mutually opposed to impairment related to substance abuse. Finally, openness to experience, a trait that describes a combination of characteristics, such as being curious, unconventional, imaginative, sensitive, non-dogmatic in attitude, and behaviourally flexible (Costa & McCrae, 1992), appears to be a poor predictor of substance use (Livingston et al., 2015), with inconsistent findings across studies (Kotov et al., 2010).

In addition to the evidence suggesting that traits associated with the Five Factor Model are risk factors for substance use, there is also evidence of these associations changing as a function of trait fluctuations over time. Although many individuals display stable personality traits over time, decreases or increases in scores for certain traits have been found over time for others (Turiano et al., 2012). Littlefield et al. (2009; 2010) found that a decline in problematic alcohol use with age was associated with decreases in scores on trait neuroticism and impulsivity. Other researchers have noted that the development or the exacerbation of impairments related to personality is associated with increased vulnerability to substance use and addiction (Faridhosseini et al., 2019; Korsgaard et al., 2016; Langås et al., 2012). Indeed, among individuals who develop a personality disorder, the risk of developing alcohol use disorder or a substance use disorder is increased by five-fold and 12-fold, respectively (Trull et al., 2010).

In a review carried out by Goretta et al. (2017), the “Cluster B” personality disorders, including antisocial personality disorder (ASPD), borderline personality disorder (BPD), histrionic personality disorder (HPD), and narcissistic personality disorder (NPD), were found to be significantly and positively associated with ongoing and problematic illicit drug use, likely due to the high impulsivity and affective dysregulation found among this personality cluster (Helle et al., 2019; James & Taylor, 2007). ASPD is characterized by remorseless, deceitfulness, impulsivity, a persistent disregard for others, and by behaviour that violates others’ rights and safety (APA, 2013). BPD is characterized by an unstable self-image, emotional and social instability, and impulsivity (APA, 2013). HPD is typified by intense dramatization, high emotionality, and attention seeking behaviour (APA, 2013). NPD is characterized by a sense of grandiosity and entitlement, as well as admiration- or attention-seeking behaviours (APA, 2013).

In particular, a high prevalence rate of both alcohol abuse and illicit drug abuse, including cocaine and heroin, has been found in those with ASPD (Helle et al., 2019; Köck & Walter, 2018) and in individuals with BPD (Sansone et al., 2014; Trull et al., 2018). The relation between either HPD or NPD and substance abuse has been subject to less empirical attention, though both disorders have been found to be positively associated with substance use disorders due to the highly impulsive nature of these conditions (Taylor et al., 2006). Parmar and Kalojya (2018) note that of the four Cluster B PDs, ASPD and BPD are most often found to be associated with substance use disorders and are most observed in clinical practice, with prevalence rates among those with substance use issues ranging from 34.8% to 73.0%. These authors call for the undertaking of further research in order to better understand the relation between substance use and personality dysfunction.

The Dark Triad

One set of personality traits that has been found to be significantly associated with features of the “Cluster B” personality disorders (Vossen et al., 2017), is known as the Dark Triad (Paulhus & Williams, 2002). As the name implies, this cluster of personalities is comprised of three sets of traits, narcissism, psychopathy, and Machiavellianism, and is termed “dark” due to various malevolent qualities associated with these personality types. These traits have been found to have weak to moderate correlations with one another (Paulhus, 2014) and have been accepted as distinct constructs (Furnham et al., 2013). In addition, men have been found to score higher on Dark Triad traits relative to women (Jonason et al., 2015a; Paulhus & Williams, 2002). Common among those high on these traits is an inclination to be aggressive and socially aversive, as well as to be less compassionate, less empathetic, less agreeable, and to have less life satisfaction, compared to those who are low on these traits (Kaufman et al., 2019). In addition, the Dark Triad is represented by a core of anti-social behaviour, which often results in various forms of crime (Lyons, 2019a). Due to the high prevalence of the Dark Triad traits in those that engage in a wide range of criminal behaviour (e.g., theft; robbery; drug-related crimes; fraud; cybercrime; sexual assault; assault; murder; etc.), a significant portion of research conducted on the Dark Triad has been carried out with prison samples who have been convicted of these wrongdoings (Lyons, 2019a). Notwithstanding, it should be noted that a substantial number of studies have also been carried out using university students (e.g., Austin et al., 2007; Birkás et al., 2018; Brewer et al., 2018; Monaghan et al., 2016) in order to learn about behavioural tendencies associated with these dark traits in the general population. A review of each of these three sets of dark traits follows.

Narcissism

Narcissism is characterized by a grandiose, arrogant, or inflated self-view, while undervaluing others (Campbell et al., 2002; Morf & Rhodewalt, 2001). Those high on narcissism also tend to feel an intense sense of entitlement, display extreme vanity, are prideful, harbor feelings of superiority, and are attention seeking (Raskin & Terry, 1988). Such individuals will also exaggerate their achievements, ignore criticisms, and only seek out relationships with those who admire them (Campbell, 1999; Resick et al., 2009). Individuals with high levels of narcissistic traits may enjoy some positive attributes in the short-term, such as popularity (Back et al., 2010) or high status (Brunell et al., 2008). However, these individuals often feel vulnerable (Miller et al., 2011) and are prone to act dishonestly (Blair et al., 2008), eventually leading to significant difficulty in their functioning. Narcissism appears to be a strong predictor of HPD and NPD and a poor predictor of ASPD and BPD (Vossen et al., 2017). Given that narcissism is a related, yet distinct construct from Machiavellianism (Furnham et al., 2013), it was decided to employ a measure specifically designed to assess traits comprising this narcissism to statistically control for this construct.

Psychopathy

Psychopathy is considered to be the most malevolent and dangerous of the triad. Individuals who score high on measures of psychopathy are acknowledged as irresponsible, highly impulsive, and thrill seeking (Hare, 1985; 2003). These individuals lack empathy for others (Mullins-Nelson et al., 2006) and conduct themselves with a general unemotional callousness (Frick & White, 2008). They tend to manipulate others and are prone to engage in anti-social behaviour (Ogloff et al., 2016; Rauthmann & Kolar, 2012). A strong positive correlation exists between psychopathy and violent behavior (Nuemann & Hare, 2008), leading to repeated imprisonment or detention (Coid et al., 2009) for actions as serious as homicide

(Woodworth & Porter, 2002). In a meta-analysis involving over 100 studies, Muris et al. (2017) found that psychopathy significantly predicted the tendency for aggression and violence. It is clear that individuals with high levels of psychopathy do not show remorse for actions that negatively impact themselves or others (Skeem et al., 2011) and of all Dark Triad traits, only psychopathy has been found to be associated with lying for the sake of lying, with no specific motive (Jonason et al., 2014). While those high in narcissism and Machiavellianism also lie, it appears they do so with a motivation to secure a desired outcome. Psychopathy is understood to be a strong predictor of both ASPD and BPD and a poor predictor of HPD and NPD (Vossen et al., 2017). It is worth noting that psychopathy and ASPD are often considered to be synonymous in contemporary literature (APA, 2013). Those with ASPD tend to engage in anti-social and criminal behaviours. But psychopathy is distinguished from ASPD, in part, by its broader array of characteristics beyond anti-social behaviour, including a lack of empathic responding and general unemotional callousness (Ogloff et al., 2016), promiscuous sexual relations, proneness to boredom, low frustration tolerance, and lack of remorse or guilt, among other attributes (Hare, 2003). Nonetheless, it is unsurprising that both conditions often overlap (Millon & Grossman, 2004).

Machiavellianism

The third component of the Dark Triad, and the set of traits that is the primary focus of this dissertation, is “Machiavellianism”, a term based on a chief political advisor, Niccolo Machiavelli, who served the ruling Medici family in Italy during the 16th century (Jones & Paulhus, 2009). In his books, *The Prince* and *The Discourses*, Machiavelli advocated an end-justifies-the-means approach, espousing the view that because other individuals are untrustworthy, malevolent, and self-serving, a ruler must be open to any kind of strategy,

including deceit and interpersonally manipulative maneuvers like flattery or lying, in order to achieve or maintain their agenda (Fehr et al., 1992). In the modern era, in their classic work, Christie and Geis (1970) noted parallels between the political views of Machiavelli and individual social behaviour and identified a comparable constellation of personality traits, which was labeled as Machiavellianism. Those who score high in Machiavellianism work toward their wants, desires, and goals with a cold selfishness and in a purely instrumental fashion (Fehr et al., 1992). Seen as one of the trademarks of Machiavellianism, this emotionally detached interpersonal orientation was dubbed “cool syndrome” by Christie and Geis (1970). Past research has found that individuals with high levels of Machiavellian traits prioritize ambitions related to money, power, and competition (Stewart & Stewart, 2006) and view commonly held pro-social goals, such as family, community, and self-love to be considerably less important, relative to those with low levels of Machiavellian traits (McHoskey, 1999). In light of these values, it is not surprising that individuals with high levels of Machiavellian traits appraise achievement and success to be of paramount importance and worth any cost (Ryckman et al., 1994). In the service of their goals, individuals with high levels of Machiavellian traits will lie to others (Kashy & DePaulo, 1996) and are more likely to withhold useful information (Sakalaki et al., 2007). They will also cheat when the risk of detection is low (Fehr et al., 1992). Interestingly, those with higher levels of Machiavellianism are likely to engage in strategic forms of cheating, rather than opportunistic forms (Jones & Paulhus, 2009), due to their relatively high impulse control (Nathanson et al., 2006). Due to their persistent drive to succeed and hyper-competitiveness in securing power, fame, and wealth, individuals with high levels of Machiavellian traits are at times judged favourably and seen as preferred leaders (Coie et al., 1990; Deluga, 2001; Hawley, 2003). Nevertheless, their low-prosocial orientation, high-power orientation, and generally low

intrinsic motivation, renders them unfavourable in most other social contexts (Becker & O’Hair, 2007; Judge et al., 2009; McHoskey, 1999). As will be described below, the Machiavellian trait of peer exploitation and cynicism likely result in social rejection. Individuals who are high in Machiavellianism have low scores on trait Conscientiousness and trait Agreeableness (Jakobwitz & Egan, 2006), which likely also contribute to peer rejection of Machiavellian behaviour. Machiavellianism has been found to be a strong predictor of BPD, ASPD, and NPD (Vossen et al., 2017), with BPD displaying the strongest association with Machiavellianism (McHoskey, 2001).

The MACH-IV (Christie & Geis, 1970) has been the most popular tool in the study of Machiavellianism, having been used in over 2000 published studies (Jones & Paulhus, 2009), many of which have been carried out using undergraduate student samples (e.g., Monaghan et al., 2016; Vonk et al., 2015). Using scores from this measure, having higher or lower scores in Machiavellianism has been classified using a median split (e.g., Bolino & Turnley, 2002; Sheppard & Socherman, 1997; Wirtz & Kim, 2004) or by using the scoring system proposed by Christie (e.g., Gunnthorsdottir et al., 2002; Meyer, 1992) whereby a score of 100 is considered a theoretical midpoint dividing individuals who would be considered high or low in Machiavellianism (with higher scores indicative of higher levels of Machiavellianism). Before turning to the literature concerning associations with substance use, it will be useful to consider the factors of Machiavellianism tapped by this scale: 1) belief in manipulative tactics; 2) a cynical worldview; 3) a pragmatic morality. These factors are mentioned to provide a more in-depth explanation of the concept of Machiavellianism, as operationalized by the MACH-IV (Christie & Geis, 1970). It is worth mentioning that this three-factor model, though considered the gold standard in measuring Machiavellianism (Monteiro et al., 2022), has not always been

found to be consistently supported. Rauthmann (2013) noted that the MACH-IV has been found to have problems in its factorial structure and internal consistency due to some items being poorly phrased (e.g., being too radical), reflecting unfortunate but commonly held facts (such as it being wise to flatter important people), or being too specific or puzzling to respondents. Using item response theory, Rauthmann (2013) found that items with the most measurement precision on the MACH-IV tended to relate to “cynicism and misanthropy content (p. 395)”, suggesting that this single factor is what the scale largely measures. Monaghan et al. (2016) also analyzed each item of the three subscales and found consistency among the manipulative tactics and cynical worldview factors. A confirmatory factor analysis (CFA) supported this two-factor structure (Monaghan et al., 2016). Support for a two-factor structure was found a second time when Monaghan et al. (2018) conducted a meta-analytic CFA, and where the manipulative tactics factor was related to how immoral behaviours are justified in one’s efforts to achieve their goals. Despite this research, the three-factor MACH-IV scale continues to be the gold standard in assessing Machiavellianism, having been adapted for use in various countries, including Japan (Nakamura et al., 2012), Spain (Corral & Calvete, 2000), and Pakistan (Qadir & Khalid, 2017), and continues to be employed in recent research (e.g., Belaus et al., 2022; Lo, 2021; Vossen et al., 2017). As such, the decision was made to employ the MACH-IV as the measure of Machiavellianism, even with the empirical controversy around the factorial structure of the MACH-IV scale.

Belief in Manipulative Tactics. The hallmark of high Machiavellian behaviour is a tendency to engage in interpersonal manipulation that is strategic and pragmatic (Jones & Paulhus, 2009). A review by Fehr et al. (1992) emphasized that persuasion, self-disclosure, guilt induction, and ingratiation, are commonly employed tactics used by individuals who are high in

Machiavellianism. Similarly, Kumar and Beyerlein (1991) found that individuals with high levels of Machiavellianism use thought manipulation (belittling others to think a certain way; gas-lighting), deceit (e.g., lying to friends or romantic partner), and ingratiation (e.g., giving compliments to powerful others) in order to exploit others. These findings have been confirmed in more recent research (e.g., Brewer & Abell, 2015; 2017; Brewer et al., 2016; Jonason et al., 2012). The literature also suggests that impression management strategies are a component of the Machiavellian tactics suite. Individuals who are high in Machiavellianism have been found to actively promote their highly positive qualities and conceal any suggestion of weakness or vulnerability from others (Sherry et al., 2006). In addition to these positive-impression management techniques, individuals who are high in Machiavellianism use negative impression management practices, such as supplication (e.g., “I’m helpless”) or intimidation, as a means in achieving their desired outcomes (Bolino & Turnley, 2003; Corral & Calvette, 2000).

Cynical Worldview. In general, High Machiavellian perceptions of other people are negative. They are hyper-vigilant to being manipulated by others and maintain a worldview that others are untrustworthy (Monaghan et al., 2016) and dishonest (Mudrack, 1993). Indeed, in holding a mindset that others are unreliable and unpredictable, individuals with high levels of Machiavellianism view any kind of intimacy as risky, as such a connection leaves them vulnerable to betrayal (Ináncsi et al., 2015). Further, they believe that those around them should be manipulated for personal gain (Jones & Paulhus, 2009) because they believe others are weak and possess little agency in their lives (McHoskey et al., 1999). With this attitude, they often maintain impersonal relationships with others and treat those around them as exploitable objects (Ináncsi et al., 2015).

Pragmatic Morality. Understanding the moral views of individuals high in Machiavellianism is noted to be an ongoing challenge in research (Jones & Paulhus, 2009). It is clear that those high in Machiavellianism lack the conventional morality held by general society that would theoretically condemn their malevolent actions (Monaghan et al., 2016). Jones and Paulhus (2009) speculate that high Machiavellian immorality reflects a detached pragmatism in confronting what would conventionally be emotion-laden decisions (e.g., favoring euthanasia). An argument supporting the idea that this immorality is actually simple pragmatism (Leary et al., 1986) may be correct. Individuals high in Machiavellianism have moral attitudes that are consistent with outcomes that appear to confer a benefit. For example, they support the violation of privacy and intellectual property law (Winter et al., 2004) and are willing to accept unmerited reward at others' expense (Mudrack et al., 1999). Relative to individuals who are low in Machiavellianism, individuals who are high in Machiavellianism endorse lower ethical standards (Singhapakdi & Vitell, 1991), experience less discomfort in behaving unethically (Mudrack & Mason, 1995), and report greater intention to behave unethically in the future (Bass et al., 1999).

Machiavellianism as a Personality Type

It should be noted that the division of Machiavellianism into high and low groups, for the purposes of this dissertation project, was to investigate functional or attitudinal differences at the extremes of this set of personality traits. Machiavellianism is not a mental disorder, but rather a non-pathological personality type (Paulhus & Williams, 2002). Higher scores on Machiavellianism should equate to stronger attitudes and behaviours that are consistent with this set of traits and should not be considered through the same clinical lens as when considering personality disorders outlined in the Diagnostic and Statistical Manual for Mental Disorders (DSM-V; 2013). In the context of the results of this dissertation, the clinical applications should

not imply that scoring high on Machiavellianism should be a marker indicating that clinical intervention is needed. Rather, any results found from this dissertation should support the idea of high Machiavellian scores as a responsivity consideration, when targeting problematic substance use behaviour in treatment, in order to maximize the effectiveness of interventions.

Distinction Between Machiavellianism and Psychopathy

It is noteworthy that some authors consider Machiavellianism to be a subclinical form of psychopathy (Miller et al., 2017; McHoskey et al., 1998), as both sets of traits comprise manipulative behaviour and an emotional coldness. But others believe that these are distinct constructs (Furnham et al., 2013; Lyons, 2019b; Paulhus & Jones, 2015). Which of these positions is ultimately better supported empirically remains to be seen, but an argument can be made that Machiavellianism and psychopathy should be viewed as separate constructs within a clinical framework. Paulhus and Williams (2002) found that psychopathy differed from Machiavellianism in that psychopathy was associated with significantly higher levels of impulsivity (and lack of self-control), as well as a deficiency in long-term planning, relative to Machiavellianism. Further, while individuals with high levels of psychopathy are understood to be both instrumentally and reactively aggressive (Anderson & Kiehl, 2014), research has found only a small positive correlation between Machiavellianism and aggressive acts (Fehr et al., 1992) and there is no evidence for overt aggression in individuals who are high in Machiavellianism (Jones & Paulhus, 2009). In the context of forensic rehabilitation, these disparities would necessitate significant differences in the planning and delivery of treatment for individuals represented by elevations in either set of traits. This is most apparent in considering the widely supported Risk-Need-Responsivity Model (Andrews et al., 2011) used to guide the protocol for the rehabilitation of criminal offenders. Within the model, impulsivity and

aggression are main indicators of a major criminogenic risk factor (antisocial personality pattern). In following the model, these indicators would be noteworthy treatment targets for an individual high in psychopathy, while theoretically an individual who is high in Machiavellianism may have other indicators of risk that would require other treatment considerations, such as improving one's pro-social support system.

Differences have also been observed among these dark traits in the context of general mental wellness. Specifically, past research has found that psychological wellbeing is negatively associated with psychopathy, but not with Machiavellianism (Aghababaei & Blachnio, 2015). Other work has found results on other markers of well-being wherein psychological stress was positively associated with Machiavellianism and was unrelated to psychopathy (Richardson & Boag, 2016). Lyons (2019b) argues that findings from such studies indicate that Machiavellianism and psychopathy are dissimilar when considering psychological outcomes and treatment and that interpreting the two sets of traits as separate constructs is warranted. Given that the objective of this dissertation is to investigate differences between Machiavellian and non-Machiavellian substance users in order to highlight implications for substance use treatment planning and delivery, it was decided (much like Narcissism) to utilize measures specifically designed to assess traits comprising that construct and to statistically control for the construct of psychopathy using measures designed specifically to assess those traits.

Machiavellianism and Substance Use

Though an enormous amount of literature exists that reliably links both narcissism and psychopathy to substance use and addiction (see Jauk & Dieterich, 2019 for review), the association between substance use behaviour and Machiavellianism has been far less explored, is less understood, and merits further research (Jauk & Dieterich, 2019). Christie and Geis (1970)

hypothesized that an absence of psychopathology, including substance use, would be characteristic of individuals high in Machiavellianism to allow for effective reality testing and to allow for unmitigated action toward goals and achievement. Yet, a handful of studies provide evidence of a significant and positive association between Machiavellian traits and alcohol, heroin, and cannabis use (Chabrol et al., 2009; Gardiner & Lawson, 2022; Krampen, 1980; Pugovkina & Popinako, 2014; Zentsova & Fedorov, 2013). These studies used the MACH-IV scale and self-reported measures of substance use. Three of the four studies included samples from the general population and from patients in treatment and did not examine whether Machiavellianism differed among gender. Chabrol et al. (2009) examined the associations between the Dark Triad and substance use among a student sample and found a significant and positive association between Machiavellianism and substance use, though the association was stronger for males than for females. Using a sample from the general population, the MACH-IV, and self-report measures of cocaine use, Quednow et al. (2017) conducted a longitudinal study and found that both recreational and dependent cocaine users displayed significantly higher Machiavellian scores than control subjects and that this finding remained stable with the passage of time. No significant gender differences were found. Based on these results, the authors suggested that Machiavellianism might be a predisposition for stimulant use. Findings from a previous study are consistent with this suggestion. Compared to university students found to be low in Machiavellianism, undergraduate students high in Machiavellianism have been found to more regularly use non-medical methylphenidate for pharmacological cognitive enhancement (Maier et al., 2015). In addition to expecting substance use to confer a cognitive advantage, a study using a large sample from an introductory psychology class found that those high in Machiavellianism believed that substance use would make the user feel more confident and

reduce tension, putting those high in Machiavellianism at an increased risk for drug use (Gott & Hetzel-Riggin, 2018).

Analogous External Appearance of High and Low Mach Substance Users

Reasons for why few studies have examined the relation between substance use and Machiavellianism could be that the behaviours and views of those with elevated Machiavellian traits can be seen to have a marked similarity with a number of the behaviours and views of individuals with substance use issues, making it difficult to differentiate between them. That is, it might be that the elevated scores on Machiavellian traits in substance users with high levels of Machiavellian traits are being attributed to their addictive behaviour and actions associated with such a lifestyle, such that the Machiavellian personality traits would not be considered as part of their presentation to an external observer. Sarkar (2004) noted that as addiction worsens, an individual undergoes a “personality change”, where the majority of their thoughts and behaviour revolve about obtaining and using drugs, despite familial, social, financial, and legal consequences. This single-minded orientation appears to parallel that of a Machiavellian personality, in that individuals who are high in Machiavellianism believe that they must do whatever must be done, at any cost, to achieve their goals. As outlined above, individuals high in Machiavellianism are characterized by the tendency to employ manipulative tactics, possess a cynical view of others, and maintain a pragmatic moral attitude (Christie & Geis, 1970). These attributes are also commonly observed characteristics among individuals who struggle with substance use issues.

Similar to the behaviour of individuals high in Machiavellianism, research has found that substance users employ a variety of manipulative devices, across a range of circumstances, to facilitate their substance use. Substance users induce guilt, are emotionally abusive, and

challenge the thinking of family members, in order to garner financial or practical support for their addiction, or to protect the secrecy of the same (Usher et al., 2007). Guilt induction, or “playing the victim” in particular (e.g., “*It’s your fault that I’m addicted to drugs*”), has been found to be a frequently used form of manipulation among substance users with family members (Rusnáková, 2014). Furthermore, when family members make efforts to reward the substance user for abstinent behaviour, those struggling with addiction may negotiate or resort to emotional blackmail (Rusnáková, 2014) in an attempt to enjoy the benefits offered, while maintaining their substance use. Among acquaintances, substance users often use deceit, by feigning positive relationships with others in order to obtain drugs or other resources, such as money or shelter (Barlow & Weare, 2019). They will also break promises and lie to their real companions in the service of sustaining their drug habit (Sarkar, 2004). To offset an internal sense of lack of social control, users will engage in “splitting” among acquaintances, where they will pit a person against another, using ingratiation and deceit, in order to gain loyalty and support in their interpersonal relationships (RRC, 2017). Such strategies allow for less constrained navigation in social environments, which would otherwise safeguard against drug use behaviour (e.g., alienating a friend among a friend group who is outspoken about the user being abstinent).

Substance users have also been observed to use manipulative tactics in both psychological and medical treatment settings. Levine and Stephens (1971) have written at length on how users will manipulate therapists during treatment in order to feel excitement or power. In a forensic context, such as in prisons, reasons for manipulating therapists were noted to be in the service of gaining respect from peers, and to exact revenge on “the system.” Levine and Stephens highlighted that in both treatment environments guilt induction and ingratiation were frequently employed. In medical settings, substance users have been documented to manipulate

nurses and doctors to gain a surplus of prescription pain medication for later abuse (Fountain et al., 1998; Neville & Roan; 2014). Methods used to obtain extra medication include exaggerating their medical complaints, negotiating with prescribers, giving false identities, inducing sympathy or guilt, and pretending to be a medical resident.

Substance users also appear to hold a cynical view of the world. Individuals struggling with addiction commonly learn from an early age (through abuse, neglect, or other trauma) that eliciting emotional support from other people is costly (Weiss, 2016). Importantly, several studies support the link between childhood sexual, physical, or emotional abuse from a parent and the development of a substance use disorder in adulthood (e.g., Tucci et al., 2010). In light of these early negative and traumatic experiences substance users appear to become disconnected, shame-prone, and struggle with mental health disorders, such as depression and anxiety (Prosek et al., 2018). Grappling with this emotional discomfort and having lost the ability to trust others to help relieve them of distress, many substance users appear more inclined to seek comfort from the influence of substances, which does not require emotional vulnerability (Weiss, 2016). In other words, individuals who are low in Machiavellianism abuse substances in order to escape from emotional pain, stemming from trauma and isolation. It is important to note that substance users who are low in Machiavellianism *do* possess a deep craving for emotional intimacy (Weiss, 2016), however they have learned through experience that turning to others for support will produce a negative outcome, and so refrain from connecting to others (Weiss, 2016). This constraint creates or exacerbates their mental health issues (Weiss, 2016). Arguably, this is why when substance users, who are low in Machiavellianism, are able to emotionally connect with others safely, such as in group therapy or 12-step recovery program, their mental struggles improve (Weiss, 2016). In contrast, those high in Machiavellianism have self-models that are

comprised of unbending self-reliance and stable self-esteem, whereby their need for emotional closeness is minimized and where they *do not* have an interest in establishing emotionally deep relationships (Ináncsi et al., 2015). Thus, it can be concluded that though substance users, who are either high or low in Machiavellianism, likely differ in their desire for connection, both appear to be untrusting or uninterested in close relationships to an observer. It is the *underpinnings* of their comparable presentation that distinguishes their cynical mindsets.

Finally, a Machiavellian mentality that subscribes to a pragmatic morality may easily be attributed to the illegal, criminal, or wrongful acts carried out by substance users in the service of their addiction. Substance users may fund their addiction through theft (Sarkar, 2004; Wanner et al., 2009) or robbery (Boles & Miotto, 2003). They may also threaten others to protect themselves or warn others of the consequences of preventing their ongoing use (Boles & Miotto, 2003). Additionally, substance users may take up careers as drug-traffickers or distributors in order to maintain their substance-using lifestyle (Boles & Miotto, 2003). Other immoral acts may be directed at family and friends of the users. As previously mentioned, substance users may lie to loved ones in order to hide their problematic behaviour (Usher et al., 2007). Further, they are inclined to tap into familial finances to fund their addictions (Sarkar et al., 2016), instead of basic expenses (e.g., breadwinning mother uses her salary on alcohol instead of groceries for her children). While the reviewed acts are considered immoral by societal standards, a substance user may hold the perspective that these acts are permissible, in order to continue their addictive behaviour. Such actions, as viewed by an observer, could easily be misconstrued as Machiavellian pragmatism, in that substance users are frequently willing to engage in unethical activity when they profit (ongoing substance use).

It seems clear that the behavioural manifestations of substance users who are high in Machiavellianism, and substance users who are low in Machiavellianism, are similar, such that it may be impossible in a significant portion of cases to differentiate members of these two groups by observation or by background review alone. Even administering a self-report measure of Machiavellianism (e.g., MACH-IV) may not distinguish between these groups because individuals who are low in Machiavellianism, who would be characterized by their addictive mindset and behaviours, may respond consistently with one who is truly high in Machiavellianism. Indeed, it has been long known that an individual's transitory mood, thoughts, situations, or other qualities influences responding on self-report measures (Moum, 1988). Thus, the main question being asked is: How does one distinguish individuals who are truly high in Machiavellianism from those who low in Machiavellianism but appear high in this personality type due to their addictive behaviour? This question is an important one to answer because discerning the underlying differences between these two groups and being able to classify members of both groups accurately has ramifications for substance use treatment planning and delivery.

Treatment Ramifications

As alluded to earlier, group treatment for substance use disorders leads to relatively greater improvement in these conditions in comparison to individual treatment, other forms of treatment, and no treatment (Coco et al., 2019). Group treatment promotes a sense of comradery and teamwork among participating members, as they are able to work with others toward a common goal (e.g., abstinence) and actively contribute to both their own self-improvement and the growth of others. In theory, such an advantage would be a treatment barrier to both those high in Machiavellianism and surrounding group members, as individuals high in

Machiavellianism have been found to hold negative views of teamwork and partnership and have been perceived by others to be unsympathetic and detrimental in team situations (Rauthmann, 2012). In addition to a high likelihood of facilitating alienation and interpersonal conflict (Monaghan et al., 2016) that would supposedly disrupt the group therapeutic process, individuals high in Machiavellianism would also be less trusting of other group members due to their cynical nature (Christie & Geis, 1970). Trusting others is understood to be one of the most important aspects of group therapy (Venter & Uys, 2019) and higher levels of trust has been found to be positively associated with greater group cohesion and self-disclosure. What is more, research has found that these factors are core components of successful treatment outcomes (Lasky & Riva, 2006; Osilla et al., 2017).

Given the literature outlined above, it is likely that group therapy would be relatively less effective, or ineffective, for individuals with high levels of Machiavellianism in comparison to receiving individual therapy. Although there are no comparative empirical investigations of the effectiveness of individual versus group treatment for Machiavellianism specifically, Puskar (2019) has noted that individual therapy, rather than group intervention, is more appropriate for those struggling with trust issues or suspicion of others, because it is more difficult to build trust with a group rather than a single therapist. This is especially true with an open format for the group, where group membership changes constantly with new members beginning treatment as senior members complete it. In another vein, findings of clinical research carried out by Chakhssi et al. (2014) indicate that individual therapy for ASPD may be effective in the context of forensic treatment. Furthermore, Lyons (2019b) has recommended that the treatment of those high in Dark Triad traits should be tailor-made to accommodate an individual's response style. In review of such considerations, including the significant association between ASPD and

Machiavellianism (Vossen et al., 2017), it is reasonable to advocate for individual intervention rather than group therapy in the treatment of individuals high in Machiavellianism. Accordingly, being able to categorize substance users as having high or low levels of Machiavellianism at the outset of treatment would be beneficial in determining the appropriate type of intervention methods for each group.

Early differentiation of substance users who are high in Machiavellianism from substance users who are low in Machiavellianism during treatment is also important because Machiavellianism has been found to relate to several domains of psychopathology, including internalizing disorders and thought dysfunction (Monaghan et al., 2016). Several studies have found a moderate correlation between the MACH-IV scale and neuroticism (Jakobwitz & Egan, 2006; Stead et al., 2012; Vernon et al., 2008), suggesting that individuals who are high in Machiavellianism tend to experience negative emotions or stress (Monaghan et al., 2016). Consistent with these works, is the finding that a strong correlation exists between Machiavellianism and BPD (Láng, 2015; McHoskey, 2001). A number of other forms of psychological issues have also been found to correlate positively with Machiavellianism, including depression (Bakir et al., 1996), low-self-esteem (Valentine & Fleischman, 2003), and anxiety (Jakobwitz & Egan, 2006). Individuals high in Machiavellianism also struggle to express their feelings (Szijarto & Bereczkdi, 2014; Wastell & Booth, 2003), which likely impairs their capacity to manage negative emotions. In regard to thought disorder issues, individuals with high levels of Machiavellianism hold a hyper-vigilant view toward being manipulated and do not trust others (Christie & Geis, 1970). Consistent with this orientation, Machiavellianism has been found to be associated with strange or atypical cognitions in adolescence (Loftus & Glenwick, 2001) and with paranoia in adulthood (Christofferson & Stamp, 1995). Monaghan et al. (2016)

suggest that the Machiavellian cynical view, hyper-vigilance, and overestimation of threat, could be considered as delusional in extreme cases.

Given the link between Machiavellianism and various forms of psychopathology, it is likely that substance users who are high in Machiavellianism would struggle with more complex issues in practice compared to substance users who are low in Machiavellianism and would be better served with more intensive therapies that seek to address these potentially more difficulty struggles. For example, cognitive behaviour therapy (CBT; Beck, 2011) is the most widely used treatment modality in the rehabilitation of offenders in forensic treatment, including for those struggling with substance use issues (Andrews & Bonta, 2006). Yet, multiple studies have found that other treatment modalities appear to be more effective in the treatment of co-morbid substance use disorders and personality dysfunction compared to CBT, including dialectical behaviour therapy (Linehan et al., 2002) and dynamic deconstructive therapy (Gregory et al., 2008). Distinguishing between substance users who are high in Machiavellianism and substance users who are low in Machiavellianism at the beginning of treatment would be conducive to allocating current best practice therapies to these individuals in order to maximize rehabilitative potential. It is noteworthy that CBT has also been found to be effective in treating individuals with co-morbid substance use issues and maladaptive personality features when treatment is tailored to address specific problematic personality features (Nielson et al., 2007; Parmar & Kaloiya, 2018). However, modification of treatment in this manner would first require the differentiation of substance users who are high and low in Machiavellianism, so that a treatment provider would recognize that adjustment to treatment is required.

Predictors of Successful Treatment Outcome

No empirical investigations in the peer-reviewed literature have distinguished between substance users with high levels of Machiavellianism and substance users with low levels of Machiavellianism. Notwithstanding, it is worth reviewing literature on several predictors of treatment, in which those high in Machiavellianism and those struggling with substance use issues have been found to differ, in order to contemplate potential underlying differences between both groups in the context of treatment. Four factors are reviewed below: attachment style, coping style, readiness for change, and treatment expectations.

Based on peer-reviewed literature, which will be discussed in detail in the sections that follow, these factors are noted to significantly impact the treatment success of substance users. In a recent meta-analysis, Schindler (2019) examined the attachment style of substance users and concluded that attachment style should be considered in the treatment of this population because various forms of insecure attachment were found to be linked to problematic substance use. In addition, meta-analytic data indicates that attachment style is a strong predictor of the therapeutic alliance, another element of therapy that is predictive of client improvement (Deiner & Monroe, 2011). The therapeutic alliance was considered, but ultimately rejected, as a factor for this investigation because an alliance can improve over time based on the efforts of the therapist (Summer & Barber, 2004; Crits-Cristoph et al., 2007), which then may be less useful in helping to differentiate between High and Low Mach substance users. In addition, several other “therapist” factors may impact a substance user’s perception of the therapeutic alliance, including the client-therapist fit and the therapeutic modality used (Lynch, 2012). Further, because a non-clinical sample was employed in the dissertation project, measures of therapeutic alliance would be abstract, rather than grounded in a clinical context.

Substantial examination of coping strategies as predictors of addiction recovery has also taken place, with passive and avoidant coping styles being found to be associated with more severe substance use (e.g., Kronenberg et al., 2015; Magidson et al., 2013; Opalach et al., 2016). Research has found that active means of coping with addiction is associated with greater reduction in substance use (e.g., Liu et al., 2019). Given, the large literature linking coping style as an important element of recovery from addiction (Azizi et al., 2019; Opalach et al., 2016; Valtonen et al., 2006), it was considered as an appropriate factor for inclusion.

Readiness for change is a factor that has been studied extensively in the context of tobacco cessation, abstinence from alcohol, and the reduction in the use of other addictive substances (Brick et al., 2018; Velicer et al., 2007; Punjani et al., 2019; Rios et al., 2019; Robinson et al., 2012), and where results consistently indicate that lower motivation or readiness to change is associated with higher levels of substance use. Motivation for changing one's behaviour is often investigated using the Trans-Theoretical Model of Behaviour Change (Prochaska & DiClemente, 1984) as a framework. Indeed, Armitage (2009) has noted that the model is considered the "most dominant model of health behaviour change" (pp. 195).

In sum, the three discussed treatment factors above (attachment style, coping style, and readiness for change), were included in this investigation due to the large bodies of literature that indicate that these three specific variables are important in the treatment of substance use. Understanding how High and Low Mach substance users differ on these variables would be valuable in the development and delivery of treatment. On the other hand, treatment expectations in substance users have been subject to relatively less empirical attention (Kuusisto et al., 2011a; 2011b), though the association between general pre-treatment expectations and client improvement has been well documented (Dew & Bickman, 2005). Therefore, this variable was

included in order to expand the treatment expectation literature for substance users and to investigate another relevant axis in which substance users who are high in Machiavellianism, and substance users who are low in Machiavellianism, may differ.

Attachment Style

Attachment style is a concept based on Bowlby's (1977) attachment theory and refers to an individual's way of relating to significant others, originally caregivers ("attachment figures"). The idea revolves around an individual's confidence in the availability of the attachment figure as a secure foundation from which the individual can explore their environment safely when not in distress, and as a source of safety when the individual is seeking comfort, protection, or support (Levy et al., 2011). Ainsworth et al. (1978) identified three distinct attachment styles in children, which were termed secure, anxious-resistant or ambivalent, and avoidant styles of attachment. Hazan and Shaver (1987) applied these childhood attachment patterns to the study of adult attachment, wherein they explored the phenomenon of romantic love as a type of attachment and developed parallels in Ainsworth's categories to matching measures of adult attachment (secure attachment; anxious-preoccupied; dismissive-avoidant). Bartholomew and Horowitz (1991) revised Hazan and Shaver's classification to incorporate a fourth attachment, which is termed fearful-avoidant (also termed unresolved or disorganized) attachment.

Individuals who are securely attached are comfortable entering loving and emotionally intimate relationships (Banse, 2004; Bartholomew & Horowitz, 1991; Levy, 2017). They are capable of depending on their partner and allow their partner to depend on them. They are able to communicate their emotions and needs effectively and are attuned to the emotions and needs of their partners. Because these individuals are trusting, forgiving, and empathic (Mikulincer et al., 2005), they are also able to accept their partner's need for separation without feeling rejected

(Bartholomew & Horowitz, 1991) and experience less frequent negative emotions in their relationships (Konrath et al., 2014; Simpson, 1990). In other words, these individuals are able to feel close and independent simultaneously. Finally, these individuals are trusting of others, manage their emotions in a healthy way, and are able to forgive past transgression in their relationships (Levy, 2017).

Anxious-preoccupied individuals are insecure in their relationships and harbor ongoing worries about abandonment and rejection (Bartholomew & Horowitz, 1991; Ravitz et al., 2010). They require constant reassurance about the security of the relationship and often push their partners away due to behaviour that conveys a desire to be inappropriately close with them (Levy, 2017). These individuals are hypersensitive to their partner's behaviour (Bartholomew & Horowitz, 1991) and are prone to view minor offenses directed towards them in an exaggerated fashion and incorrectly interpret neutral behaviour as personal attacks. They often ruminate about past issues, which fosters emotions such as anger and fear, which negatively impacts their current relationships. They are unpredictable and highly emotional and can be combative and controlling. They often connect with significant others through invading personal boundaries of their partner or through conflict (Bartholomew & Horowitz, 1991; Levy, 2017).

Dismissive-avoidant individuals are emotionally distant and tend to reject intimate relationships in order to keep their partners at a safe emotional distance (Bartholomew & Horowitz, 1991). These individuals do not possess a strong need for attachment, often equating intimacy to a threat to their independence (Ciechanowski & Katon, 2006; Levy, 2017). They do not depend on their significant others and do not permit their partners to depend on them (Ciechanowski & Katon, 2006). This is because these individuals strongly value their independence. Their intellectual style of communication is reflected in a narrow emotional range

that is perceived as non-emotional (“cool”) or stoic. They are not comfortable discussing their own emotions and prefer to be alone when they are able (Levy, 2017). Notwithstanding, this avoidance likely results in a high proneness to feeling lonely (DiTomasso et al., 2013). Partners of dismissive-avoidant individuals often long for more intimacy, though are rarely able to realize a deep emotional connection.

Finally, individuals with a fearful-avoidant (also termed unresolved or disorganized) attachment are plagued by unresolved emotions and memories associated with prior traumatic experiences (Levy, 2017). Such individuals have negative models of both the self and others (Konrath et al., 2014). These individuals struggle to regulate their emotions and cannot tolerate emotional closeness with their partners. Indeed, individuals with a fearful-avoidant attachment feel that they have little control in their relationships (Bartholomew & Horowitz, 1991) and are highly sensitive to rejection (Ravitz et al, 2010). In response to others making efforts to connect with them, they tend to act argumentatively and abusively, often creating unhealthy bonds that resemble past patterns of dysfunctional relationships (Levy, 2017). These individuals lack empathy and remorse, are selfish, and act aggressively toward their partners. Unsurprisingly, they have little regard for rules and tend to engage in criminal activity (Levy, 2017).

As one would expect, those who are securely attached tend to improve more from clinical intervention than individuals with an insecure attachment style (Muklincer et al., 2013). Indeed, the ability to socially connect with others successfully is associated with reductions in symptoms of depression and anxiety (Haslem et al., 2016) and with significantly greater working alliances with therapists (Taylor et al., 2014). Though it is clear that insecure attachment styles are associated with various forms of psychological distress (Winham et al., 2015), studies that have examined the relation between insecure attachment styles and treatment outcome suggest that the

three insecure styles are not uniform in relation to treatment improvement. Horowitz et al., (1993) found that outpatients with a dismissive-avoidant attachment displayed less clinical improvement than outpatient with other attachment styles, subsequent to receiving individual therapy. More recent work is consistent with the finding that a dismissive-avoidant attachment style is associated with the least amount of improvement in therapy (e.g., Quijada et al., 2015). A dismissive-avoidant attachment style is also related to conflict within the therapeutic alliance (Byrd et al. 2010) and to early termination from group therapy (Tasca et al., 2004). Yet, other work has reported seemingly inconsistent results. In contrast to the findings discussed above, other studies suggest that an anxious-preoccupied attachment has been found to negatively correlate with treatment outcome, while dismissive-avoidant attachment has been found to be uncorrelated with treatment outcome (Levy et al., 2011).

In addition, Strauss and colleagues (2011) conducted a study that investigated changes to attachment style with adult inpatient women with borderline personality disorder and found that those who shifted from an anxious-preoccupied style to a dismissive-avoidant attachment style reported better treatment outcomes. The authors theorized that adopting an avoidant attachment and “deactivating” emotional distress might be related to better symptom outcome, especially if one is in significant distress at the outset of treatment. Though more research is needed to clarify whether an anxious-preoccupied or a dismissive avoidant attachment style is considered more clinically problematic, it is clear that individuals with a fearful-avoidant attachment tend to experience the most difficulty in regulating their emotions (Favez & Tissot, 2019) and are at the most risk for psychological distress (e.g., Scheffold et al., 2018). Finally, it is worth noting that the insecure attachment styles vary in association with different forms of psychopathology. Anxious pre-occupied and fearful-avoidant attachment styles are associated with higher scores of

psychoticism (delusions and hallucinatory behaviour) and affect (depression, anxiety, guilt, and tension), while dismissive-avoidant attachment is linked to anxiety (Ponizovsky et al., 2013).

With respect to attachment differences between substance users who are high and low in Machiavellianism, individuals high in Machiavellianism show a dismissive-avoidance attachment style in both community and student samples (Brewer et al., 2018; Láng & Birkás, 2014; Ináncsi et al., 2015). These individuals hold a positive model of the self and a negative view of others and maintain relationships with others in order to exploit them in the service of satisfying their own needs and goals (Ináncsi et al., 2015). This kind of relationship style is consistent with Bartholomew and Horowitz's classification of a dismissive-avoidant attachment pattern. On the other hand, substance users present with a range of attachment styles across many studies. A review of 37 studies by Schindler (2019) found that substance users appear to primarily display a fearful-avoidant (unresolved/disorganized) attachment style, which supports the idea that abusing substances is a behavioural coping strategy used to manage emotional distress related to a deficient attachment pattern. The review included studies using both clinical and non-clinical (community and undergraduate) samples and self-report measures of attachment. Though fewer in number than those with results that pointed to connection between substance use and fearful-avoidant attachment, Schindler's review also found studies that linked substance users to anxious-preoccupied and dismissive-avoidant styles. Given the range of attachment styles among this population, it is likely that individuals with different attachment patterns use substances for different reasons (Schindler, 2019). Individuals with a fearful-avoidant pattern likely use substances to cope with their fears and residual symptoms of trauma. Individuals with an anxious pre-occupied attachment may consume substances to reduce interpersonal distress and to feel more comfortable connecting with their partners. Those with a

dismissive-avoidant attachment likely use substances to evade uncomfortable and negative emotions. Because of the differing attachment patterns seen in past research among individuals high in Machiavellianism and substance users, and the low probability that the majority of substance users in Schindler's (2019) review were individuals who were high in Machiavellianism, it seems likely that attachment style would be a worthwhile variable to examine and could potentially account for a portion of the underlying differences among these groups.

Coping Strategies

When confronted with psychological distress, the intensity of one's undesirable experience can be reduced using effective coping strategies. Folkman and Lazarus (1985) proposed that coping strategies primarily fall into two main categories, emotion-focused coping and task- or problem-focused coping. Emotion-focused coping is defined as the regulation of distressing emotion, or a strategy employed to regulate negative emotional consequences of a stressor (Folkman et al., 1986). Problem-focused coping reflects the act of, "doing something to change for the better the problem causing the distress" (pp. 152). In other words, it is an approach in which efforts are made to eliminate or alter the source of stress. Endler and Parker (1990) proposed a third strategy that is used to cope with stress, namely avoidance. Avoidance-focused coping is understood to be one's efforts to avoid a stressor. Further coping dimensions have been added to these strategies, including cognitive reappraisal (Carver et al., 1989), where the meaning of a problem or how one views a problem is changed, and seeking social support (Amirkhan, 1990).

An individual's preferred method of coping is related to his or her own evaluation of the situation, which suggests that a strong association exists between personality characteristics and

coping approach (Birkás et al., 2016; Vollrath, 2001). For example, problem-focused coping (that is rational, active, planned) is associated with high Conscientiousness (Costa et al., 1996), while avoidance-focused coping is linked to high Neuroticism (Vollrath et al., 1995). And as one would expect, seeking social support is related to high Extraversion (Watson & Hubbard, 1996). Ireland et al. (2006) conducted a study to explore the relationship between maladaptive personality traits (personality disorders; inflexible traits related to psychological distress) and coping style among male prisoners and found that these traits were related to both emotion-focused and avoidance-focused coping styles. These findings are consistent with research that has examined the coping styles of individuals with high levels of Machiavellianism. Birkás and colleagues (2016) found that Machiavellianism was negatively correlated with problem-focused coping and seeking social support and positively correlated with an emotion-focused coping process called positive reappraisal (efforts to create positive meaning out of the situation). In a later study, Birkás et al. (2018) found that individuals high in Machiavellianism were more likely to employ a fast-life strategy (Kaplan & Gangestad, 2005) when placed in distressing conditions, wherein there is a tendency to act in ways that yield immediate returns over delayed outcomes. This finding is consistent with Birkás and colleagues (2016) earlier research finding, where Machiavellianism was found to be negatively associated with more adaptive and planned problem-focused coping. Finally, Rim (1992) reported that undergraduate and graduate students, who were high in Machiavellianism, consciously suppress their thoughts as a type of coping to halt the contemplation of distressing thoughts. In sum, individuals who are high in Machiavellianism appear to employ a coping style wherein others are not seen as a support system and internal stratagems (reappraisal and suppression), that can be carried out independently, are used to cope with troubling thoughts and emotions.

Substance users' coping appears to overlap in a very general sense with that of individuals high in Machiavellianism in that they have been found to use cognitive appraisal to cope with distressing events. Past research indicates that substance users employ positive appraisal and make efforts to minimize the importance of negative experiences (Kaur, 2016). But in contrast to the coping style of individuals who are high in Machiavellianism outlined above, those who use substances have been found to show a wide range of both adaptive and maladaptive coping mechanisms, including wishful thinking, making efforts to escape or avoid their problems, and planful problem-solving (Kaur, 2016; Madden et al., 1995). Recent work suggests that those struggling from opiate or alcohol addictions employ a wide range of both emotion-focused and avoidance-focused coping strategies (Azizi et al., 2019; Opalach et al., 2016). In a large qualitative study conducted by Valtonen et al. (2006) with individuals in multiple addiction rehabilitation facilities, it was found that an overwhelming majority of substance users employed emotion-focused strategies to manage their distress in uncontrollable situations. Only a small portion of those interviewed employed problem-focused strategies or sought social support to mitigate the negative emotion associated with their hardships. Lastly, it should be pointed out that the act of using substances to elude uncomfortable feelings is an avoidant-focused strategy in and of itself.

The scientific community would benefit from additional research exploring the coping approaches of those high in Machiavellianism and other Dark Triad traits. To that end, given that a range of coping strategies have been observed to be part of the substance-using population's repertoire and a specific profile of coping mechanisms has been found to be utilized by individuals high in Machiavellianism, exploring the coping behaviours of substance users who are high in Machiavellianism and substance users who are low in Machiavellianism appears to be

a promising endeavour in order to determine the underlying difference between these two groups that have implications for treatment planning and delivery. Identifying the different coping mechanisms used by either group is important because once different coping skills are identified for each group, treatment could be tailored to increase adaptive coping behaviour to increase the chance of positive treatment outcomes. Past research suggests that increasing the act of seeking social support and problem-focused coping is associated with decreased drinking behaviour (Kupar et al., 2010). Intervention aimed at equipping either group with these coping skills may require different approaches. For example, a substance user found to have high levels of Machiavellianism, who is more prone to viewing others as threatening, may require a more intensive treatment plan in order for them to connect with others in a healthy way, compared to a substance user who has low levels of Machiavellian traits.

Readiness for Change

Motivation is understood as a mechanism underlying how and why individuals change their substance use behaviour (DiClemente et al., 2008). This concept broadly comprises one's concern or need for change, intention for change, the need to take responsibility for change, having adequate incentives for change, and sustaining behaviour changes that have been made (DiClemente et al., 2004; Miller & Rollnick, 2013). These motivational tasks have been described as the Stages of Change in the Trans-Theoretical Model of Behaviour Change (Prochaska & DiClemente, 1984). The model consists of five stages on a continuum, including pre-contemplation ("not ready"), contemplation ("getting ready"), preparation ("ready"), action ("current action"), and maintenance ("monitoring"). Substance users in the pre-contemplation stage do not intend to begin to engage action consistent with abstinent behaviour and could be unaware of the negative impact of substance use on their life. Users often underestimate the pros

of change and overestimate the cons of change during this stage. In the contemplation stage, individuals intend to begin abstaining from substances in the foreseeable future and have gained more awareness of the benefits of discontinuing their substance use. Notwithstanding, the cons of stopping to use often continue to be a powerful deterrent to abstain. Due to the clash of both significant pros and cons to substance use, one will experience ambivalence and will struggle to decide whether or not to use substances, which often delays the decision and action to abstain.

Those in the preparation stage are ready to make efforts to abstain from substances in the foreseeable future. In this stage, an individual may take small steps toward engaging in healthier behaviour, such as communicating to others their intention to abstain from substances. In the action stage, an individual has recently abstained from substances and is actively working to overcome their addiction. Activities carried out in this stage may include replacing drug use behaviour with sober activities and avoiding situations or others that remind of past substance use or encourages relapse. In the maintenance stage, the individual has continued to remain abstinent for a significant period and is vigilant of situations that may tempt the individual to revert back to substance-using behaviour. DiClemente et al. (1985) also noted the concept of relapse, which is not a stage of the model, but rather a potential event within the model, where substance use prompts a return from the action or maintenance stage to an earlier stage.

Greater readiness for change is typically associated with higher motivation, wherein an individual would be found to be farther along the continuum (Kushnir et al., 2016). In treatment, a client's stage of change has been found to be predictive of reductions in alcohol (Heather et al., 1993), tobacco (Cox et al., 2011), cocaine (McKay et al., 2013), heroin (Henderson et al., 2004), and gambling behaviour (Petry, 2005). Considerable work has been carried out to examine the relationship between substance use and readiness for change (e.g., Brick et al., 2018; Velicer et

al., 2007; Punjani et al., 2019; Rios et al., 2019; Robinson et al., 2012). But there are no investigations of the association between Machiavellianism and readiness for change in the peer-reviewed literature. With an untrusting attitude toward others, substance users who are high in Machiavellianism may exclusively rely on the mind-altering effects of substances to cope with distressing emotions. If so, substance users high in Machiavellianism may become entrenched in the pre-contemplative or contemplative stage of treatment because the cost of relinquishing their ability to cope with negative emotions via substance use may be unbearably high for them. Alternatively, substance users high in Machiavellianism may be highly motivated to change given their focus on achievement and success at any cost (Jones & Paulhus, 2009). In considering these two reasons that could explain Machiavellian level of readiness for change, it is apparent that the reason *why* an individual is motivated to change matters.

Self-Determination Theory (SDT; Deci & Ryan, 1985) posits that the kind of motivation one holds affects the extent to which an individual will engage in, and persist with, behaviours. SDT distinguishes between two types of motivation: autonomous or controlled. Autonomous motivation is defined as carrying out behaviours because they are consistent with intrinsic goals or interests. Individuals experience a sense of choice, a sense of competence, a sense of agency within one's environment, and a sense of satisfaction in engaging in behaviours that are autonomously motivated (Hagger et al., 2014). Those engaging in these self-determined behaviours are more likely to initiate and persist at the same, without external reinforcement. Conversely, controlled motivation is understood as engaging in actions for external reasons (e.g., to gain a reward, others' approval, or to avoid punishment). Accompanying these behaviours is a sense of obligation and pressure (Hagger et al., 2014). The behaviour will likely be halted should the associated external contingency be removed.

Past research examining motivation in the context of addiction treatment (Kennedy & Gregoire, 2009) found that those with autonomous motivation were more likely to be in the contemplation or action stage of change, rather than the pre-contemplative stage of change. In addition, those who endorsed a controlled form of motivation were more likely to be in the pre-contemplative stage. It is important to explore the presently unexamined relation between readiness for change and Machiavellianism and to determine whether substance users who are high in Machiavellianism differ in their treatment motivations, compared to substance users who are low in Machiavellianism.

Treatment Expectations

Clients' expectations of therapy have been acknowledged as an important factor of successful treatment (Constantino et al., 2011). Nock and Kazdin (2001) define expectations in this context as "...anticipatory beliefs that clients bring to treatment and can encompass beliefs about procedures, outcomes, therapists, or any other facet of the intervention and its delivery" (p. 155). There are two main expectancies in treatment, namely role expectancies and outcome expectancies (Dew & Bickman, 2005). Role expectancy refers to the behaviour that one is expected to demonstrate in a given role. For example, it might be assumed that a therapist will give advice in a therapeutic context. Outcome expectancy is understood to be the view that therapy will lead to change (Arnkoff et al., 2002). For instance, expecting that therapy will be useful, that a specific modality of treatment will help the client improve, or that the therapist specifically will help the client recover, are all outcome expectancies.

Research examining expectancy in therapy have focused on three types of therapeutic outcome, including client improvement, premature termination, and therapeutic alliance. Numerous studies suggest a positive relation between outcome expectancy and client

improvement (e.g., Sotsky et al., 2006), while the relation between role expectancy and client improvement has been studied far less and existing findings are inconclusive. The literature that examines treatment expectancy and premature termination implies that results are mixed (Dew & Bickman, 2005). Studies have found that holding very high expectations of therapy is related to either excellent attendance or early drop out (Nock & Kazdin, 2001; Otto & Moos, 1974). Another aspect of treatment expectation is the “correctness” of the expectation, or whether perceived progress matches client outcome expectations. Predictably, past work suggests that premature termination is related to “incorrect” client expectancies (Dew & Bickman, 2005). In regard to the therapeutic alliance, studies have consistently found that more positive outcome expectancies are associated with more positive relationships with their therapists (Gibbons et al., 2003; Meyer et al., 2002) and that positive role expectations are associated with positive client ratings of the alliance (Al-Darmarki & Kivilghan, 1993).

As in other therapies, holding more positive expectations about treatment outcome appears to be an asset for those struggling with substance abuse issues, though exploration of this relationship has primarily been carried out with alcohol users (de Carvalho Leite et al., 2011; Kadden & Litt, 2011; Kuusisto et al., 2011a). Kuusisto and colleagues (2011b) conducted a longitudinal study involving 327 outpatient substance users and found that higher positive expectations about treatment outcome was a predictor for higher percent of days abstinent at follow-up, compared to those with lower expectations. Substance users have also been found to possess a wide range of outcome and role expectations in regard to treatment aims, including abstinence, receiving emotional support from the therapist, support in discussing substance use problems with the therapist, gaining self-awareness, improving self-esteem, learning coping strategies to manage relapse, learning how to manage stress and fear, and learning how to

organize one's life in a practical way (Schneider et al., 2004). In treatment, substance users assess their personal efficacy expectations in relation to their desired changes and their expectations about treatment (Kuusisto et al., 2011a). Challenging this process are both positive and negative expectations revolving about the use of substances (Baldwin et al., 1993) and the consequences of consumption (e.g., alcohol will make the drinker more assertive; one may not be able to control oneself after alcohol consumption). These often clashing expectations influence whether one decides to abstain from substance use or what kind of treatment one may make efforts to pursue.

No empirical investigations in the peer-reviewed literature have explored the treatment expectations of High Mach substance users. The lack of search results underscore the need to examine the nature of this group's views of treatment. Based on the extant literature, the Machiavellian cynical and untrusting view of others and the world would likely foster the espousal of negative outcome and role expectations in treatment, which is associated with reduced client improvement, higher premature termination risk, and weak therapeutic alliance (Dew & Bickman, 2005). As with the aforementioned treatment factors, determining whether a substance user is high or low in Machiavellianism is important because of the possibility that High Mach treatment expectations of those high in Machiavellianism may vary significantly from those who are low in Machiavellianism. If substance users who are high in Machiavellianism harbor low expectations for treatment success, this issue would need to be accounted for in planning and providing intervention. In a practical context, the treating clinician or organization could implement a measure of treatment expectations through a screener or questionnaire during the treatment intake process or intermittently throughout treatment.

It is noteworthy that examining treatment expectations in non-clinical samples has been found to be a productive and worthwhile endeavor (Norberg et al., 2011). For example, using an undergraduate sample, Elchert and Gaasedeln (2016) found that adult attachment style predicted therapy expectations. Further, in conducting a series of studies with undergraduate students enrolled in introductory psychology courses, Seligman et al. (2009) found results that suggest that the general population may not expect the specific tasks typical of certain psychotherapeutic interventions. In both of these studies, the participants were therapy naïve/non-seeking. Though it is possible that individuals seeking therapy may have completed measures in these studies differently, it is noted that both previous experiences in therapy and one's level of exposure with mental illness have been found to not be significant predictors of treatment expectations (Stewart et al., 2014), bolstering the viability of investigating treatment expectations in a non-clinical sample for this dissertation project.

Mixed-method Approach

Though a handful of qualitative studies involving individuals with high levels of Machiavellianism have been carried out (e.g., Hutter et al., 2015; Zheng et al., 2017), no qualitative investigations in peer-reviewed literature have examined individuals with high Machiavellianism scores and any form of substance use. The decision to incorporate a qualitative component in the investigation of differences between substance users who are high in Machiavellianism, and substance users who are low in Machiavellianism, was made to collect rich data that would allow for a deeper and more meaningful interpretation of the explored phenomena (Teddlie & Tashakkori, 2003).

Adding a qualitative component allowed for a deeper exploration of the data, that would have been more difficult to conduct via quantitative research (Kazdin, 2017). Namely, the

quantitative analyses were focused on more general themes related to treatment or therapy (e.g., type of motivation endorsed for stopping to use substances), whereas the qualitative data encapsulated the nuances and details of an participants' experience or behavior. As another example, by asking open-ended questions related to coping strategies, the complexity of answers, provided by substance users high in Machiavellianism, were captured in a manner that was not acknowledged by the quantitative aspect of the dissertation. By examining Machiavellianism and substance use using a mixed-method approach, convergent data was obtained from both quantitative and qualitative components of the project, which provide greater assurance in its results. In addition, because Machiavellianism and substance use is a relatively underexplored area of research, it would be important to collect a data set that was rich in information, to increase the probably of finding information that would help generate new hypotheses or research questions.

CHAPTER II

Purpose of Study

The purpose of the dissertation project was three-fold. The study aimed to: 1) discern underlying differences between substance users who are high in Machiavellianism, and substance users who are low in Machiavellianism in an undergraduate sample in order to distinguish between these two outwardly consistent groups in the service of planning and provision of specific interventions; 2) investigate the types of motivation and readiness for change in substance users who are high on trait Machiavellianism; 3) investigate treatment expectations of individuals who have high levels of Machiavellianism. In addition, the study sought to verify the association between Machiavellianism and substance use and bolster the relatively small pool of studies devoted to this relation.

Hypotheses

In addition to the explanation of hypotheses below, hypotheses and their foundations are presented in Table 1 for the reader's convenience. Hypothesis numbers corresponding to its location in Table 1 are provided in parentheses throughout the following paragraphs. In consideration of the literature previously discussed, it was hypothesized that underlying differences between substance users high in Machiavellianism, and substance users who are low in Machiavellianism, would be found.

Hypothesis 1: Association between Machiavellianism and Substance Use

Based on the literature reviewed above which links Machiavellianism to the use of various substances, the first hypothesis is that a significant and positive association will be found between this set of dark triad traits and the use of drugs or alcohol, such that higher Machiavellian scores will be associated with higher scores of drug or alcohol use (Hypothesis 1).

Hypothesis 2: Attachment Style and Social Connectedness

A high Machiavellian profile in substance users was predicted to be identified by a dismissive-avoidant attachment (Hypothesis 2a) and of generally feeling less socially connected to others, compared to substance users who are low in Machiavellianism (Hypothesis 2b). A low Machiavellian substance user profile was predicted to include a predominantly fearful-avoidant attachment style (Hypothesis 2a).

Hypothesis 3: Coping Strategies

Whereas substance users with high levels of Machiavellianism were hypothesized to primarily use emotion-focused and associated cognitive coping strategies (Hypothesis 3), substance users with low levels of Machiavellianism were hypothesized to display a range of emotional-coping and avoidant strategies (Azizi et al., 2019; Opalach et al., 2016). Some research also suggests that substance users who are low in Machiavellianism are capable of seeking social support to manage their distress (Valtonen et al., 2006). This problem-focused coping strategy was hypothesized to emerge in the substance user profile of those low in Machiavellianism (but not in the high Machiavellian substance user profile).

Hypothesis 4: Motivation and Stage of Change

Because individuals high in Machiavellianism have been found to predominantly display dismissive-avoidant attachment patterns (Ináncsi et al., 2015), it was hypothesized that these individuals would experience significant ambivalence in relinquishing their substance use, and thus would report to be in the pre-contemplative stage of change (Hypothesis 4a). The quality of motivation for stopping to consume alcohol or other addictive substances will be characterized by controlled motivation in those high in Machiavellianism (Hypothesis 4b), given their goal-oriented nature toward external contingencies (Jones & Paulhus, 2009). On the other hand,

substance users who are low in Machiavellianism are predicted to display a range of stages of change positions, given that samples observed in past research have endorsed a varied distribution of stages (Hypothesis 4a). Motivation of substance users who are low in Machiavellianism will more likely be characterized by autonomous motivation rather than controlled motivation (Hypothesis 4b), due to the absence of Machiavellianism and more sincere self-interest to improve their lives (Schneider et al., 2004).

Hypothesis 5: Treatment Expectations

Finally, due to possessing a cynical and untrusting view of others (Christie & Geis, 1970), substance users who are high in Machiavellianism will have significantly lower role and outcome expectations for therapy compared to substance users who are low in Machiavellianism (Hypothesis 5). Based on past work that has found that substance users have positive expectancies about addiction treatment, such as eventually living an abstinent lifestyle and receiving emotional support in treatment (Schneider et al., 2004), substance users who are low in Machiavellianism are hypothesized to have significantly higher role and outcome expectations than substance users who are high in Machiavellianism (Hypothesis 5).

Table 1*Hypotheses Based on the Literature*

Hypothesis #	Hypothesis	Foundation	Analysis
Hypothesis 1: Machiavellianism and Substance Use	It is hypothesized that a significant and positive association will be found between Machiavellianism and substance use, such that higher Machiavellian scores will be associated with higher scores of specific drug or alcohol use.	Multiple studies (though small in number) have established this association with alcohol, cannabis, heroin, and cocaine (Chabrol et al., 2009; Krampen, 1980; Pugovkina & Popinako, 2014; Zentsova & Fedorov, 2013; Quednow et al., 2017).	Pearson Correlation
Hypothesis 2a: Attachment Style	Among those who report a high level of substance use, High and Low Mach substance users are hypothesized to have significantly different attachment styles. High Machs are hypothesized to be characterized by a dismissive avoidant attachment, whereas Low Machs are hypothesized to have a predominantly fearful-avoidant attachment style.	In a study involving 210 undergraduate students, Ináncsi et al. (2015) found that those high in Machiavellianism were characterized by a dismissive-avoidant attachment style. In a large review by Schindler (2019), it was reported that substance users were predominantly characterized by fearful-avoidant attachment.	Chi-Square Test
Hypothesis 2b: Social Connectedness	High Mach substance users are hypothesized to feel less socially connected to others relative to Low Mach substance users.	High Machs are characterized by a dismissive-avoidant attachment and often view others as only exploitable objects (Ináncsi et al., 2015). High Machs are cynical and untrusting of others (Christie & Geis, 1970).	MANCOVA and Discriminant Function Analysis

Hypothesis 3: Coping Style	High and Low Mach substance users are hypothesized to have significantly different coping styles. High Machs are hypothesized to employ emotion-focused or cognitive coping strategies, whereas Low Machs are hypothesized to display a range of emotional, avoidant, and problem-focused coping strategies.	In a study involving 200 undergraduate students, Birkás et al. (2016) found that High Machiavellianism was positively associated with positive reappraisal (type of emotion-focused coping). Past research (Azizi et al., 2019; Kaur et al., 2016; Opalach et al., 2016; Valtonen et al., 2006) has found that substance users employ a range of coping styles, including emotional, avoidant, and problem-focused coping strategies.	MANCOVA and Discriminant Function Analysis
Hypothesis 4a: Readiness for Change	High and Low Machs are hypothesized to differ in their position within the trans-theoretical model of behaviour change. High Machs are hypothesized to be in the pre-contemplative stage of change, whereas Low Machs are predicted to display a range of stages of change positions.	High Machs have been found to be characterized by dismissive-avoidant attachment styles (Ináncsi et al., 2015). Those with this style tend to abuse substances to cope with distress (Schindler, 2019). Thus, High Machs substance would be resistant to relinquish their favoured coping strategy. Past work has found that substance users have endorsed a varied distribution of stages of change (Kennedy & Gregoire, 2009).	Chi-Square Test
Hypothesis 4b: Readiness for Change	High and Low Machs are hypothesized to differ in the nature of their motivation for stopping consumption of alcohol or other addictive substances. High Machs are hypothesized to possess a controlled motivation for treatment, whereas Low Machs will possess an autonomous motivation for treatment.	High Machs are goal-oriented in nature, toward external contingencies (Jones & Paulhus, 2009). Low Machs have been found to possess sincere self-interest to improve their lives (Schneider et al., 2004).	MANCOVA and Discriminant Function Analysis

Hypothesis 5: Treatment Expectations	High and Low Mach substance users are hypothesized to differ in their respective expectations for treatment. Low Machs are predicted to have significantly higher positive outcome and role expectations than High Machs.	High Machs possess a cynical and untrusting view of others (Christie & Geis, 1970). Past work has found that substance users have positive expectancies about addiction treatment, such as eventually living an abstinent lifestyle and receiving emotional support in treatment (Schneider et al., 2004)	MANCOVA and Discriminant Function Analysis
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Chapter III

Method

Participants

Five hundred and five University of Windsor undergraduate students were included in the final analyses of the study, which included 160 individuals (32%) recruited via a mass email advertisement sent by the university IT department to all undergraduate students and 345 individuals (68%) recruited from the university's Psychology Participant Pool. An initial total sample of 828 surveys were collected via both recruitment strategies. Decisions resulting in the smaller final sample are noted in the below subsection "Quantitative Data Cleaning and Preparation" (p. 65).

In the final sample, participant age ranged from 17 to 50 years ($M_{age} = 22, SD = 4.51$). Most of the sample identified as female (82.6%). Demographic information including age, gender, ethnic background, and social status (during upbringing and current), is presented in Table 2. Frequency of substances used over the past year is provided in Table 3.

Table 2

Frequency of Demographic Information Reported by Substance User Sample

	Total sample $N = 505$	
	M	SD
Age	22.00	4.51
Frequency		
Gender		
Female	417	82.6
Male	77	15.2

Transgender	3	0.6
Non-Binary	7	1.4
Not reported	1	0.2
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Ethnicity		
White/Caucasian	370	73.3
Black/African/Caribbean	20	4.0
Chinese	5	1.0
Korean	2	0.4
South Asian	22	4.4
Latin American	12	2.4
Filipina/o	6	1.2
First Nations	6	1.2
European	3	0.6
Middle Eastern	23	4.6
Indian	2	0.4
Multi-Ethnic	30	5.9
Not reported	4	0.8
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Social Status (Growing Up)		
Lower Class	44	8.7
Lower Middle Class	114	22.6
Middle Class	235	46.5
Upper Middle Class	105	20.8
Upper Class	7	1.4
<hr/>		
Social Status (Current)		
Lower Class	42	8.3
Lower Middle Class	140	27.7
Middle Class	219	43.4
Upper Middle Class	97	19.2
Upper Class	7	1.4
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Table 3*Frequency of Reported Substances Used Over Past Year by Sample*

	Total sample <i>N</i> = 505	
	Frequency	Percent (%)
Alcohol		
Never	12	2.4
Less than 12 times	66	13.1
Once a month	74	14.7
2-3 times a month	159	31.5
1-2 days a week	131	25.9
3-4 days a week	47	9.3
5-6 days a week	14	2.8
Everyday	2	0.4
Cannabis		
Never	54	10.7
Less than 12 times	127	25.1
Once a month	45	8.9
2-3 times a month	58	11.5
1-2 days a week	40	7.9
3-4 days a week	49	9.7
5-6 days a week	45	8.9
Everyday	87	17.2
Cocaine		
Never	429	85.0
Less than 12 times	54	10.7
Once a month	8	1.6
2-3 times a month	10	2.0
1-2 days a week	3	0.6

3-4 days a week	1	0.2
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Crack Cocaine		
Never	505	100.0
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Methamphetamine		
Never	502	99.4
Less than 12 times	2	0.4
2-3 times a month	1	0.2
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Heroin		
Never	504	99.8
Less than 12 times	1	0.2
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Other Opioids		
Never	470	93.1
Less than 12 times	25	5
2-3 times a month	7	1.4
1-2 days a week	1	0.2
5-6 days a week	1	0.2
Everyday	1	0.2
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Hallucinogens/Psychedelics		
Never	404	80.0
Less than 12 times	90	17.8
Once a month	5	1.0
2-3 times a month	4	0.8
1-2 days a week	2	0.4
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MDMA/Ecstasy		
Never	446	88.3
Less than 12 times	57	11.3
Once a month	2	0.4
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Sedatives/Hypnotics/Tranquilizers		
Never	470	93.1

Less than 12 times	18	3.6
Once a month	1	0.2
2-3 times a month	5	1.0
1-2 days a week	5	1.0
3-4 days a week	2	0.4
5-6 days a week	1	0.2
Everyday	3	0.6
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Non-medical Prescription Drug use		
Never	392	77.6
Less than 12 times	89	17.6
Once a month	5	1.0
2-3 times a month	10	2.0
1-2 days a week	6	1.2
3-4 days a week	2	0.4
7 days a week	1	0.2
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Recruitment

In efforts to obtain a large sample, participants were recruited using a mass email advertisement sent via the University of Windsor Information Technology (IT) department and also using the University of Windsor Psychology Participant Pool. With the exception of being able to read and write in English (based on self-report), no specific exclusion criteria was applied to either sample. It is noted that recruitment was planned to span over multiple semesters using both recruitment strategies. However, due to the online learning protocols initiated in response to the COVID-19 pandemic, there was a saturation of emails sent to undergraduate students over the course of the dissertation data collection. Accordingly, the IT department restricted the amount of mass emails sent to undergraduate student population, leading the principal

investigator to have permission from the university administration to recruit participants via email advertisement only for the initial semester of data collection.

Mass Email Advertisement

Recruitment via email involved advertising the study to the undergraduate student population. The principal investigator provided an email advertisement to the University of Windsor IT department, which was distributed by the IT department at the beginning of the Fall 2020 semester (Appendix A). All undergraduate students received an email that advertised the study and provided a link to complete the study online should students be interested. The study was advertised as an investigation of “Specific Personality Traits and Substance Use.” It was emphasized that there would be no penalty should students prefer to not participate in the study. Participants were prompted to provide their uwindsor.ca email address as part of the online survey. This protocol enabled the potential identification of participants who initially participated in the study through the email advertisement, who then could be identified again if participation took place via the participant pool in error. Notwithstanding, duplicate emails were not found among participants.

An additional reason for collecting students’ uwindsor.ca email was that it allowed for the entering of this information into a draw for one of twenty \$50 (Canadian) Amazon.ca gift cards. These gift cards were purchased using funding from the principal investigator’s former and late supervisor, who generously provided his surviving students with modest funds, to be used in future research. Subsequent to completion of email advertisement recruitment (at the end of the Fall 2020 semester), all participant email addresses were assigned a number. These numerical values were input into a random number generator program and a request to generate 20 numbers was executed. The 20 participants, who provided email addresses that corresponded

to the 20 numbers generated, were subsequently awarded one of the twenty \$50 (Canadian) Amazon.ca gift cards via email.

Psychology Participant Pool

The second recruitment pathway involved recruitment of undergraduate student participants via an advertisement posted to the University of Windsor Psychology Participant Pool (Appendix B). Recruitment began during the Fall 2020 semester and spanned four semesters, through the Fall 2021 semester. The Psychology Participant Pool allows researchers to advertise their studies based on screening criteria. To increase the probability of recruiting substance-using participants, the four questions that comprise the CAGE-AID (Brown & Rounds, 1995) were included in the participant pool screening questions. The four questions included: 1) Have you ever felt that you ought to cut down on your drinking or drug use?; 2) Have people annoyed you by criticizing your drinking or drug use?; 3) Have you ever felt bad or guilty about your drinking or drug use?; and 4) Have you ever had a drink or used drugs first thing in the morning to steady your nerves or get rid of a hangover? Questions are answered in a “yes” or “no” option format. The CAGE-AID is a widely used tool for screening for alcohol and drug use conjointly (Brown & Rounds, 1995). Students gained access to the study via study advertisement if at least one CAGE-AID response was answered affirmatively. The CAGE-AID screener was employed to limit the number of students who participate in the study, who did not have a substance-related problem. Participants recruited through this pathway received appropriate course credit from the participant pool as compensation for their participation.

Measures

To permit screening of the data for uniform and random response patterns as well as participant inattention, four embedded validity check items were administered as part of the

questionnaires in the online survey. These validity check items were phrased in the same way as items in the questionnaires in which they appear and have the same response options. An example is: “16. Please select response option six for this item,” with a Likert scale of 1 to 7, inserted in the Treatment Self-Regulation Questionnaire (TSRQ; Levesque et al., 2007).

Demographic Form

This form included demographic questions related to age, gender, race/ethnicity, socioeconomic status, social status, and frequency of past year use for various drugs (Appendix C). Past drug use was measured using an adapted version of the Drug Use Frequency measure (DUF; O’Farrel et al., 2003). Respondents were asked: “How frequently have you consumed the following substances over the past 12 months?”. Each substance use item is answered on an eight-point Likert scale ranging from zero (Never) to seven (Every Day). The DUF is commonly adapted to measure the frequency of use of various substances (e.g., Dillon et al., 2011; Pearson et al., 2019; Spinella, 2005). Adaptations usually involve the inclusion of additional substances in the form or changing the time period of substance use (e.g., past 12 months; past six months; past 3 months). The adaptation of the DUF for this project involved inclusion of additional substances (e.g., MDMA; non-medical abuse of prescription drugs), as well as altering the second option on the Likert-scale from “several times” to “less than 12 times” in order to make the option more clear among other options on the scale. This kind of alteration has been carried out in past work using the DUF (Reeves et al., 2014). Prompts are given for the following substances: 1) Alcohol; 2) Cannabis; 3) Cocaine; 4) Crack Cocaine; 5) Methamphetamine; 6) Heroin 7) Other Opioids; 8) Hallucinogens/Psychedelics; 9) MDMA/Ecstasy; 10); Sedatives, Hypnotics, and Tranquilizers; and 11) Non-medical Use of Prescription Drugs. Specific examples are provided for each type of substance (e.g., “Adderall” for Non-medical Use of

Prescription Drugs). The DUF has established concurrent validity with the Timeline Followback measure (Sobell & Sobell, 1996) and with collateral informants (O'Farrel et al., 2003).

MACH-IV SCALE (Christie & Geis, 1970)

Machiavellianism was assessed using this 20-item self-report scale, which measures the use of deceit in interpersonal relationships, cynical attitude to others, and lack of concern for conventional morality (Appendix D). Items are answered on a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Ten items represent Mach attitudes (e.g., “*It is wise to flatter important people*”) and 10 items represent anti-Mach attitudes (e.g., “*Most people are basically good and kind*”). As previously mentioned, some studies have used a median split to classify scores as High or Low Mach (e.g., Shepperd & Socherman, 1997), while other studies (e.g., Gunnthorsdottir et al., 2002) have used the scoring system proposed by Christie (1970). A value of 20 is added to a total MACH-IV score to create a neutral score of 100, with a lowest possible MACH-IV score of 40 and the highest possible Mach score of 160 (Christie, 1970). For the purposes of this dissertation project, the undergraduate sample was divided into High and Low Mach groups based on the cut-off of Machiavellian scores at the 50th percentile. Acceptable internal consistency has been reported for data from MACH-IV ($\alpha = .76$; Jones & Paulhus, 2011). Data from the current study were found to have acceptable reliability ($\alpha = .75$).

Levenson Self-Report Psychopathy Scale (LSRP; Levenson et al., 1995)

Psychopathy was measured using this 26-item self-report scale, which includes scales of egocentricity, callousness, and anti-sociality (Appendix E). Though not directly related to the proposed study, psychopathy has been found to correlate significantly with Machiavellianism (Barlett, 2016). Therefore, this construct was measured in order to control for psychopathy as a potential confound. Items are answered on a four-point Likert scale ranging from one (strongly

disagree) to four (strongly agree), with higher scores indicating higher levels of psychopathy.

Previous studies have found adequate reliability ranging from .63 to .82 (Levenson et al., 1995).

Data from the current study were found to have good reliability ($\alpha = .83$).

Brief-Pathological Narcissism Inventory (B-PNI; Schoenleber et al., 2015)

Narcissism will be measured using this 28-item self-report scale, which includes scales of exploitativeness, self-sacrificing self-enhancement, grandiose fantasy, contingent self-esteem, hiding the self, devaluing, and entitlement range (Appendix F). Though not directly related to the proposed study, narcissism, like psychopathy, has been found to moderately correlate with Machiavellianism (Paulhus, 2014). Therefore, this construct was measured in order to control for narcissism as a potential confound. Items are answered on a six-point Likert scale ranging from zero (not like me) to five (very much like me), with higher scores indicating higher levels of pathological narcissism. The inventory has been found to have good reliability ranging from .71 to .93 across subscales (Schoenleber et al., 2015). Data from the current study were found to have excellent reliability ($\alpha = .90$).

Drug Use Disorder Identification Test (DUDIT; Berman et al., 2005)

Drug use will be measured using this 11-item test, which measures drug-related problems in terms of hazardous or harmful use of substance dependence (Appendix G). This measure was used to verify the level of substance use problems in participants. Further, because substance use has been found to significantly correlate with Machiavellianism (Zentsova & Fedorov, 2013), substance use was also measured with this test in order to control for this variable and ensure the amount of variance accounted for by Machiavellianism was observed. Items are answered on a five-point Likert scale ranging from one (Never) to five (Daily/Almost Daily), with higher scores indicating higher levels of substance-related problems. A maximum score on the DUDIT is 44,

with a cut-off of six for men and two for women being indicative of substance-related problems. A score of 25 or more is indicative of a high probability of dependence on one or more drugs. The DUDIT has been found to have good reliability ($\alpha = .80$; Berman et al., 2005). Data from the current study were found to have good reliability ($\alpha = .86$).

Alcohol Use Disorder Identification Test (AUDIT; Babor et al., 1992)

The AUDIT is a 10-item self-report questionnaire that assesses alcohol consumption, drinking patterns, and alcohol related issues (Appendix H). Like the DUDIT, this measure was used to verify the level of substance use problems in participants. Further, because substance use has been found to significantly correlate with Machiavellianism (Zentsova & Fedorov, 2013), substance use was also measured with this test to control for this variable and ensure the amount of variance accounted for by Machiavellianism was observed. Items are answered on five-point Likert scale, ranging from zero (*Never*) to four (*Daily or almost daily*). Scores range from zero to 40 with a score of eight or higher suggesting harmful alcohol use. The AUDIT has been found to have good reliability in prior work ($\alpha = .82$; Pillersdorf & Scoboria, 2019). Data from the current study were found to have good reliability ($\alpha = .81$).

Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991)

The RQ is a four-item questionnaire designed to measure adult attachment style (Appendix I). It consists of four paragraphs that each describes one of the four attachment style patterns. Responders indicate how well each paragraph applies to them on a seven-point Likert scale, ranging from one (It does not describe me at all) to seven (It very much describes me). Continuous scores of the four patterns provide a profile of an individual's attachment feelings and behaviour. The RQ has been found to possess good test-retest reliability over both four-month (Kirkpatrick & Hazen, 1994) and eight-month (Scharfe & Bartholomew, 1994) periods

and to possess alphas ranging from .87 to .95 in prior work (Bartholomew & Horowitz, 1991; Ligiéro & Gelso, 2002).

Social Connectedness Scale – Revised (SCS-R; Lee et al., 2001)

The SCS-R is 20-item self-report form used to assess social connectedness within one's social networks (Appendix J). The SCS-R measures an individual's perception of self in relation to the social environment. Ten items query about positive perceptions (e.g., "*I find myself actively involved in people's lives*") and 10 items query about negative perception (e.g., "*Even among my friends, there is no sense of brother/sisterhood*"). The items are answered on a six-point Likert scale, ranging from one (Strongly Disagree) to six (Strongly Agree). Higher scores are indicative of higher levels of social connectedness. The SCS-R has been found to have strong reliability ($\alpha = .92$; Lee et al., 2001). Data from the current study were found to have excellent reliability ($\alpha = .93$).

COPE Inventory (Carver et al., 1989)

This questionnaire is a 60-item self-report measure that assesses the different coping strategies that individuals use in response to stress (Appendix K). The measure includes three scales, including a problem-focused coping scale, an emotion-focused coping scale, and a "less useful" scale, which captures aspects of avoidant-coping (e.g., physical disengagement; mental disengagement; denial). The developers of the COPE Inventory termed the scale "less useful" as it contained items that measured less adaptive strategies, that would less often be associated with positive outcomes for the individual employing the strategy (e.g., avoidance). Items are answered on a four-point Likert scale, ranging from one (I don't do this at all) to four (I do this a great deal). Higher scores on each dimension indicate greater use of a particular coping strategy. The form takes approximately 10 minutes to administer. The COPE Inventory is widely used, is well

established, and possesses good psychometric properties (Carver et al., 1989; Litman, 2006). Data from the current study were found to have good reliability, with a Cronbach's alpha of .83 for the scale. With regard to the subscales, data from the current study were found to have acceptable to good reliability with a Cronbach's alpha of .88 for the problem-focused coping subscale, .77 for the emotion-focused coping subscale, and .74 for the avoidant-coping subscale.

Readiness to Change Questionnaire (RCQ; Heather & Rollnick, 1993)

Participants' stage of change was measured by an adapted version of the RCQ (Appendix L). The original RCQ inquired only about alcohol. The adapted version modified questions to inquire about general substance use, so that participants could consider their readiness to change their alcohol or drug use (e.g., "*My drinking is sometimes a problem*" → "*My substance use is sometimes a problem*"). This 12-item questionnaire assesses the stage in which one is positioned as they attempt to resolve a substance-related (either alcohol or drug) problem. Items are answered on a five-point Likert scale ranging from one (Strongly Disagree) to five (Strongly Agree). An example of an item from this scale is "*I am trying to use substances less than I used to.*" Items pertaining to each stage of change scale are summed. The designation of stage of change is then identified by the highest value among the stage of change scale scores. Each Stage of Change scale has been found to have adequate to good reliability, with alphas ranging from .73 to .85 in prior work (Heather & Rollnick, 1993). Alphas from the current study were found to be consistent with prior work, ranging from .67 to .84.

Treatment Self-Regulation Questionnaire (TSRQ; Levesque et al., 2007)

The TSRQ is a 15-item self-report measure that assesses an individual's quality of motivation for continuing or stopping to use addictive substances (Appendix M). It contains two subscales: autonomous motivation/self-regulation and controlled motivation/self-regulation. The

questionnaire was adapted for the purposes of this study to examine motivation in the context of general substance use. This tool has been adapted for a wide range of behavioural change issues, including dieting and exercise. A prompt is given at the beginning of the measure: “The reason I would not use addictive substances is...” The subsequent items are answered on a seven-point Likert scale, ranging from one (Not True at All) to seven (Very True). An example of an item from this scale is “*Because I feel pressure from others to not use substances.*” Items are averaged for each subscale to create an index for each type of motivation. Each subscale has been found to have adequate to good reliability, with alphas ranging from .73 to .95 in prior work (Levesque et al., 2007). Data from the current study were found to have acceptable reliability, with a Cronbach’s alpha of .76 for the scale. With regard to the subscales, data from the current study were found to have good reliability with a Cronbach’s alpha of .87 for the autonomous motivation subscale and .81 for the controlled motivation subscale.

Milwaukee Psychotherapy Expectations Questionnaire (MPEQ; Norberg et al., 2011)

Treatment expectations will be measured using an adapted version of the MPEQ (Appendix N). This questionnaire is a thirteen-item measure that is divided into two subscales, assessing role expectations (e.g., “*I will be able to express my true thoughts and feelings*”) and outcome expectations (e.g., “*Therapy will provide me with an increased level of self-respect*”). Items are answered on a 10-point scale ranging from one (Not at All) to 10 (Very much so). Subscale scores are calculated by summing each item of the subscale and then dividing by the number of items on the subscale. The total expectation score is the sum of both subscale scores. Higher scores indicate higher levels of positive expectancy. Both subscales have been found to have good reliability with alphas ranging from .82 to .91 in past work (Norberg et al., 2011). Data from the current study were found to have excellent reliability, with a Cronbach’s alpha of

.93 for the scale. With regard to the subscales, data from the current study were found to have excellent reliability with a Cronbach's alpha of .90 for the outcome expectations subscale and .91 for the role expectations subscale.

Short-answer Questionnaire

Participants were prompted to answer 14 open-ended short answer questions as an exploratory procedure to gain insight into differences in High and Low Mach attitudes, beliefs, and behaviours related to substance use. Prior to being prompted to answer the questions, participants viewed a short instructional statement: "The following questions are about your drinking or drug use. Please respond in as much detail as possible so that someone who is not present or who is unfamiliar with your substance use would understand your experience." The following qualitative questions were asked:

- 1) Describe your drinking or drug use in as much detail as you feel comfortable.
- 2) When (in what situations) do you drink and/or use your drug of choice? Please describe all that you can think of.
- 3) Do you drink or use drug(s) alone or do you use socially? What are the reasons for this preference?
- 4) People have different motivations for why they drink or use drugs, can you tell me yours?
- 5) What do you like best about drinking or using your drug of choice?
- 6) Does anything concern you about your drinking or using your drug of choice?
- 7) How do you feel, or what thoughts do you have, *before* drinking or before using your drug of choice? Please describe these thoughts or feelings.

- 8) How do you feel, or what thoughts do you have, *while* drinking or while using your drug of choice? Please describe these thoughts or feelings.
- 9) How do you feel, or what thoughts do you have, *after* drinking or after using your drug of choice? Please describe these thoughts or feelings.
- 10) Does your drinking or drug use have an effect on any of your important relationships?
Please describe these effects.
- 11) Do any important people in your life have opinions about your drinking or your drug use? What are these opinions and what do you think about them?
- 12) Has your drinking or use of the drug of your choice caused you problems in your life?
Please describe any problems.
- 13) If your drinking or use of the drug of your choice has caused you problems in your life, have you considered treatment for this issue? Why or why not?
- 14) If alcohol or your drug of choice is not available, what do you do instead?

Question 1 was asked to elicit responses that will describe a participant's drinking or drug use behaviour. Questions 2 and 3 sought to collect data about the context in which substance use occurs. Questions 4 to 9 were chosen as various prompts to record the numerous reasons for substance use among High and Low Mach participants. Past research has found that substances (including alcohol) are consumed for various reasons, including to increase energy, to increase enjoyment, to relax, to distract oneself from one's problems, to help manage the effects from other drugs, to decrease social inhibitions, to relieve boredom, to alter one's mood, to increase confidence, to facilitate work, or to change one's perspective or perception (Boys et al., 1999; 2001; Tkalić et al., 2013). Given the wide range of reasons for substance use previously found, multiple questions posed in different ways were warranted to maximize opportunity to capture

participants' full experience. Questions 10 and 11 were included to explore the social dynamics that High and Low Mach participants may experience in the context of their substance use. Questions 12 and 13 provided an opportunity for participants to offer their thoughts about problems and substance use treatment. Question 14 allowed participants to provide a description of activities engaged in when they do not access substances, including alternative coping strategies. The question is worded to allow participants to also admit to using other substances if their usual/preferred substance is unavailable.

Procedure

Participants recruited via either of the two recruitment pathways described above gained access to the study URL online via the University of Windsor's Qualtrics platform. Participants first view the informed consent document (Appendix O for Email Advertisement Consent; Appendix P for Participant Pool Consent). It was highlighted that students were welcome to email the principal investigator and/or his supervisor with any questions about the study should they wish to do so before clicking to indicate their consent to participate or declining to participate by either clicking that option or simply closing their browser. The final page of the consent form contained supports on campus and in the local community for any participants who may have experienced difficulties as a result of participation or who may wish to seek help for substance use issues. Participants were prompted to print out the consent form. Participants then completed the battery of self-report measure and short-answer questionnaire described above.

Participants completed the demographic form. After this form, the rest of each participant's survey questionnaires were randomized to control for order effects. Subsequently, the short-answer questionnaire was completed. Pilot work within the principal investigator's supervisor's research lab was conducted to ensure that estimates of the time required to

participate was based on actual practice. Upon completion of the battery, participants viewed a ‘thank you’ page with contact details for the principal investigator and his supervisor again along with the same list of supports given as the final page of the consent form. Participants were then taken to a separate landing page to enter their name and email for the purposes of being entered into the draw or to receive their Pool participation credit points (one credit for the hour).

Quantitative Data Cleaning and Preparation

Data Screening

A total of 828 surveys were received via both recruitment strategies. All participant data were screened in order to assess for integrity and completeness of responses. Retention of data was determined on an individual case basis. Completion of measures, response pattern, and the passing or failing of the embedded validity checks, were factors considered in this process. In addition, participant cases were also excluded if AUDIT or DUDIT scores were below the respective cut-offs for problematic alcohol or drug related problems.

Problematic Substance User. A total of 296 participants were excluded due to scoring below the threshold deemed as harmful or as likely having substance-related problems. As above, these score thresholds included scoring an eight on the AUDIT or scoring a two for females and scoring a six for males, on the DUDIT.

Survey Completion. Upon inspection of the data set, 10 participants did not complete 50% or more of the survey and thus were excluded from the final sample.

Response Pattern. An additional 17 participants were excluded due to having failed more than one embedded validity check. A portion of these participants were noted to respond to survey items in an inattentive manner (e.g., responding with the second likert scale option for an entire survey). Among these participants, qualitative responses were either not provided or little

information was offered (e.g., providing one-word answers; providing responses that did not answer the prompt meaningfully).

Missing Data

Subsequent to the above screening procedures, data were analyzed to determine the amount of missing data. A review of all variables determined that 65% of variables were found to have at least one missing response. The percentage of missing responses across all measures ranged from 0.0% to 1.6% for individual items, and overall, 0.4% of missing values for the entire data set. Little's (1988) Missing Completely at Random (MCAR) test was conducted and was not significant. Expectation maximization (EM) was then used to estimate missing values at the item level for each measure to calculate total scores. The decision to employ EM was made based on the recommendation of Tabachnik and Fidell (2013). These authors state that EM is permissible when less than 5% of the data are missing and when the data are missing at random.

Outliers

To determine whether outliers were present in the data, boxplots and histograms for all study variables were inspected. The number of outliers ranged from zero to seven across all variables. All outliers were determined to be in proximity to the distribution of data and no outlier case was found to be present across the majority of variables. Given these findings, all outliers were retained in the data set.

Qualitative Coding

Coding Team

Coding of qualitative data was undertaken by the principal investigator and four research assistants. Coding took place so that answers to survey questions could be content analyzed (Neuendorf, 2002). The research assistants were members of the research lab to which the

principal investigator belonged and were recruited by the director of the lab (who is also the principal investigator's dissertation supervisor) to assist in this coding task. Two assistant coders were graduate students, and the two other coders were undergraduate students who were seeking to gain experience in coding qualitative data.

Both graduate student coders each coded 75 cases independently and the two undergraduate student coders each coded 30 cases independently. The principal investigator coded 256 cases independently. As part of a measure of inter-rater reliability (to be discussed below) all members of the coding team also individually coded a selection of the same 60 cases.

Training

Prior to the commencement of coding, the four assistant coders attended a lab meeting where the principal investigator delivered a presentation on conducting a content analysis. A definition of content analysis was provided, and the methodological steps involved in conducting a content analysis were outlined. Key concepts such as meaning units, codes, and categories/themes were also reviewed. In addition, the lab was presented with brief excerpts of already collected qualitative data and coding practice took place as a group. The exercise allowed the research assistants to begin to practice coding for the content analysis. No issues in assistant answers were noted during this exercise.

Subsequently, the principal investigator held individual virtual orientation meetings with each of the four coding assistants. During these meetings, the procedure for coding was reviewed. It was explained that cases would be coded in the Microsoft/Mac Word program, using the highlight and comment functions. The principal investigator guided each assistant in coding a randomly chosen participant case during the individual orientation meetings. No concerns were noted during these practice sessions. The subsequent stage of the orientation involved assistant

coders being encouraged to maintain a brief diary of their coding work, where they could record their thoughts and feelings that came up over the course of weekly coding, which could be shared, should the research assistant wish to, in later supervision sessions. The encouragement to record thoughts and feelings in a diary over the course of coding was implemented to monitor assistant well-being as the content of coding material contained serious and potentially triggering themes (e.g., accounts of self-harm; serious mental health concerns; substance use).

Each coder was then provided five randomly selected participant cases to code on their own as additional coding practice. Assistants agreed to complete these tasks over the course of one week. Upon completion, each coder met virtually with the principal investigator to review the coding practice, which involved comparing the assistant's coding to the principal investigator's coding and discussing any differences between coders' work. It was highlighted to each assistant that their reasoning for their chosen codes was equally valid to that of the principal investigator. In most cases, the principal investigator's coding and assistants' coding were nearly identical. However, two issues emerged among assistant coding (though both issues occurred rarely). The first issue observed was that assistants coded ambiguous responses as positive. For example, coding the response, "Fine" as a positive or pleasurable. The principal investigator explained that the coding team could not code these types of answers due to ambiguity and due to the importance of avoiding making assumptions about the participants' experiences. The second issue observed was that assistants coded some reported experience of emotion as "sad" or "depressed", when these units of data would be more appropriate to designate as their own code. For example, the reported experiences of "guilt" or "regret" was, at times, coded as "depressed." Feedback provided to assistants to address this issue was that these reported emotions should be marked as independent codes.

The process of practicing to code five randomly selected cases, and subsequently meeting with the principal investigator for review, occurred three times, over three consecutive weeks. Practicing and receiving feedback on coding this number of times was decided to ensure that assistants were given the opportunity to adequately practice and improve their coding skills, before beginning to formally code participant cases for the content analysis. It was noted that the four coding assistants were responsive to the feedback provided related to the issues discussed above. During the third round of review, the principal investigator noted no coding discrepancies, including related to the issues described above. No concerns about difficulties arising when coding the qualitative data were raised by the research assistants during this training period.

At the conclusion of the third virtual review meeting for practice coding, assistants agreed to formally code five (undergraduate assistants) or 10 (graduate assistants) cases per week until coding was complete. No concerns about difficulties arising when coding the qualitative data were raised by the research assistants during the coding period. All assistant coders continued to meet individually on a weekly basis with the principal investigator (via phone or Zoom) to review potential coding issues. Meeting times ranged from a full hour of reviewing coding (which occurred regularly during the early weeks of coding) to a five-minute check-in where any coding issues were briefly discussed (which was characteristic of meetings toward the final weeks of coding), to eventually not holding meetings. Meetings were not held in the final weeks of coding due to the coding assistants not requiring feedback on their work and due to the principal investigator concluding that no meeting was necessary subsequent to reviewing assistants' work during each of the final weeks of coding. Assistants were regularly asked if they believed that any reactions to reading the data were impacting their coding work. Assistants

consistently re-affirmed that no difficulties had arisen with the coding work. Regular group meetings were deemed unnecessary by the principal investigator and assistants, given the consistent occurrence of individual meetings between the principal investigator and each coding assistant.

Codebook

Following the guidelines of Glaser (1992), codes were allowed to emerge from the written accounts of participants, rather than from pre-existing research. The principal investigator compared all assistants' coding made throughout the three rounds of coding practice and created a preliminary codebook. This codebook was composed of distinct themes (e.g., "motivation for substance use") and codes related to each theme (e.g., "cope with anxiety"). The majority of codes incorporated into the preliminary codebook were independently identified by all coders, which suggested that the process of initial code selection was executed reliably. The principal investigator and four assistants familiarized themselves with this codebook before formal coding took place. Codes contained in this version of the codebook were used in the initial period of formal coding. However, the process of formalizing the codebook occurred iteratively. During the initial weeks of formal coding, the principal investigator and some coding assistants determined that some additional codes applied to the data set. For example, qualitative data related to using substances to view or consider issues or experiences from a different perspective (coded as to be "more open-minded") was not initially observed in the randomly selected cases used for coding practice. Furthermore, some codes were determined to be better accounted for by including them within other code labels. For example, an initial code labeled as "remain sober" was included in the coding process. However, as all coders became more familiar with the data set, it was determined that this code was synonymous with the code "adjust

naturally to not using” and so “remain sober” coded data was merged with the “adjust naturally to not using” code and was then counted as relating to that code in future coding. The principal investigator incorporated the new applicable codes into the codebook, culminating in an updated codebook (Appendix Q), which was referred to when coding the entire qualitative data set. Before proceeding to code new cases, all coders reviewed previously coded cases using the updated codebook to check if new codes could be applied. Coding work was updated in instances where new codes appropriately applied.

Analytic Procedure

Qualitative data were coded in order to conduct a content analysis. This method involves reducing text material into manageable units that can then be classified (according to their meaning) into quantifiable content categories and examined for patterns (Neuendorf, 2002). Strengths of content analysis include capability of discerning trends in individuals or groups, it is widely used and understood, and is easily replicable (Durliau et al., 2007; Vitouladiti, 2014). A significant weakness of content analysis is that analysis is limited by the material available (Durliau et al., 2007). Relatedly, this type of analysis may describe only observed patterns, without elucidating underlying mechanisms or motives for the observed pattern (Durliau et al., 2007). By using both quantitative methods and content analysis in the investigation of differences between individuals found to be high and low in Machiavellianism, an effort was made to reveal what differences exist and why those difference exist.

Following the guidelines of Erlingsson and Brysiewicz (2017), the entire data set was read by the principal investigator multiple times in order to become familiar with the data and gain a general understanding of participants’ experience. Coding assistants read the entire set of participant data that was assigned to them for coding. During these readings, initial impressions

and ideas were documented. Examples of documented initial impressions can be viewed in Table 4. Subsequently, the text was divided up into “meaning units”, wherein the smallest meaningful segment of text was considered the unit of analysis. As others have done (e.g., Grayman, 2009), and due to the fact that descriptions of behaviours, attitudes, and situations, were expected to be observed in relation to participants’ reporting of substance use, meaning units were designated as phrases within a sentence (or one word in instances where this amount of text was provided), rather than sentences or paragraphs. For example, the sentence “I use as a coping mechanism as I suffer from anxiety”, may be broken down into the meaning units “use as a coping mechanism” and “anxiety.”

The next step involved formulating codes that were descriptive labels for the meaning units (Erlingsson & Brysiewicz, 2017). This code labeling sought to concisely describe the meaning units and facilitate the identification of connections between meaning units. It is noted that because of the limited pool of prior research that examined the relation between Machiavellianism and substance use, initial codes were allowed to emerge from the data rather than from pre-existing categories. Building on the aforementioned example of meaning units, an appropriate code name developed for these meaning units was the designation “cope with anxiety.”

In the next phase of the content analysis, more formal themes (also called categories) were created (Erlingsson & Brysiewicz, 2017). This was accomplished by comparing codes and evaluating them to determine which codes “belong” together. Stated in another way, themes were made to consist of codes that appeared to be related to the same issue. Referring back to the previously used example, the code “cope anxiety” appeared consistent under the formal theme of

“motivation for substance use.” Some other examples of codes that fell under this theme included, “for sleep aid”, and “focus.” Qualitative data were organized using Microsoft Excel.

All unit codes were then input into an SPSS-Version 27 database. Each code was designated as its own variable. If the code was endorsed (e.g., a participant’s account indicated that they engage in behaviour consistent with using substances to cope with anxiety), the code was labeled with a “1”, whereas if no mention of that variable was found within a participant’s account, the non-endorsed code was labeled with a “0.” The SPSS database was created to compute and report the frequencies of endorsed themes and to use the frequencies of endorsed themes between high and low Mach substance users to make comparisons.

Table 4

Examples of Initial Impressions by Coders

Coder Initial Impression Example 1	“There are evidently individuals who appear to have problems with their usage and others who use responsibly. Even those who use somewhat responsibly appear to have issues as well – just not as severely.”
Coder Initial Impression Example 2	“I am impressed with how detailed some of the answers are and how willing individuals are to share their stories. I understand that they are anonymous but some of the answers were so greatly detailed.”
Coder Initial Impression Example 3	“Overall, there are a wide range of participants in this set of codes. Some who use responsibly, some who do not. Some realize that there is no issue, some seem to have an issue and yet do not recognize it.”
Coder Initial Impression Example 4	“Alcohol and cannabis seem to be what most participants have endorsed using. This makes some sense given it is an undergraduate sample.”

Inter-rater Reliability

To increase the trustworthiness (confidence in coding of the qualitative data) of the data (Morrow, 2005), the Holsti’s Method (1969) was used to calculate inter-rater reliability. This method is well known and has been used to check inter-rater reliability in prior qualitative research (e.g., Grayman, 2009; Pieper et al., 2016). Holsti’s formula $PAo = 2A/(n_A + n_B)$ was employed. PAo is the proportion of agreement, A is the number of agreements between principal

investigator and research assistant, and $n_A + n_B$ are the total number of units coded by both the principal investigator and coding assistant. A conservative minimum rating agreement of 85% was deemed to be acceptable agreement (Miles & Huberman, 1994). The Holsti formula was used to calculate inter-rater agreement between each pair of coders, leading to the result of 10 agreement percentage scores. Checking for inter-rater reliability occurred subsequent to the completion of approximately 33.3% of coding work and again at a second time interval, subsequent to the completion of approximately 66.6% of coding work. Measuring inter-rater agreement at two time points allowed for the assessment of agreement over time. A collection of 29 cases was coded by all coders during the first inter-rater agreement check. At this interval, rating agreement percentages were found to range from 89% to 94%. A collection of 31 separate cases was coded by all coders during the second inter-rater agreement check. At this interval, rating agreement percentages were found to range from 87% to 92%.

Rater drift refers to changes in rater behaviour across test administrations (Park, 2011). Several studies have found that raters' practices change over time, including for both inter-rater and intra-rater consistency (Congdon & McQueen, 2000; Leckie & Baird, 2011; Myford & Wolf; 2009; de Moira et al., 2002). Though rater drift was observed across inter-rater agreement checks, this drift was observed to be small (2% drift) and at no point did percent agreement among raters fall below the conservative minimum rating agreement standard of 85%. For these reasons, rater drift among the five coders was not considered problematic and coding was evaluated to be completed reliably.

Study Design

In order to conduct an in-depth examination of potential differences between High and Low Mach substance users, the study employed a convergent parallel design. This design is a

mixed-methods research approach, where both quantitative and qualitative data are gathered simultaneously and weighed equally (Creswell & Clark, 2018). Further, both forms of data are analyzed independently (Creswell & Clark, 2018). Consistent with this design, the principal investigator and four assistants were blind to the Machiavellian classification of all participants during the coding process. All qualitative data were copied to Microsoft/Mac Word documents and coded on that program to preclude coders from being impacted by potential biases or influences that may develop from knowing about participants' associated quantitative data. A final consideration of the convergent parallel design is that quantitative and qualitative results are interpreted together, with the goal of both types of data corroborating the other (Creswell & Pablo-Clark, 2011; Demir & Pisek; 2017). In triangulating these data using this research approach, validity of the dissertation project results is more assured. In addition, by investigating the differences between High and Low Mach substance users, using both quantitative and qualitative methods, different dimensions of certain themes could be explored in greater detail (as will be outlined below).

Chapter IV

Results

Quantitative Analysis

Quantitative analyses were carried out using SPSS-Version 27. Pearson correlation was employed to assess the relationships between Machiavellianism and drug use and between Machiavellianism and alcohol use. An original plan was to employ MANCOVA to test for statistically significant differences on the continuous study variables by Machiavellian grouping (those high in Machiavellianism versus those low in Machiavellianism). However, when checking the assumptions of this test, it was found that the assumption of homogeneity of regression slopes was violated. This assumption states that dependent variables and covariates in MANCOVA should have the same slope or linear relationship across all levels of the categorical grouping variable (Tabachnik & Fidel, 2013). For the purposes of this dissertation, that means that continuous study variables, such as treatment outcome expectations, and covariates, such as psychopathy, should have the same linear relationship in both substance users found to have high levels of Machiavellianism and in substance users found to have low levels of Machiavellianism. Because the two groups were found to differ significantly on the covariate psychopathy, including it in the MANCOVA would not control for differences across groups. Differences found across the two Machiavellian groups would vary as a function of psychopathy, rendering the MANCOVA results to carry little meaning. Steyn (2013) noted that when this assumption is violated there is a greater risk of type two error. Given this issue, the decision was made to employ a logistic regression analysis as this test was the closest non-parametric equivalent to MANCOVA, where the variables to be investigated could still be employed in efforts to discriminate between substance users who are high in Machiavellianism and substance users who

are low in Machiavellianism. It is acknowledged that by making the decision to use logistic regression, instead of MANCOVA, the analysis shifted to investigating which variables would predict Machiavellian grouping (logistic regression), from determining on which variables the groups differed (MANCOVA).

Across three models, hierarchical logistic regression was employed to predict High or Low Machiavellian membership based on participant responses on a series of continuous independent variables and covariates. The dependent variable used in the analysis is Machiavellianism. This variable was binary with two groups (High and Low Machiavellianism). The two groups were created by dividing participants in to “High” and “Low” Machiavellian groups based on the cut-off MACH-IV scores at the 50th percentile, culminating in 251 high Mach and 254 low Mach substance users. The eight independent variables included a measure of social connectedness (SCS-R), the problem-focused, emotion-focused, and avoidance-focused subscales of the COPE, the autonomous motivation subscale and controlled motivation subscale of the TSRQ, and the treatment outcome and role expectations subscales of the MPEQ. Covariates were continuous variables and included the LSRP (measure of psychopathy) and BPNI (measure of narcissism). Herein, the high Machiavellianism group will be termed High Mach group (or High Mach) and those in the low Machiavellianism group will be termed Low Mach group (Low Mach). This phrasing is frequently employed in dark triad literature. It is worth repeating that this term does not imply that Machiavellianism is a disorder or issue that requires treatment. The shortened terminology is being used for convenience and efficient communication.

Model 1 included the demographic variables, namely gender, social status growing up, current social status, and age. These variables were included in Model 1 because past research

has found differences in levels of Machiavellianism between genders and between different levels of social status. Specifically, higher levels of Machiavellian attitudes have been found in males compared to females (Christie & Geis, 1970; Jonason et al., 2020) and in those with higher household incomes compared to those with lower household incomes (Götz et al., 2020). Levels of Machiavellianism have been found to vary by age, where levels of Machiavellianism trend upward and peak in adolescence, and subsequently display a downward trend across adulthood as individuals successfully transition through adulthood (Bartlett & Bartlett, 2015; Götz et al., 2020). A literature search failed to find any studies examining potential differences in levels of Machiavellianism and ethnicity. Research most closely related to examining potential differences in levels of Machiavellianism and ethnicity has focused on country comparisons, where differences in level of Machiavellianism has been found between different countries (Deutchman & Raihani, 2017; Jonason et al., 2020). Given the extant literature, ethnicity was not included in the main analyses as there was no theoretical basis to include this demographic variable. Results of the regression analysis with ethnicity predictors can be viewed in Appendix R and Appendix S. Including demographic variables (gender, social status growing up, current social status, and age) in Model 1 allowed for these variables to be accounted for statistically, to remove their effects on other variables. In Model 2, the eight independent variables were added. As a reminder to the reader, the eight independent variables included a measure of social connectedness (SCS-R), the problem-focused, emotion-focused, and avoidance-focused subscales of the COPE, the autonomous motivation and controlled motivation subscales of the TSRQ, and the treatment outcome and role expectations subscales of the MPEQ. In Model 3 the two covariates were added, which included the LSRP (measure of psychopathy) and BPNI (measure of narcissism). The dependent variable in all models was Machiavellian grouping (high and low).

By dichotomizing the continuous MACH-IV variable and creating two Machiavellian groups (High and Low), a significant portion of information is potentially lost and it may be more difficult to find effects within a given statistical procedure employed (limitation of dichotomizing continuous variable is expanded upon in the Limitations section of the dissertation). To corroborate the findings from the logistic regression, a three-step hierarchical multiple regression was also conducted using a continuous Machiavellianism variable (as measured by the MACH-IV) as the dependent variable, the aforementioned demographic variables, eight independent variables, and two covariates.

To explore potential differences between High and Low Mach substance users based on participant responses on categorical variables, two Pearson's Chi-Square (χ^2) Tests were employed. Variables included a measure of one's readiness to change their substance use behaviour (RCQ) and a measure of adult attachment (RQ).

Pearson Correlation

Pearson correlation coefficients were computed to assess the linear relationships between Machiavellianism and the DUDIT (measure of drug use) and between Machiavellianism and the AUDIT (measure of alcohol use). A continuous Machiavellianism variable (as measured by the MACH-IV) was used in this analysis. The relationship between Machiavellianism and drug use was found to not be significant, $r(503) = .08, p = .06$. A significant and positive relationship between Machiavellianism and alcohol use was found, $r(503) = .16, p < .01$.

Assumptions of Logistic Regression

Assumptions of logistic regression were checked following the guidelines of Tabachnik and Fidell (2013). The first assumption of logistic regression assumes that the dependent variable (Machiavellian grouping) is binary or has only two levels. This assumption was met by the

research design of the dissertation because there are only two groups within the dependent variable, namely High Machiavellian substance users and Low Machiavellian substance users.

The second assumption requires that observations within the data set are independent of each other. For the purposes of this dissertation, this assumption requires that each subject should belong to only the high Machiavellian group or only the low Machiavellian group, with no relationship between data in each group. This assumption was also met by the research design of the dissertation project, as responses from members of either group were not included in the other group's response set when analyses were run.

The third assumption requires that there be no multicollinearity among independent variables. This means that the independent variables included in the logistic regression should not be exceedingly correlated. Tabachnik and Fidell (2013) caution the use of two variables with bivariate correlations of .70 or above, thus this correlation was used as a conservative threshold for multicollinearity. Correlations between all independent variables and covariates were reviewed. Correlations between study variables can be viewed in Table 5. The correlation between the treatment outcome expectations subscale of the MPEQ and the role expectations subscale of the MPEQ was found to be .75. A follow up collinearity diagnostic was conducted using SPSS-Version 27, which revealed all Tolerance values to be above .2. This finding indicated that there was no multicollinearity concerns among independent variables and so all eight independent variables were retained.

A fourth assumption of logistic regression requires that the independent variables be linearly related to the log odds (Tabachnik & Fidell, 2013). In logistic regression, group membership is classified based on predictors (independent variables). A logit transformation is applied on the odds of classification. In the context of this dissertation project, this means that

the log odds are calculated by dividing the probability estimate of being in the High Mach group by the probability estimate of being in the Low Mach group, then taking the natural log of that value to yield a logit score. These logit values should be linearly related to the independent variables included in the logistic regression. To check this assumption, scatter plots between the log values and each independent variable were visually inspected and observed to display linear relationships.

The fifth assumption of logistic regression requires that a large sample size be used in analysis (Tabachnik & Fidell, 2013). Pituch and Stevens (2016) note that large samples of over 500 cases are typically adequate in conducting a logistic regression. Further, Long (1997) suggested that a logistic regression analysis contain at least 10 observations per independent variable. Given that the analysis included more than 100 observations (eight independent variables and two covariates would mean at least 100 observations would be required) and that the entire sample exceeded 500 cases (505 cases were included), this assumption was determined to have been met.

An additional check that was undertaken before inspecting the results of the logistic regression was to inspect for homoscedasticity. This term describes when the variance of residuals (random "noise" in the relationship between independent variables and the dependant variable) is not significantly different across all values of the dependent variables.

Homoscedasticity was checked for all three models of the logistic regression using a Hosmer-Lemeshow Test. All tests were found to not be significant, implying a condition of homoscedasticity.

In inspecting for outliers, standardized residuals were calculated for all cases. Three cases were observed to have absolute values greater than three. Analysis was conducted with these

cases included and a second time where these cases were excluded. Because a significant difference was not found between these analyses, the three cases were retained.

Table 5

Correlations between Machiavellianism, Independent Variables, and Covariates

Variable	1	2	3	4	5	6	7	8	9	10
1. Machiavellianism										
2. Social Connectedness	-.26**									
3. Problem-focused coping	-.14**	.31**								
4. Emotion-focused coping	-.12**	.28**	.64**							
5. Avoidant-focused coping	.15**	-.24**	.01	.20**						
6. Autonomous Motivation	-.16**	.02	.29**	.24**	-.08					
7. Controlled Motivation	.14**	-.21**	.01	.09*	.20**	.29**				
8. Treatment Outcome Expectations	-.27**	.25**	.25**	.29**	.09	.20**	-.04			
9. Treatment Role Expectations	-.23**	.29**	.29**	.27**	.05	.09*	-.13**	.75**		
10. Psychopathy	.58**	-.30**	-.15**	-.04	.22**	-.12**	.25**	-.20**	-.19**	
11. Narcissism	.32**	-.25**	.01	.09*	.33**	.05	.38**	.024	-.05	.46**

Note. *Statistically significant ($p < 0.05$), **Statistically significant ($p < 0.01$). Machiavellianism was measured using the MACH-IV scale. Social connectedness was measured using the Social Connectedness Scale – Revised (SCS-R). Problem-focused coping, emotion-focused coping, and avoidant-focused coping were measured using subscales of the same name, which comprised the COPE Inventory (COPE). Autonomous Motivation and Controlled Motivation, were measured using subscales of the same name, which comprised the Treatment Self-Regulation Questionnaire (TSRQ). Treatment Outcome Expectations and Treatment Role Expectations were measured using subscales of the same name, which comprised the Milwaukee Psychotherapy Expectations Questionnaire (MPEQ). Psychopathy was measured using the Levenson Self-Report Psychopathy Scale (LSRP). Narcissism was measured using the Brief-Pathological Narcissism Inventory (BPNI).

Logistic Regression - Analysis

Prior to conducting the main hierarchical logistic regression analysis, a logistic regression for each independent variable was run separately to confirm appropriate inclusion in the final

analysis. The dependent variable was Machiavellian group (high or low) for all eight logistic regression analyses. All independent variables tested were found to be significant predictors. Means, standard deviations, odds ratios, and 95% confidence intervals, are reported in Table 6.

Table 6

Means, Standard Deviations, ORs, and 95% CIs for Regression Predictor Variables

	Mach Group		OR(95% CI)
	High (<i>n</i> = 251)	Low (<i>n</i> = 254)	
	<i>M</i> (<i>SD</i>)	<i>M</i> (<i>SD</i>)	
SCS-R	75.02(16.61)	82.59(17.04)	0.97(0.96-0.98)**
COPE-PF	49.35(8.95)	51.97(9.77)	0.97(0.95-0.99)**
COPE-EF	45.78(7.06)	47.43(8.22)	0.97(0.95-0.99)*
COPE-AF	30.54(5.34)	28.48(5.74)	1.07(1.04-1.11)**
TSRQ-AUT	35.11(10.23)	37.56(10.02)	0.98(0.96-0.99)**
TSRQ-CONT	16.74(7.16)	14.67(6.68)	1.04(1.02-1.07)**
MPEQ-OUT	6.89(1.95)	7.86(1.84)	0.76(0.69-0.84)**
MPEQ_ROLE	7.15(1.64)	7.88(1.58)	0.75(0.67-0.84)**

Note. *Statistically significant ($p < 0.05$), **Statistically significant ($p < 0.01$). SCS-R is the Social Connectedness Scale – Revised. COPE-PF is the problem-Focused subscale on the COPE Inventory. COPE-EF is the emotion-focused Subscale on the COPE Inventory. COPE-AF is the avoidant-focused subscale on the COPE Inventory. TSRQ-AUT is the Autonomous Motivation subscale on the Treatment Self-Regulation Questionnaire. TSRQ-CONT is the Controlled Motivation subscale on the Treatment Self-Regulation Questionnaire. MPEQ-OUT is the Treatment Outcome Expectations subscale on the Milwaukee Psychotherapy Expectations Questionnaire. MPEQ-ROLE is the Treatment Outcome Expectations subscale on the Milwaukee Psychotherapy Expectations Questionnaire.

Subsequent to determining that all independent variables were appropriate for inclusion, a three-model hierarchical logistic regression was conducted in order to classify participants by Machiavellian group based on the independent variables noted above. The results of the analyses

are reported in Table 7. The likelihood ratio for Model 1 was not significant ($\chi^2 = 10.64$, $df = 10$, $p = .39$). But, with the addition of the eight independent variables, Model 2 was found to be significant ($\chi^2 = 74.02$, $df = 18$, $p < .01$). Compared to the null (intercept-only) model, Model 2 displayed a 19.3% improvement in explaining variability in Machiavellian grouping (Nagelkerke pseudo R^2) and correctly classified 69% of cases. Having lower positive expectancy of treatment outcome (OR=.83, 95% CI [.70, .97]) was one significant predictor. The odds ratio for this predictor indicates that there is a 20% greater likelihood of being in the low Machiavellian group with a one unit increase on this variable. Having higher levels of controlled motivation for substance use treatment (OR=1.04, 95% CI [1.01, 1.08]) was a second significant predictor. The odds ratio for this predictor indicates that there is a 4% greater likelihood of being in the high Machiavellian group with a one unit increase on this variable. A third significant predictor was having higher levels of avoidance coping engagement (OR=1.08, 95% CI [1.03, 1.12]). The odds ratio for this predictor indicates that there is an 8% greater likelihood of being in the high Machiavellian group with a one unit increase on this variable.

With the addition of the two covariates, Model 3 was found to be significant ($\chi^2 = 159.55$, $df = 20$, $p < .01$). Compared to the null (intercept-only) model, Model 3 displayed a 38.20% improvement in explaining variability in Machiavellian grouping (Nagelkerke pseudo R^2) and correctly classified 74% of cases. Higher levels of psychopathy was the only significant predictor (OR=1.13, 95% CI [1.09, 1.16]). The odds ratio for this predictor indicates that there is a 13% greater likelihood of being in the high Machiavellian group with a one unit increase on this variable.

Table 7*Hierarchical Logistic Regression Model Results*

	Model 1	Model 2	Model 3
Gender, female	1.14(0.68, 1.92)	1.33(0.73, 2.41)	0.71(0.36, 1.42)
SS Growing Up – Lower Middle Class	1.02(0.56, 2.58)	1.05(0.45, 2.42)	1.13(0.44, 2.88)
SS Growing Up – Middle Class	0.77(0.37, 1.60)	0.64(0.29, 1.44)	0.86(0.35, 2.11)
SS Growing Up – Upper Middle Class	0.82 (0.35, 1.92)	0.82(0.32, 2.11)	1.08(0.38, 3.12)
SS Growing Up – Upper Class	1.13(0.15, 8.37)	1.45(0.17, 12.22)	1.11(0.11, 11.56)
Current SS –Lower Middle Class	1,12(0.52, 2.40)	1.03(0.46, 2.32)	0.96(0.39, 2.38)
Current SS – Middle Class	1.17(0.54, 2.50)	1.31(0.58, 2.97)	1.31(0.53, 3.22)
Current SS – Upper Middle Class	1.03(0.43, 2.48)	1.10(0.43, 2.82)	0.89(0.32, 2.50)
Current SS – Upper Class	1.33(0.18, 9.80)	1.88(0.23, 15.50)	0.78(0.07, 8.48)
Age	0.94(0.90, 0.99)*	0.97(0.93, 1.02)	0.99(0.94, 1.04)
SCS-R	—	0.99(0.98, 1.00)	1.00(0.99, 1.02)
COPE-PF	—	1.00(0.97, 1.03)	1.01(0.97, 1.04)
COPE-EF	—	0.99(0.95, 1.02)	0.97(0.93, 1.01)
COPE-AF	—	1.08(1.03, 1.12)**	1.05(1.00, 1.10)
TSRQ-AUT	—	0.98(0.96, 1.00)	0.99(0.97, 1.02)
TSRQ-CONT	—	1.04(1.01, 1.08)*	1.00(0.96, 1.04)
MPEQ-OUT	—	0.83(0.70, 0.97)*	0.84(0.71, 1.01)
MPEQ-ROLE	—	0.94(0.78, 1.13)	0.94(0.77, 1.15)
LSRP	—	—	1.13(1.09, 1.16)**
BPNI	—	—	1.01(1.00, 1.03)

Note. *Statistically significant ($p < 0.05$), **Statistically significant ($p < 0.01$). Data are given as odds ratios with 95% confidence intervals. Male option in the gender variable, and Lower Class option in the Social Status Growing Up and Current Social Status variables, were used for contrasting categorical variables in the regression. SCS-R is the Social Connectedness Scale – Revised. COPE-PF is the problem-focused subscale on the COPE Inventory. COPE-EF is the emotion-focused Subscale on the COPE Inventory. COPE-AF is the avoidant-focused subscale on the COPE Inventory. TSRQ-AUT is the Autonomous Motivation subscale on the Treatment Self-Regulation Questionnaire. TSRQ-CONT is the Controlled Motivation subscale on the Treatment Self-Regulation Questionnaire. MPEQ-OUT is the Treatment Outcome Expectations subscale on the Milwaukee Psychotherapy Expectations Questionnaire. MPEQ-ROLE is the Role Expectations subscale on the Milwaukee Psychotherapy Expectations

Questionnaire. LSRP is the Levenson Self-Report Psychopathy Scale. BPNI is the Brief-Pathological Narcissism Scale.

Subsequent to conducting the logistic regression, a new variable was created by conducting a transformation procedure on SPSS-27, using the Machiavellian predicted group membership values and the Machiavellian group dependent variable. This new grouping variable was used to compare means of those correctly and incorrectly classified, to determine if a difference existed between these groups. To compare means across the eight independent variables and two co-variates, an initial plan was to execute independent samples *t*-tests. However, in checking the assumptions of this test, it was found that the assumption of normality was violated for all independent variables and psychopathy, with the Kolmogorov-Smirnov Tests of Normality ($p < .05$) being significant for each variable. Following the recommendation of Field (2013), and because the vast majority of predictor variables were found to violate the assumption of normality, Mann-Whitney *U* Tests were conducted. This test is a non-parametric test, which does not assume that an outcome is normally distributed. This test is frequently used to determine whether a population's scores (observations) are smaller or larger than another population's scores (Montoro, 2020). No significant group mean difference were found across the ten variables.

Assumptions of Multiple Regression

Assumptions of multiple regression were checked following the guidelines of Tabachnik and Fidell (2013). In inspecting for outliers, standardized residuals were calculated for all cases. No multivariate outliers outside of plus or minus three were found. The first assumption of multiple linear regression is that there is a linear relationship between each independent variable and the dependent variable. In the context of this dissertation, this means that each of the independent variables (e.g., expectancy of treatment outcome) and dependent variable

(Machiavellianism) have a relationship where change that occurs in one variable, must also change in the other variable in the same proportion. To check this assumption, scatterplots were viewed for each independent variable and covariate – dependent variable relationship and were determined to be linearly related.

The second assumption of multiple linear regression is multivariate normality. This assumption states that error between observed and predicted values (also called residuals of the regression) is normally distributed. This assumption was checked by viewing histograms and Q-Q plots for each variable. Residuals were observed to be normally distributed.

The third assumption of multiple regression is multicollinearity. This assumption was checked and was determined to be met when assumptions of logistic regression were checked. All Tolerance values were above .20, suggesting no multicollinearity.

The last assumption of multiple linear regression is homoscedasticity. This assumption was checked and confirmed before when conducting the logistic regression analysis. Notwithstanding, this assumption was verified by viewing a scatterplot of residual values versus predicted values. No clear pattern was observed in the distribution, which re-confirmed a condition of homoscedasticity.

Multiple Regression - Analysis

A three-model hierarchical multiple regression was conducted with Machiavellianism as the dependent variable. Demographic variables, including gender, social status growing up, current social status, and age were entered into Model 1 of the regression. Results of the regression analysis with ethnicity as a predictor can be viewed in Appendix S. The eight independent variables, including a measure of social connectedness (SCS-R), the problem-focused, emotion-focused, and avoidance-focused subscales of the COPE, the autonomous

motivation, and controlled motivation subscales of the TSRQ, and the treatment outcome expectations and role expectations subscales of the MPEQ, were entered into Model 2. In Model 3 the two covariates were added, which included the LSRP (measure of psychopathy) and BPNI (measure of narcissism). Regression statistics are reported in Table 8.

The hierarchical multiple regression revealed that at Step One, social connectedness, avoidance-focused coping, autonomous motivation, controlled motivation, and treatment outcome expectations, contributed significantly to the model, $F(8, 464) = 9.78, p < .01$, and accounted for 14% of the variation in Machiavellianism. Having a higher social connectedness score was associated with a lower Machiavellian score, such that one unit increase in score was associated with .09 unit decrease in Machiavellian score, holding other variables constant. Having a higher autonomous motivation score was associated with a lower Machiavellian score, such that one unit increase in score was associated with .18 unit decrease in Machiavellian score, holding other variables constant. Having more positive treatment outcome expectations was associated with a lower Machiavellian score, such that one unit increase in score was associated with 1.11 unit decrease in Machiavellian score, holding other variables constant. Having a higher controlled motivation score was associated with a higher Machiavellian score, such that one unit increase in score was associated with .23 unit increase in Machiavellian score, holding other variables constant.

The addition of the measures of psychopathy and narcissism in Step Two explained an additional 24% of variation in Machiavellianism. This change was significant, $F(2,462) = 89.19, p < .01$. Having more positive treatment outcome expectations was a significant predictor and was associated with a lower Machiavellian score, such that one unit increase in score was associated with .77 unit decrease in Machiavellian score, holding other variables constant.

Having a higher psychopathy score was associated with a higher Machiavellian score, such that one unit increase in score was associated with .64 unit increase in Machiavellian score, holding other variables constant. Having a higher narcissism score was associated with a higher Machiavellian score, such that one unit increase in score was associated with .06 unit increase in Machiavellian score, holding other variables constant.

The addition of demographic variables, including age, gender, social status growing up, and current social status, did not explain a significant portion of additional variation in Machiavellianism, $F(10,452) = 0.52, p = .88$. Together, the 10 independent variables, (including measures of psychopathy and narcissism), and demographic variables, accounted for 39% of the variation in Machiavellianism.

Table 8

Summary of Hierarchical Regression Analysis for Variables Predicting Machiavellianism

Step and Variable	<i>B</i>	CI	<i>SE B</i>	β	<i>t</i>	sr ²	<i>R</i> ²	ΔR^2
Step One							.14	.14
SCS-R	-.10	[-.17, -.03]	.04	-.14	-2.68**	.01		
COPE-PF	.01	[-.14, .16]	.08	.01	.08	.00		
COPE-EF	-.02	[-.20, .16]	.09	-.01	-.23	.00		
COPE-AF	.23	[.02, .44]	.11	.11	2.17*	.01		
TSRQ-AUT	-.18	[-.29, -.07]	.06	-.15	-3.09**	.02		
TSRQ-CONT	.23	[.07, .39]	.08	.13	2.75**	.01		
MPEQ-OUT	-1.10	[-1.94, -.28]	.42	-.18	-2.63**	.01		
MPEQ-ROLE	-.17	[-1.13, .79]	.49	-.02	-.35	.00		
Step Two							.38	.24
SCS-R	-.01	[-.07, .05]	.03	-.01	-.33	.00		

COPE-PF	.05	[-.08, .18]	.07	.04	.82	.00		
COPE-EF	-.12	[-.28, .03]	.08	-.08	-1.54	.00		
COPE-AF	.09	[-.09, .27]	.09	.04	.95	.00		
TSRQ-AUT	-.08	[-.17, .02]	.05	-.06	-1.49	.00		
TSRQ-CONT	-.01	[-.16, .13]	.08	-.01	-.19	.00		
MPEQ-OUT	-.77	[-1.48, -.06]	.36	-.12	-2.13*	.01		
MPEQ-ROLE	-.11	[-.95, .71]	.42	-.02	-.26	.00		
LSRP	.64	[.53, .75]	.06	.50	11.40**	.17		
BPNI	.06	[.01, .11]	.03	.10	2.29*	.01		
Step Three							.39	.01
SCS-R	-.01	[-.07, .54]	.03	-.01	-.30	.00		
COPE-PF	.07	[-.06, .20]	.07	.05	1.05	.00		
COPE-EF	-.14	[-.30, .02]	.08	-.09	-1.70	.00		
COPE-AF	.07	[-.13, .26]	.10	.03	.68	.00		
TSRQ-AUT	-.08	[-.18, .03]	.05	-.06	-1.48	.00		
TSRQ-CONT	-.01	[-.16, .13]	.08	-.01	-.17	.00		
MPEQ-OUT	-.89	[-1.62, -.16]	.37	-.14	-2.40*	.01		
MPEQ-ROLE	-.03	[-.86, .81]	.43	.01	-.07	.00		
LSRP	.65	[.53, .76]	.06	.50	11.12**	.17		
BPNI	.06	[.01, .11]	.03	.10	2.26*	.01		
Gender	-1.88	[-4.64, .89]	1.41	-.06	-1.33	.00		
SS Growing Up - LMC	-1.42	[-5.19, 2.34]	1.92	-.05	-.74	.00		
SS Growing Up - MC	-2.28	[-5.91, 1.35]	1.85	-.09	-1.23	.00		
SS Growing Up - UMC	-2.41	[-6.67, 1.84]	2.17	-.08	-1.12	.00		
SS Growing Up - UC	-2.75	[-12.58, 7.08]	5.00	-.03	-.55	.00		
Current SS - LMC	1.76	[-1.95, 5.46]	1.88	.06	.93	.00		
Current SS - MC	2.43	[-1.29, 6.15]	1.89	.10	1.28	.00		
Current SS - UMC	3.32	[-.95, 7.59]	2.17	.11	1.53	.00		

Current SS - UC	2.38	[-7.43, 12.20]	4.99	.02	.48	.00
Age	.07	[-.14, .28]	.11	.03	.67	.00

Note. *Statistically significant ($p < 0.05$), **Statistically significant ($p < 0.01$). Male option in the gender variable, and Lower Class option in the Social Status Growing Up and Current Social Status variables, were used as reference variables in the regression. SCS-R is the Social Connectedness Scale – Revised. COPE-PF is the problem-focused subscale on the COPE Inventory. COPE-EF is the emotion-focused Subscale on the COPE Inventory. COPE-AF is the avoidant-focused subscale on the COPE Inventory. TSRQ-AUT is the Autonomous Motivation subscale on the Treatment Self-Regulation Questionnaire. TSRQ-CONT is the Controlled Motivation subscale on the Treatment Self-Regulation Questionnaire. MPEQ-OUT is the Treatment Outcome Expectations subscale on the Milwaukee Psychotherapy Expectations Questionnaire. MPEQ-ROLE is the Role Expectations subscale on the Milwaukee Psychotherapy Expectations Questionnaire. LSRP is the Levenson Self-Report Psychopathy Scale. BPNI is the Brief-Pathological Narcissism Scale. SS is social status. LMC is Lower Middle Class. MC is middle class. UMC is Upper Middle Class. UC is Upper Class.

Assumptions of Chi-Square Test

Prior to conducting two Chi-Square tests with the Machiavellian grouping variable (High and Low) and two additional independent variables, including readiness for change (RCQ) and adult attachment style (RC), the assumptions of this test were checked. The first assumption of the Chi-Square test requires that variables be categorical (Field, 2013). This assumption was met by the dissertation research design, as the Mach grouping variable, the RQ, and the RCQ, are all categorical variables. The second assumption of the Chi-Square test requires that all observations be independent from each other (Field, 2013). This assumption was previously checked and met in preparation for conducting the hierarchical logistic regression. The third assumption requires that individuals can only belong to one cell within a Chi-Square contingency table (Field, 2013). That is, individual categorical data is exclusive to one cell. In the context of this dissertation, this means that substance users can only be in one stage of change or have one attachment style. Because categories within these variables are mutually exclusive (e.g., one cannot be in the pre-contemplation and action stage of change simultaneously; one cannot have a secure attachment style and fearful-avoidant attachment style at the same time), and because responses on the measures used produce one categorical label upon completion, this assumption was met. The

fourth assumption of the Chi-Square test requires that the expected values of cells in the test contingency table be five or greater in at least 80% of cells and that no cell should have a value less than one (Field, 2013). This assumption was checked by reviewing values in all cells. Because the lowest value in any cell was 28, it was concluded that this assumption was met.

Chi-Square Test – Analysis

Subsequent to assumptions being met, a Chi-Square test of Independence was then performed to examine the relationship between Machiavellianism and readiness to change substance use behaviour. The relationship between these variables was not significant, $\chi^2 (3, N = 503) = 1.53, p = .68$. High and low Mach substance users did not significantly differ on any endorsed stage of change (precontemplation, contemplation, preparation, or action).

A second Chi-Square test of independence was performed to examine the relationship between Machiavellianism and adult attachment style. The relationship between these variables was significant, $\chi^2 (3, N = 505) = 11.52, p < .01, V = .15$. Counts, percentages, and totals are reported in Table 9. High Mach substance users were more likely to identify themselves as having an anxious-preoccupied attachment style compared to Low Mach substance users. Low Mach substance users were more likely to identify themselves as having a secure attachment style compared to High Mach substance users.

Table 9

Counts, Percentages, and Totals of Chi-Square Test of Machiavellianism and Attachment Style

	Mach Group					
	Mach Group				Total	
	High		Low			
	Count	%	Count	%	Count	%
Secure	40	15.90	70	27.60	110	21.80

Fearful-Avoidant	115	45.80	109	42.90	224	44.40
Anxious-Preoccupied	57	22.70	40	15.70	97	19.20
Dismissive-Avoidant	39	15.50	35	13.80	74	14.70

Qualitative Analysis and Frequency Comparisons

Out of the 505 participants retained for quantitative analysis, 488 participants provided written accounts related to their substance use, including 238 High Mach substance users and 250 Low Mach substance users. Demographics in terms of substance use endorsement is presented in Table 10. Among endorsed substances, Low Mach substance users mentioned their use of opioids at a significantly greater frequency than High Mach substance users (Fisher’s Exact Test; $p < .05$), $V = .12$.

Table 10

Frequency of Substance Use Endorsement by Sample of High and Low Mach Users

	Mach Group					
	High		Low		Total	
	<i>Frequency</i>	<i>%</i>	<i>Frequency</i>	<i>%</i>	<i>Frequency</i>	<i>%</i>
Alcohol	206	85.2	213	86.6	419	85.9
Cannabis	139	58.4	159	63.6	298	61.1
Opioids	0	0.0	7	2.8	7	1.4
Nicotine	3	1.3	5	1.6	7	1.4
MDMA	2	0.8	5	2.0	7	1.4
Cocaine	4	1.7	8	3.2	12	2.5
LSD	1	0.4	2	0.8	3	0.6
Psilocybin Mushrooms	3	1.3	6	2.4	9	1.8

Xanax	0	0	1	0.4	1	0.2
Recreational Prescription Drug use	7	2.9	3	1.2	10	2

A total of 10 themes were developed through content analysis, including situation of use, concerns related to use, motivation for use, user state pre-use, user state during use, user state post-use, impact of use in life domains, impact of use on relationships, attitudes toward treatment, and alternate coping strategies. Table 11 depicts a summary of themes, endorsement frequency, and examples of each theme. Examples are provided in their written context to provide richer descriptions of phenomena reported, in order to provide “thickness” to the qualitative data (Lincoln & Guba, 2006; Ponterrotto & Grieger, 2007).

Table 11

Summary of Themes, Endorsement, and Frequency of Emergent Themes

<i>Theme</i>	<i>High Machs</i>		<i>Low Machs</i>	
	<i>Frequency</i>	<i>Example</i>	<i>Frequency</i>	<i>Example</i>
Situation of Use	514	“When at parties, clubs, bars, at a cottage, camping with friends, or hanging out with friends on a weekend night.”	554	“I will have alcoholic drink(s) at parties, and occasionally at restaurants, dinners, hanging out with friends, or other social outings.”
Concerns Related to Use	214	“Smoking weed is bad for your brain and health overall and sometimes that worries me.”	232	“I am a bit concerned that my weed will be laced one day and I’ll die.”
Motivation for Use	651	“Because I find myself having things I want to forget. Drinking is a way for me to be happy for a small moment in my life.”	694	“I drink to feel a buzz because I think its fun to do so once in a while.”

User state pre-use	204	“I get excited when I’m about to pop a pill or drink some alcohol.”	217	“Before smoking cannabis, I sorta already feel high just looking and feeling it (kinda weird). Then I get excited and feel nice as I’m about to smoke.”
User state during-use	196	“The moment feels right and comforting. My negative emotions are numbed and makes me feel grateful that I no longer feel as if I am on the verge of death.”	215	“I feel like I can take a breathe, and I feel taken over by something other than my own brain. It is a bit of an escape.”
User state post-use	164	“Sometime regret when you get that horrible hangover or when you do something that you didn’t mean.”	200	“I often feel regret over a night of drinking due to the decisions I make while drunk, as well as the health implications that I become acutely aware of during a hangover.”
Impact of use on Relationships	234	“When my girlfriend found out that i had been using coke for a few months she wrote a letter explain that she was breaking up with me and why.”	245	“It definitely affected the relationship I had with my parents. We had a very tense relationship and I almost lost them from my life because of my behavior.”
Impact of Use in Life Domains	240	“A few times I’ve missed school assignments because I was under the influence, or had to write an assignment while under the influence.”	254	“My drug use caused me to lose my scholarship to my first university. My drug use caused me to drop out of university 2 separate times.”
Alternate Coping Strategies	219	“Play video games or distract myself by doing errands or homework or cleaning or drawing so that the time passes and eventually the craving subsides.”	225	“I hangout with my family or friends.”
Attitudes Toward Treatment	150	“I haven’t considered treatment because I really do not care that much. I know that there are negative effects but they don’t seem serious enough for me to change.”	138	“I went to treatment twice. Once in 2018 and once in 2019. Thankfully this last time has been a lot more successful than the previous one. The truth of it was that I was sick and tired of being sick and tired. I had been avoiding my problems for so long and I could see the impact it was having on my family and myself. I knew something needed to change or the end result would be tragic.”

Situation of Use

All codes for the theme of situation of use can be viewed in Table 12. The use of alcohol in social settings was commonly observed within participant accounts (high Mach $n = 198$; low Mach $n = 200$). High and Low Mach substance users did not appear to differ in their use of alcohol in social settings. Individuals in both groups described their social drinking in the context of informal social gatherings with friends, parties at friends' houses, at bars or clubs, during camping trips, on special occasions, such as a wedding, or at restaurants with friends or family. The account of Participant 493 (High Mach) is representative of this observation:

“I drink with my friends at a bar, restaurant, or house party usually every Friday and Saturday, sometimes going out for dinner during the week and getting a drink.”

Table 12

Theme of Situation of Use and Associated Codes

Theme	Comprising Codes
Situation of Use	For social gathering/context In preparation for social gathering With one other person Alone During leisure time Before going to sleep

The use of cannabis in social settings were also similar among High and Low Mach substance users (high Mach $n = 104$; low Mach $n = 124$). Participants from both groups described their cannabis use in social contexts to involve consuming cannabis at parties, and at informal social gatherings:

Participant 345 (H): “I smoke at parties/hangouts when other people are smoking.”

Participant 326 (L): “During social events like parties or get-togethers.”

High and Low Mach substance users tended to provide distinct contexts for their use of alcohol alone (high Mach $n = 71$; low Mach $n = 51$). Low Mach substance users tended to provide accounts in which alcohol was used alone as a means to relax at the end of day, while eating, or to augment a recreational activity, such as drinking while watching television:

Participant 369 (L): “When I drink alone it is when I have some down time and will watch a show with a glass of wine, but this is not often.”

Participant 171 (L): “Sometimes alone, if I am watching a movie or in the bath, I like a glass of wine.”

In contrast, High Mach participants tended to describe instances of drinking alone that involved consuming to manage emotional distress:

Participant 491(H): “I will have a few drinks by myself if I am stressed.”

Participant 411 (H): “I drink alone if it’s late and I’m in a bad mood and I just want to feel better while I watch Netflix or something.”

This pattern was also observed between reported situations in which cannabis use was used alone (High Mach $n = 102$; Low Mach $n = 106$). Accounts of Low Mach substance users tended to describe the use of cannabis during leisure time in the home:

Participant 139 (L): “I smoke after my twin daughters are put in bed around 7pm. I smoke one time, watch some TV, I eat, then I smoke another time, I eat, and go to bed around 10pm.”

Participant 346 (L): “I get high on THC alone and listen to music or read philosophy.”

Distinct from this type of description, many High Mach substance users noted the use of cannabis alone to manage negative emotions, such as stress or anxiety:

Participant 106 (H): “Smoking alone can be nice because it lets me calm down and think rationally.”

Participant 121 (H): “I only use pot occasionally alone. Typically it’s with other people as a social activity. I have little desire to do it alone unless its for emotional reasons (help with anxiety).”

High and Low Mach substance user accounts also highlighted that substance use behaviour included the use of cannabis before sleep, in order to relax and help facilitate sleep (High Mach $n = 18$; Low Mach $n = 27$). In addition, accounts from both groups revealed the use of substances with one other person (High Mach $n = 8$; Low Mach $n = 18$), including a friend, boyfriend or girlfriend, a spouse, or a sibling. Further, details provided in relation to when substances are used included the use of substances during leisure time (High Mach $n = 13$; Low Mach $n = 28$):

Participant 390 (H): “Usually when it is a day off and I have no responsibilities and I have completed what I needed to do.”

Participant 196 (L): “When I am watching a movie or playing a video game.”

The content of explanations related to using cannabis before bed, using with one other person, and during periods of leisure did not appear to differ among substance users in either Machiavellian group.

Chi-Square Tests of Independence were performed to examine the relationship between Machiavellianism and each of the coding subthemes, including the social use of alcohol, using alcohol alone, the social use of cannabis, using cannabis alone, using cannabis before sleep, using substances with one other person, and the use of substances during leisure activities. The relationship between Machiavellianism and using alcohol alone was significant, $\chi^2(1, N = 122) = 5.79, p < .05, V = .11$, such that High Mach substance users were more likely to identify themselves as using alcohol while alone. The relationship between Machiavellianism and the use of substance during leisure activity was also significant, $\chi^2(1, N = 41) = 5.22, p < .05, V = .10$. Low Mach substance users were more likely to identify themselves as using substances during periods of leisure.

Concerns Related to Use

Participants voiced several concerns related to their substance use, though a large portion of the sample indicated that they had no concern related to their substance use (High Mach $n = 91$; Low Mach $n = 99$). All codes for the theme of concerns related to use can be viewed in Table 13. Individuals from both High and Low Mach substance user groups noted that they were concerned about the amount of alcohol or drug consumed (High Mach $n = 29$; Low Mach $n = 25$). The content of expressed concerns between High and Low Mach substance users did not appear to differ. Concern was related to consuming in excess, to the extent that the user could not function properly directly or shortly after use, or the following day. Alcohol and cannabis were substances that were specifically mentioned during these instances. Participants also expressed concern about consuming excessively to the point of being unable to remember events of the previous night (blacking out):

Participant 109 (H): “Sometimes I think that I shouldn’t have had X amount of drinks or may I should’ve gone a little easier.”

Participant 68 (L): I often feel like I go overboard with drinking (blacking out, having terrible hangovers) and drug use I feel like it’s just bad for you

Participant 251 (H): “Yeah I smoke too much weed and I should stop but I cant.”

Participant 22 (L): “Sometimes, I drink too much in one night (which can very well only be 6 drinks) and I end up blacking out, or throwing up and needing someone to take care of me.”

Table 13

Theme of Concerns Related to Use and Associated Codes

Theme	Comprising Codes
Concerns Related to Use	No concern Amount used Health risks Losing control Becoming dependent Stigma of being known as a “User”

Health risks was another concern espoused by High and Low Mach substance users (High Mach $n = 59$; Low Mach $n = 63$). The content of expressed concern related to health did not appear to differ between High and Low Mach substance user groups. Participants conveyed concerns related to the consumption of alcohol causing a decline in general health, damage to one's liver, and weight gain:

Participant 515 (H): "Weight gain. I drank 2-4 times a week and I did that for 4 or 5 months. One day I saw stretch marks."
Participant 92 (L): "I have put on weight due to drinking."
Participant 517 (L): "I worry about my overall health, specifically my liver."

In addition to individuals from both groups expressing a fear of developing cancer or damaging their lungs due to smoking, many participants highlighted that they were concerned about the negative affect of smoking cannabis on their brain:

Participant 212 (H): "Smoking weed is bad for your brain and health overall and sometimes that worries me."
Participant 349 (L): "I'm concerned about any possible irregularities that might come with smoking marijuana while I'm under 25 as my brain has not fully developed yet. I am also concerned about my teeth and lungs."

Finally, participants noted that being under the influence of alcohol or drugs could potentially lead to various negative outcomes, including entering situations that could lead to bodily harm, death, or the use of other substances that would not have been used if the individual was sober.

A portion of the sample reported concern related to "losing control" while under the influence of alcohol, wherein the user would engage in embarrassing or regretful behaviour, that would not have been engaged in if the user was not intoxicated (High Mach $n = 5$; Low Mach $n = 7$). The content related to this expressed concern did not appear to differ between High and Low Mach substance user groups:

Participant 523 (H): “Sometimes when I drink I make poor decisions. For example, I kiss a friend’s ex-boyfriend, or I spend a lot of money.”

Participant 56 (L): Drinking too much and saying or doing something that I shouldn’t.”

Participant 501 (L): I sometimes worry if I’m drunk, I might say something that I don’t really mean to a loved one and offend them.

Participant 256 (H): “Possibly acting like an idiot.”

The concern of being dependent on alcohol or drugs was also commonly articulated by participants in both groups (High Mach $n = 26$; Low Mach $n = 30$). The content related to this expressed concern did not appear to differ between High and Low Mach substance user groups. Individuals in both groups described feeling worried about how they need alcohol or cannabis to help them fall asleep or to successfully function in their daily lives. A concern that substances must be generally relied upon was also indicated. Both groups also noted concern related to needing alcohol to feel confident or generally comfortable with themselves:

Participant 435 (H): “I don’t want to get comfortable with drinking in order to be comfortable with myself because I fear that one day that will be my only way to let loose and have fun (addiction).”

Participant 242 (H): “I shouldn’t rely on alcohol for confidence.”

Participant 223 (L): “I feel like I have become somewhat dependent on alcohol in social situations.”

Across both groups, 12 participants (High Mach $n = 3$; Low Mach $n = 9$) expressed concern related to being thought of as a “substance user” or concern about the stigma of using alcohol and drugs. The content related to this expressed concern did not appear to differ between High and Low Mach substance user groups. Participants reported concern related to others judging them negatively for their substance use, should they find out about the user’s addictive behaviour. The issue of other family members viewing the user negatively was common among both High and Low Mach substance users. Finally, participants were concerned about being labeled as a substance user:

Participant 22 (L): “I am scared of being thought of as an alcohol.”

Participant 111 (H): “It’s embarrassing and no one needs to know.”

Participant 62 (L): “I do find that the stigma of cannabis use in society still present and that makes me more comfortable consuming alone, or privately with others.”

Participant 400 (H): “But I worry that I am being judged by my family and friends for using.”

Chi-Square Tests of Independence were performed to examine the relationship between Machiavellianism and each of the coding subthemes, including concern related to amount used, health risks, losing control, concern related to being dependent, stigma of using, and not having concerns related to substance use behaviour. No significant relationships were found.

Motivation for Use

All codes for the theme of motivation for use can be viewed in Table 14. The most common reason for participant substance use was for pleasure or to have fun (High Mach $n = 126$; Low Mach $n = 135$) The content related to this expressed reason for use did not appear to differ between High and Low Mach substance user groups. Participants described using alcohol, cannabis, and MDMA to have fun and enjoy themselves. Relatedly, participants explained that they would engage in substance use in order to elevate an already positive experience:

Participant 402 (L): “I smoke cannabis socially at concerts every once in a while, it takes the already pleasant experience of seeing a band I love performing live, and elevates it to a whole new level.”

Participant 403 (H): “Use cannabis to heighten an enjoyable experience.”

Participant 385 (H): “I typically drink to enhance a good time.”

Participant 165(H): “My favourite part about any drugs is molly and the intense happiness you feel and the way music feels in your body.”

Participant 352 (L): “I drink to have fun.”

These reasons overlapped with participants’ explanations when describing the use of substances for celebratory reasons (High Mach $n = 14$; Low Mach $n = 18$).

Table 14*Theme of Motivation for Use and Associated Codes*

Theme	Comprising Codes
Motivation for Use	Pleasure/thrill-seeking Celebration Cope with depression/sadness Cope with anxiety Cope with general emotional distress/stress Cope with traumatic stress To be more social Confidence Enhance relationship/conversation Pressured/Influenced by other To focus/concentrate To be more open-minded Manage boredom Regulate appetite Enjoy the taste Cope with physical pain Relaxation Sleep

Coping with emotional distress and mental health concerns were frequently indicated by both High and Low Mach substance users as reason for use. Both alcohol (High Mach $n = 26$; Low Mach $n = 28$) and cannabis (High Mach $n = 16$; Low Mach $n = 20$) were used to cope with feelings of depression or sadness. The content related to this expressed reason for use did not appear to differ between High and Low Mach substance user groups. Participants engaged in substance use to cope with overwhelming emotions of sadness and thoughts of hopelessness and suicidality. Participants also reported using alcohol or cannabis to improve their mood when feeling depressed:

Participant 102 (H): “When I feel hopeless and depressed I intoxicate a lot.”

Participant 140 (H): “I use to remove myself from reality that is consumed with suicidal ideation.”

Participant 62 (L): “Use it to moderate symptoms of depression.”

Participant 153(L): “Its usually when someone has upset me and when I feel betrayed.”

Participant 226 (H): “When I need to feel happier.”

Anxiety was another mental health concern that both High and Low Mach substance users reported as a reason for using both alcohol (High Mach $n = 32$; Low Mach $n = 31$) and cannabis (High Mach $n = 34$; Low Mach $n = 38$). The content related to this expressed reason for use did not appear to differ between High and Low Mach substance user groups. Participants reported that they engaged in substance use to cope with both general and social anxiety. Using substances would often alleviate anxiety and allow participants to improve their functioning:

Participant 54 (L): “I like drinking because it allows me to let down my anxiousness and finally be free of the constant worrying in social environments.”

Participant 524(L): “It really helps with my severe anxiety and agoraphobia.”

Participant 400 (H): “I get quite anxious and drugs/drinking provides a kind of peace that I can't achieve on my own.”

Participant 326 (H): “To get rid of social anxiety at social events.”

Participant 166 (H): “I'll smoke to stop thinking about things that worry me. At night if I'm sober I usually have crazy intrusive thoughts and think about the past which regularly upsets me so I smoke to change what I'm thinking about. It makes it easy hyperfocus on topics that are not important which wont affect my emotional state.”

General stress was another mental health concern that both High and Low Mach substance users reported as a reason for using both alcohol (High Mach $n = 44$; Low Mach $n = 38$) and cannabis (High Mach $n = 37$; Low Mach $n = 36$). The content related to this expressed reason for use did not appear to differ between High and Low Mach substance user groups. Participants described using substances to cope with stress or to take their minds off a stressful situation or issue:

Participant 354 (H): “If I am stressed out.”

Participant 48 (H): “Consume alcohol on Fridays or Saturdays to take my mind off my personal problems/responsibilities.”

Participant 101 (L): I like to take my mind off the daily stressors in my life (school, embarrassing things I've said, rude customers at work, etc.).”

Both High and Low Mach substance users provided accounts of using substances to cope with distress related to having experienced a past traumatic event (High Mach $n = 11$; Low Mach $n = 6$). The content related to this expressed reason for use did not appear to differ between High and Low Mach substance user groups. Participants shared that their use helped them cope with past experiences, such as being involved in a motor vehicle collision, coping with the death of a parent, or experiencing physical, emotional, or sexual abuse:

Participant 37(H): “My motivation was always to numb myself. It started after the assault when I was younger, it made me not think about it, or if I did, I felt nothing about it.”

Participant 287 (L): “To escape intrusive thoughts of killing myself and of being raped.”

High and Low Mach substance users reported using alcohol to be more social (High Mach $n = 34$; Low Mach $n = 47$). The content related to this expressed reason for use did not appear to differ between High and Low Mach substance user groups. Participants explained that drinking allowed them to be more comfortable, social, and more outgoing.

Participant 10 (H): “I use alcohol to become an outgoing person and be more social.”

Participant 369 (L): “Socially I will drink to be more outgoing and sociable with the people I am with.”

A second explanation for drinking that was discussed by individuals in both groups was that consuming alcohol was often an expected component of being social:

Participant 1 (H): “Drinking is a social activity.”

Participant 473 (L): “For me it’s like tea, you drink it socially, to chat.”

Relatedly, individuals in both groups noted that they drink alcohol to feel more confident in themselves (High Mach $n = 13$; Low Mach $n = 17$). The content related to this expressed reason for use did not appear to differ between High and Low Mach substance user groups. Specifically,

the use of alcohol reportedly helped participants feel more self-assured in their own abilities and ideas, less shy, and less caring of potentially negative evaluations or judgements from others. In addition, both High and Low Mach substance users indicated that feeling intoxicated helped them feel comfortable in communicating with other people:

Participant 151 (H): “It makes me more confident in myself. When I am drinking I am much more open and confident with talking to a stranger which I do enjoy because I like meeting new people.”

Participant 37 (H): “I loved how confident it made me. As I mentioned, I felt as if I could do anything and say whatever I wanted. Which was a far cry from what I was like sober. It made me comfortable enough to speak to men.”

Participant 22 (L): I enjoy that it makes me courageous. I would never have the guts to approach some people had I not been drunk already. I feel more confident about myself.”

Individuals in both the High and Low Mach substance using groups reported a pattern of using substances to enhance their interpersonal relationships (High Mach $n = 21$; Low Mach $n = 26$). The content related to this expressed reason for use did not appear to differ between High and Low Mach substance user groups. Participants stated that using drugs or alcohol with other people was often a bonding experience, which helped strengthen the emotional and social connection between themselves and others. Participants reported that their substance use allowed friendships to form, strengthened existing friendships, or improved previously ruined relationships:

Participant 118 (H): “Smoking has actually created a positive change in my relationship with my ex-boyfriend, although we broke up 4 years ago, we still connect and hangout from time to time due to the fact that neither one of us got in a relationship after our breakup. Throughout our relationship I was very depressed, similarly so was he, which led to us fighting very often and not being able to understand and enjoy each other. Now we are able to just smoke, and relax and hangout without arguing or having any negative tension between us.”

Participant 523 (H): I like drinking because I tend to have fun and create great memories with my friends.”

Participant 394 (H): “I love having in depth conversations with my friends and growing bonds with them over our shared state of mind.”

Participant 518 (L): “It’s more fun to express a mutual feeling of euphoria or whatever that feeling may be.”

Participant 22 (L): “I have become friends with a lot of people through going to parties and socializing while I am drunk.”

Feeling pressured or being influenced by peers to consume alcohol or drugs was another common motivation for use (High Mach $n = 21$; Low Mach $n = 26$). The content related to this expressed reason for use did not appear to differ between High and Low Mach substance user groups. Participants described their reasons for substance use as ensuring that they would be socially accepted by peers, to avoid feeling judged by others, and due to following directives from friends to maintain the relationships.

Participant 24 (H): “When my friends would ask me to come drink with them, it was like “sigh, i have to drink tonight, again?”

Participant 25 (H): “To fit in with friends.”

Participant 72 (L): “I chose to drink because I felt my friends would judge me if I chose not to, same with drugs. I just felt that I would lose some of my friends if I stopped drinking with them or going to the bar with them.”

Participant 230 (L): I feel pressured to do so when others are around.”

Both High and Low Mach substance users reported using cannabis and non-prescribed stimulant medication to help them concentrate (High Mach $n = 11$; Low Mach $n = 13$). The content related to this expressed reason for use did not appear to differ between High and Low Mach substance user groups. Individuals in both groups described using substances to more efficiently focus at school, at work, and during leisure activities:

Participant 290 (H): “Adderall while studying for an important test.”

Participant 36 (L): “At the studio with my band mates. It helps a lot when we are recording and I’m trying to stay on task. Generally, weed stops my brain from doing circles around itself and allows me to focus on one thing.”

Participant 235 (L): “Helps me concentrate on tasks.”

Another reason for use that was acknowledged by both High and Low Mach substances users was to be more open-minded (High Mach $n = 17$; Low Mach $n = 28$). The content related to this expressed reason for use did not appear to differ between High and Low Mach substance user groups. Individuals in both groups described using substances to inspire creativity or stimulate imagination in their artistic pursuits, such as in painting, drawing, music, or embroidery. Further, users were motivated to consume cannabis, psilocybin mushrooms, or LSD, in order to allow themselves to experience a shift in their perspective and reflect on themselves and their lives in different ways:

Participant 387 (H): Weed often allows me to get more in touch with my emotions without feeling overwhelmed by them. Essentially being able to analyze my emotions from an outsider point of view.”

Participant 117 (H): “To open up my mind about different things, to get different perspectives. And when I get high I am able to understand and see peoples true colours and intention, since when I'm not high its hard for me to do it.”

Participant 180 (L): “The motivation to use drugs for me is the heightened functioning of the imaginative faculty that occurs as a result of being high.”

Participant 336 (L): “Actually promotes me to think more in-depth and allows me to explore a new way of thinking.”

High and Low Mach substance users also reported using substances to manage boredom (High Mach $n = 22$; Low Mach $n = 16$), consuming cannabis to regulate their appetite (High Mach $n = 9$; Low Mach $n = 16$), consuming alcohol due to enjoying the taste (High Mach $n = 19$; Low Mach $n = 17$) and to cope with physical pain (High Mach $n = 8$; Low Mach $n = 13$). In addition, High and Low Mach substance users reported a motivation to use drugs or alcohol to relax during leisure periods (High Mach $n = 92$; Low Mach $n = 100$), and to aid in facilitating sleep (High Mach $n = 40$; Low Mach $n = 44$). Differences in these expressed reasons for use were not found between groups or could not be determined between groups due to briefer accounts being provided for these motivations.

Chi-Square Tests of Independence were performed to examine the relationship between Machiavellianism and each of the coding subthemes, including use for pleasure, use for celebration, use to cope with depression, anxiety, stress, or with trauma-related distress, use to increase confidence, use to be more social, use to enhance relationships, use to improve focus, use due to peer pressure, use to be more open-minded, use to manage boredom, appetite, or physical pain, use to relax, to help facilitate sleep, and use to enjoy the taste. No significant relationships were found.

User State (Pre-Use)

All codes for the theme of user state (pre-use) can be viewed in Table 15. High and Low Mach substance users reported experiencing specific thoughts and feelings before engaging in alcohol or drug use. Individuals from both groups provided accounts of how they would prepare and plan for their substance use behaviour (High Mach $n = 24$; Low Mach $n = 36$). Descriptions related to substance use planning did not appear to differ between High and Low Mach substance user groups. Participants explained that they would make plans before beginning to engage in substance use, including determining how the user would get home safely, whether the environment that the user would consume alcohol or drugs in, was safe, and who could be called upon if the user were to become too intoxicated or sick:

Participant 521 (H): "Before drinking I think of how I will get home or who I can turn to if I feel the need for assistance in the case where I drank too much."

Participant 445 (L): "Before I drink, I just make sure I have a secure ride home, I'm with people I trust, and I'm in a safe environment."

Table 15

Theme of User State (pre-use) and Associated Codes

Theme	Comprising Codes
User state (pre-use)	Planning use Positive anticipation of use Experience of cravings Pre-use anxiety Pre-use low mood/sadness Pre-use guilt Pre-use stress Pre-use boredom

High and Low Mach substance users were also noted to consider whether they had responsibilities for the follow morning, or whether responsibilities and obligations for the night of planned use had been accomplished. Before engaging in substance use, participants' accounts from both groups also suggested that an effort was made to consider how much of a substance one would consume, as well as the pace of consumption:

Participant 391 (H): "I think: How much am I going to drink."

Participant 334 (L): " I am thinking about how to pace myself so I don't end up drinking too much."

Participant 234 (L): " I think about my limit and try to stay within it."

High and Low Mach substance users frequently endorsed positive anticipation of alcohol or drug use (High Mach $n = 89$; Low Mach $n = 97$). Descriptions related to participants' positive anticipation of use did not appear to differ between High and Low Mach substance user groups. Participants described feeling a sense of excitement related to the potential for having fun while under the influence of alcohol or drugs and related to the pleasurable feelings of being under the influence of a given substance:

Participant 519 (H): "Most of the time I am excited to smoke or drink because I like the feeling it gives me."

Participant 425 (L): "That I'm excited usually. I get excited that i know that soon I'll be feeling good."

High and Low Mach substance users also expressed positive anticipation of experiencing relief from anxiety:

Participant 3 (H): "Excited to get rid of those anxious feelings."

Participant 284 (L): "I have hopes that my anxiety will subside."

Cravings were another experience that both High and Low Mach substance users endorsed before engaging in substance use (High Mach $n = 6$; Low Mach $n = 10$). Descriptions of cravings did not appear to differ between High and Low Mach substance user groups.

Participants reported experiencing cravings and urges for cannabis, alcohol, and other drugs, of which they intended to act upon:

Participant 240 (H): "Oh I'm craving a drink and I have one."

Participant 404 (L): "Tunnel vision. I have to have it no matter what and nobody will stop me. It was the only thing that would make me feel alive."

Participant 474 (L): "Feelings of needing instant gratification, i.e. that quick fix."

High and Low Mach substance users also reported a range of emotional experiences, including anxiety, sadness, guilt, and stress. Individuals from both groups expressed that they felt anxious before using substances (High Mach $n = 36$; Low Mach $n = 34$). The content of anxious experiences before using did not appear to differ between High and Low Mach substance user groups. Participants appeared to acknowledge their pre-use anxious in two ways. The first was related to concern about the users' future behaviour, once under the influence of alcohol or drugs. This apprehension included hoping one would not embarrass themselves or hoping that one would not go "overboard" and act in a way that they would later regret. The other way pre-use anxiety was acknowledged involved the user feeling anxiety in the moment, due to a panic attack or stressful thoughts:

Participant 140 (H): "I am having a panic attack, or I am having a crisis of some sort and need to de stress."

Participant 342 (L): “I need to escape from my anxiety, I need to calm my nerves, I need to forget for a while and take a break. I just gotta, I know it'll make me feel better.

Notably, a pattern was observed that High Mach substance users tended to describe their experience of anxiety, before using, in more intense terms than described by Low Mach substance users:

Participant 25 (H): “Extreme anxiety and stress. Hopeless. A need for escape.”

Participant 495 (H): “Before smoking weed I am often very anxious. My awareness of my environment and people around me is very heightened and it makes me feel uneasy and uncomfortable.”

Participant 378 (L): “Before I use cannabis, I get a little anxious. Sometimes I ask myself if I should do this.”

Participant 77 (L): “Generalized feelings beforehand are anxiety, inability to concentrate, etc.”

An experience of sadness or low mood was reported among High and Low Mach participants before using substances (High Mach $n = 19$; Low Mach $n = 13$). A distinction could be made between descriptions provided between High Mach substance users and Low Mach substance users in their respective accounts of pre-use sadness. Whereas Low Mach participants tended to report general feelings of sadness or remembering painful thoughts of past abuse, High Mach individuals tended to provided accounts that illustrated a low sense of self-worth:

Participant 469 (H): “Most of the time I feel like I can't do anything right or I'm screwing up something I really care about and I use it as an escape or a distraction.”

Participant 320 (H): “Awkward, quiet, the one-off person who really shouldn't be there because why the utter fuck would anyone actually want me there, no one actually wants me there, why did I bother showing up?”

Participant 200 (L): “I would have extreme emotions of sadness or anger and that is why I would use marijuana.”

Participant 274 (L): “I feel sad that this is my only escape that I have at the moment from remembering my sexual assault and or verbal abuse.”

The experience of guilt was also endorsed by High and Low Mach substance users (High Mach $n = 8$; Low Mach $n = 10$). Descriptions of feeling guilty before using did not appear to differ between High and Low Mach substance user groups. Participants described feeling guilty because their loved ones would be disappointed in them for using, because of the potential health risks, and because of the belief that the user's time could be used more productively:

Participant 221 (H): "Probably shouldn't be drinking or smoking and there are probably better ways to spend my time but often just do it anyways."

Stress was another experience endorsed by High and Low Mach substance users before using alcohol or drugs (High Mach $n = 17$; Low Mach $n = 13$). Descriptions of feeling stressed before using did not appear to differ between High and Low Mach substance user groups. Participants reported experiencing stress that was often related to general life events, such as in relationships, school, or work, prior to engaging in alcohol or drug use. Finally, boredom was an experience endorsed by High and Low Mach substance users before using alcohol or drugs (High Mach $n = 5$; Low Mach $n = 4$). Individuals from both groups indicated feeling bored before using and highlighted this feeling as an impetus for use.

Chi-Square Tests of Independence were performed to examine the relationship between Machiavellianism and each of the coding subthemes, including use for planning before use, positive anticipation of use, cravings, anxiety, sadness, guilt, stress, and boredom. No significant relationships were found.

User State (During Use)

High and Low Mach substance users reported experiencing specific thoughts and feelings during their use of alcohol or drugs. All codes for the theme of user state (during use) can be viewed in Table 16. Individuals from both groups provided accounts of how they would monitor

themselves while intoxicated, in order to determine if they would engage in further substance use or terminate consumption (High Mach $n = 7$; Low Mach $n = 10$). Descriptions of this monitoring behaviour during using did not appear to differ between High and Low Mach substance user groups. Participants tended to reflect on their natural limit in terms of their ability to manage the effects of the consumed substance before making a decision to continue to use or stop:

Participant 299 (H): “Assess how I’m feeling and if i can take more or if i should stop.”

Participant 186 (L): “While I’m drinking, I pay attention to the way I feel to decide whether I should continue drinking or stop before I consume too much/feel sick.”

Table 16

Theme of User State (during use) and Associated Codes

Theme	Comprising Codes
User state (during use)	Planning use/monitoring Positive anticipation of use Experience of cravings During-use anxiety During-use happiness/enjoyment Becoming more social/outgoing Feeling relaxed Feeling focused Feeling numb Feeling more confident

Experiencing anxiety during the use of substances was reported by both High and Low Mach substance users (High Mach $n = 20$; Low Mach $n = 16$). Descriptions of the experience of anxiety during using did not appear to differ between High and Low Mach substance user groups. Participants described feeling anxious due to being judged by their peers, due to feeling anxious about potentially engaging in embarrassing behaviour, and due to what was commonly referred to as a bad “high” or “trip”, wherein the user experienced distressing thoughts:

Participant 519 (H): “Sometimes during bad highs I have thoughts I was gonna die or panicked.”

Participant 36 (L): “My mind would usually race, never staying with one thought for a long period of time.”

A positive constellation of feelings, including happiness, satisfaction, and enjoyment, were also reported by both High and Low Mach substance users (High Mach $n = 99$; Low Mach $n = 114$). Descriptions of the experience of an elevated mood during using did not appear to differ between High and Low Mach substance user groups. Participants stated that their substance use caused them to often feel an overwhelming sense of joy and euphoria, where they were in a better position to enjoy themselves. Cannabis and alcohol were commonly cited as substance that would induce these experiences:

Participant 513 (H): “While high on marijuana, I feel euphoric. I feel the happiest I've ever been and as careless as I will ever be. My thoughts seem to resemble that of an infant, or just generally don't make sense. my thoughts go in circles and everything connects. I usually describe it as "my brain is smiling" or like I'm "in a music video.”

Participant 487 (H): “While drinking, I feel amazing. I feel like I am having the best time of my life.”

Participant 501 (L): “I feel happy and feel like I'm having a great time.”

Participant 58 (L): “Happy and blissful. I usually feel positive and optimistic, like the world is a better place than I realized.”

High and Low Mach substance users also reported feeling more social and outgoing while using (High Mach $n = 9$; Low Mach $n = 9$), feeling more relaxed (High Mach $n = 54$; Low Mach $n = 56$), feeling more focused (High Mach $n = 1$; Low Mach $n = 2$), feeling numb (High Mach $n = 4$; Low Mach $n = 4$), and feeling more confident in oneself (High Mach $n = 2$; Low Mach $n = 4$). Differences in these experiences were not found between groups or could not be determined between groups due to briefer accounts being provided for these experiences.

Chi-Square Tests of Independence were performed to examine the relationship between Machiavellianism and each of the coding subthemes, including use for planning and monitoring during use, feeling anxious, experiencing euphoria, feeling more social, feeling more focused, feeling numb, and feeling more confident in oneself. No significant relationships were found.

User State (Post-Use)

As during the pre-use and during-use periods, High and Low Mach substance users reported experiencing specific thoughts and feelings after their use of alcohol or drugs. All codes for the theme of user state (post-use) can be viewed in Table 17. As during the accounts provided previously, a positive constellation of feelings, including happiness, satisfaction, and enjoyment, were reported by both High and Low Mach substance users subsequent to consuming alcohol or drugs (High Mach $n = 22$; Low Mach $n = 36$). Descriptions of the experience of an elevated mood after using did not appear to differ between High and Low Mach substance user groups. A similar sense of euphoria was reported by many participants, though most apparent were accounts by participants that endorsed a sense of satisfaction and appreciation for having undergone a positive experience:

Participant 184 (H): “Emotionally, I feel like I had a fun night/day and continue to contact others if they are okay.”

Participant 98 (L): “Mostly happy or glad I did it.”

Participant 501 (L): “I look back on all the fun memories made and laugh about all the funny things that happened the night before.”

Table 17

Theme of User State (post-use) and Associated Codes

Theme	Comprising Codes
User state (post-use)	Post-use happiness/enjoyment Becoming more introspective/reflective Post-use low mood/sadness Post-use guilt Post-use regret Post-use anxiety Post-use experience of feeling relaxed Post-use increase in focus Post-use numbness

Individuals from both groups also provided accounts describing how they became more introspective and reflective on various subjects, subsequent to consuming alcohol or cannabis (High Mach $n = 6$; Low Mach $n = 10$). Descriptions of the experience of thinking more deeply after using did not appear to differ between High and Low Mach substance user groups. Participants reported that they were able to contemplate a wide range of issues in greater detail and reflect on their thoughts and feelings more deeply:

Participant 403 (H): “Cannabis makes me think about things in great detail with a sort of gentle curiosity.”

Participant 164 (H): I get lost in thoughts, thinking about what I think, how I feel. It varies all the time.”

Participant 410 (L): “I think about a lot of deep subjects. I like to reflect on life.”

A wide range of emotions were also experienced by High and Low Mach substance users subsequent to consuming alcohol or drugs. Feelings of sadness and depression were experienced by individuals from both groups following the use of alcohol or drugs (High Mach $n = 6$; Low Mach $n = 10$). Consistent with participants’ pre-use experience, High Mach and Low Mach substance users tended to differ in their accounts. Specifically, High Mach substance users reported more intense depressive experiences compared to Low Mach substance users. In

addition, some High Mach substance users also provided comments related to having a low sense of self-worth, while Low Mach substance users did not provide these kinds of comments:

Participant 37 (H): “After using, it was also a feeling of utter defeat and remorse. I would lie in bed and try and shit out whatever decisions I had made while high or drunk. As time went on, I’d get suicidal and depressed.”

Participant 469 (H): “I have gotten into horrible spirals where I don't want to do anything, sometimes I find that I can't move or just don't have the motivation to move. I know many people feel this way but, it's like an indescribable sadness where I can't stop feeling like I'm a complete waste of space.”

Participant 306 (L): “The day after drinking I always feel sad. Even if it was a good night out and nothing bad happened, I always just wake up feeling sad and like people don't like me.”

Participant 176 (L): “After drinking, I get really bad anxiety and borderline depression for a few days and have a lot of negative self-thoughts.”

High and Low Mach substance users also described experiencing feelings of guilt (High Mach $n = 27$; Low Mach $n = 32$), and regret (High Mach $n = 43$; Low Mach $n = 39$), after the use of alcohol or drugs. Guilt was conceptualized as the feeling experienced when the user acted in a way that they knew was wrong or risky, whereas regret was defined as the feeling experienced when the user reflected on past actions and determined that an alternative outcome was desired. Descriptions of the experience of both guilt and regret, after using, did not appear to differ between High and Low Mach substance user groups. Participants’ experience of guilt was related to engaging in substance use behaviour that was at odds with one’s cultural or familial values, or against one’s moral beliefs. Participants also felt guilty subsequent to use, due to being familiar with the potential negative impacts of substance use on one’s health:

Participant 513 (H): “After ingesting marijuana, I will usually feel extreme guilt since I know my family would be so disappointed in me.”

Participant 410 (H): “Sometimes I feel guilty if i go too hard. I just feel like a bad person, sort of guilty.”

Participant 16 (L): “What I’m doing is wrong and that I should stop... feeling guilty.”

Participant 74 (L): “Feeling guilty because of its bad effects on my health and sleep.”

High and Low Mach substance users' accounts of post-use regret were related to experiencing negative reactions to making negative decisions while intoxicated, to believing, upon reflection, that engaging in non-substance using activities would have been a more productive use of time, and to the experience of negative aftereffects of consuming alcohol or drugs:

Participant 240 (H): "Sometime regret when you get that horrible hangover or when you do something that you didn't mean."

Participant 515 (H): "After drinking I usually feel bad because I think it was a waste of my night."

Participant 301 (L): "I often feel regret over a night of drinking due to the decisions I make while drunk, as well as the health implications that I become acutely aware of during a hangover."

Post-use, High and Low Mach substance users also reported feeling more anxious (High Mach $n = 18$; Low Mach $n = 17$), and conversely more relaxed (High Mach $n = 28$; Low Mach $n = 42$), feeling more focused (High Mach $n = 1$; Low Mach $n = 2$), and feeling numb (High Mach $n = 5$; Low Mach $n = 3$). Differences in these experiences were not found between groups or could not be determined between groups due to briefer accounts being provided for these experiences.

Chi-Square Tests of Independence were performed to examine the relationship between Machiavellianism and each of the coding subthemes, including experiencing an elevated mood post-use, becoming more introspective or reflective post-use, and the experiences of sadness, guilt, regret, anxiety, and relaxation, post-use. No significant relationships were found.

Impact on Relationships

Another observed theme commonly discussed by High and Low Mach substance users involved the consumption of substances on the user's relationships. All codes for the theme of impact of use on relationships can be viewed in Table 18. Participants in both groups expressed that their substance use caused tension or conflict in their relationships (High Mach $n = 41$; Low

Mach $n = 37$). Descriptions of the negative impact of substance use on relationships did not appear to differ between High and Low Mach substance user groups. Individuals in both groups indicated that their substance use negatively impacted their friendships. Substance users reported that they would lie or steal from friends, isolate themselves from friends as part of their ongoing addictive behaviour, or act inappropriately while under the influence of a substance, which would cause relationship problems:

- Participant 24 (H): “I was drunk and kissed my best friend and i wouldn't've of done that sober and that caused problems between us.”
- Participant 143 (H): “It has isolated me from friends and turned me into a shell of a person.”
- Participant 386 (H): “My best friend who I hang out with the most has a baby and I would never smoke in front of him. My urge to smoke was always stronger than my urge to see her which would cause me to see her less/reschedule my plans with her that didn't involve her baby.”
- Participant 16 (L): “It has caused a lot of lying to friends and family.”
- Participant 68: (L): Recently I did something against a friend’s wishes that upset her, it was small but still. I generally am not one to actively decide to go against a valid request from friends.”

Table 18

Impact on Relationships and Associated Codes

Theme	Comprising Codes
Impact on Relationships	Tension/Conflict in relationships Termination of relationships Judgement from family/friends Concern from family/friends No negative impact

Content of participant accounts was also related to the use of substances causing conflict between parents or siblings of the user. Users would avoid family members due to addictive behaviour or embarrassment related to ongoing use. This avoidance included not attending familial responsibilities or events. Further tension was also characterized by verbal arguments between parents or siblings of the user, in which there was disagreement about the severity of the

addictive behaviour of the user. Participants were also noted to act aggressively toward family via overt verbal abuse or more covert theft:

Participant 111 (H): “I stole from my mother and have no idea how to tell her.”

Participant 386 (H): “A lot of my friends and family don't like me smoking and would often cause a lot of fights, especially between me and my older sister.”

Participant 404 (L): “My drinking and drug use hurt my relationships horribly. I was never there and I frequently missed set appointments and events with family. Friends and family were fearful for my health and safety.”

Participant 54 (L): “I avoided my family, as I did not want to get caught and I was embarrassed and guilty to be like that around them. Once my parents found out, the stress that my drug use put on them was enormous. Each day was filled with fighting and worrying, and ultimately ended with an ultimatum: get clean or get out.”

Conflict in romantic relationships was also described by both High and Low Mach substance users. Participants highlighted that their alcohol or drug use caused them to insult their partners or be apathetic to their partner's problems. Under the influence, some individuals also reported that they lied to their partners about their addictive behaviour and were told by their partners that their personalities had taken on a negative quality:

Participant 330 (H): “My boyfriend doesn't like me using it and claims I am too different and unlikable when I am on it.”

Participant 26 (H): “Drinking has caused me to say some rude things to my boyfriend that I should not have said.”

Participant 514 (L): “Boyfriend - Discussed how I was lying and sneaking around to hide my addictive habits, leaving him to worry about me like a parent with a teenage child.”

Participant 513 (L): “513 - It affects my boyfriend to the point where he will cry about it and when I'm high, I get apathetic and therefore don't care, leading to major arguments and lots of tears.”

In a similar vein, High and Low Mach substance users indicated that many of their relationships ended due to their substance use (High Mach $n = 9$; Low Mach $n = 12$). Descriptions of the negative impact of substance use on the termination of relationships did not appear to differ between High and Low Mach substance user groups. The use of substances was described as a

factor in the ending of relationships of romantic partners and friends in several ways. The most commonly observed account involved a partner or friend being unable to handle the user's addictive behaviour, as the user acted recklessly or was not present in the relationship. A second way in which relationship terminations were described was where the user was asked to stop consuming their substance of choice. When the user would not agree to do this, or made efforts to meet this request and failed, the relationship would end. Third, romantic relationships would be terminated due to the user's infidelity while under the influence of alcohol or drugs:

Participant 469 (H): "I did lose one relationship because he told me I could either quit or he would dump me. He knew full well that I smoked but waited a month before telling me he's wanted me to quit the whole time."

Participant 37 (H): "As a result of my addiction I lost all my friends and family and ended up in a homeless shelter at the age of 20."

Participant 276 (H): "My ex and I had problems because of my reckless drinking - eventually led to a breakup and I know it was my fault."

Participant 474 (L): "My girlfriend at the time tried to be supportive but eventually she couldn't handle it and left me."

Participant 404 (L): "Yes. I've cheated on every girlfriend I've ever had. I've stolen from friends. I've slept with my friend's girlfriends. I've physically hurt some friends. I've slept with more women than I can count."

Receiving harsh judgement from family and friends due to users' addictive behaviour was also common in both High and Low Mach substance users (High Mach $n = 17$; Low Mach $n = 20$). Descriptions of criticism due to ongoing substance use did not appear to differ between High and Low Mach substance user groups. Participants noted feeling judged by parents, or singularly their mothers, grandparents, and friends. Individuals from both groups highlighted that family and friends judged their substance use negatively, due to substance use being immoral, due to use being a health risk, and due to the potential for progression towards dependency. Often, it was reported that family or friends communicated a desire for the user to stop engaging in their addictive behaviour. For the same reasons for judgement, participants from both groups

expressed that family and friends were concerned about their substance use (High Mach $n = 20$; Low Mach $n = 26$):

Participant 136 (H): “My friends are beginning to notice I have a problem and my parents want me to quit drinking.”

Participant 378 (L): “My mother is starting to worry slightly. Which is understandable, because I did not touch substances for 2 years (I still rarely drink), but I have started using cannabis somewhat regularly.”

It is noted that despite many High and Low Mach substance users providing details about the negative impact of their substance use on their relationships, many participants in both groups attested to their substance use having no negative impact on their relationships (High Mach $n = 147$; Low Mach $n = 150$).

Chi-Square Tests of Independence were performed to examine the relationship between Machiavellianism and each of the coding subthemes, including substance use causing tension or conflict in relationships, leading to the termination of relationships, leading to the user being judged by family or friends, leading to family and friends expressing concern about the user’s addictive behaviour, and causing no impact. No significant relationships were found.

Impact on Life Domains

All codes for the theme of impact of use on life domains can be viewed in Table 19. High and Low Mach substance users recounted that their substance use negatively impacted several domains of functioning, though many individuals in both groups denied that their substance use negatively impacted any life domain (High Mach $n = 141$; Low Mach $n = 146$). Descriptions of substance use negatively impacting functioning in any life area did not appear to differ between High and Low Mach substance user groups. Participants in both groups explained that their use of alcohol or drugs negatively impacted their academic functioning (High Mach $n = 18$; Low Mach $n = 23$). Users reported that they would attend classes while inebriated or while suffering

from the aftereffects of alcohol or drugs, making it difficult to concentrate in class. Furthermore, participants reported being distracted by thoughts of using while attending classes, further impairing their ability to focus or make appropriate efforts during class. Both High and Low Mach substance users noted that they often did not attend class due to their substance use, leading to failing to do assignments, failure of the class, or more seriously, culminating in the withdrawal of enrollment:

Participant 411 (H): “A few times I've missed school assignments because I was under the influence or had to write an assignment while under the influence.”
 Participant 386 (H): “It consumed my thoughts almost 24/7. I would be in class during lectures and all I could think about was not being able to wait to get home to smoke.”
 Participant 54 (L): “My drug use caused me to lose my scholarship to my first university. My drug use caused me to drop out of university two separate times.”
 Participant 127 (L): “I would bring vodka to school in water bottles and drink during the day.”

Table 19

Impact on Life Domains and Associated Codes

Theme	Comprising Codes
Impact on life domains	No negative impact Negative impact on academic functioning Negative impact on employment Financial loss Development of mental health issues Development of memory impairment Medical concerns Motivation issues Unable to keep commitments

As in the academic domain, High and Low Mach substance users indicated that their use of alcohol or drugs impaired their ability to maintain gainful employment (High Mach $n = 10$; Low Mach $n = 10$). Participants reported that being under the influence of alcohol or drugs, or

experiencing the aftereffects of the same, has resulted in not being able to attend work shifts, performing inadequately at work, and being fired.

Participant 220 (H): “I can’t hold down a steady job.”

Participant 249 (L): “I’ve been too hungover to go to work.”

Financial loss was yet another issue that was impacted by participants’ substance use (High Mach $n = 9$; Low Mach $n = 11$). Both High and Low Mach substance users recognized that their substance use caused financial strain on the user, often resulting in the individual spending beyond their means:

Participant 515 (H): “It caused financial issues. I lost a lot of money I could have been saving towards something better instead of using it all the time on alcohol.”

Participant 404 (L): “I spent money I didn’t have to get what I needed.”

Both High and Low Mach substance users noted that their use of alcohol or drugs was a factor in the development of mental health issues (High Mach $n = 21$; Low Mach $n = 27$). Participants from both groups attributed the development, or exacerbation of, anxious or depressive symptoms, to their substance use. Users also provided accounts which described their substance use as triggering episodes of paranoia. Alcohol, cannabis, and nicotine were highlighted as substances that negatively influenced users in this domain:

Participant 326 (H): “When I heavily smoked marijuana, I was severely sad and my anxiety was horrible.”

Participant 523 (H): “I began to develop severe anxiety every time I smoked marijuana.”

Participant 404 (L): “I suffer from depression and anxiety as a result of my addiction.”

Participant 200 (L): “I would act overly paranoid and distrustful of others.”

Building on the development of mental health concerns caused by substance use, participants reported that their alcohol or drug use caused significant memory impairments (High Mach $n =$

7; Low Mach $n = 5$), such that users acknowledged that their ability to recall past events was less efficient or reliable than before beginning to engage in regular substance use:

Participant 117 (H): “I noticed that I am not the same. It takes a while for me to remember, if I even remember.”

High and Low Mach substance users also reported that their ongoing addictive behaviour had led to the development of medical issues or to causing the user to experience significant bodily harm (High Mach $n = 15$; Low Mach $n = 12$). Medical concerns included weight gain from excessive alcohol use, vitamin deficiency, and insomnia. Participants also expressed that their substance use led to the need for emergency medical services due to overdosing or excessive drinking:

Participant 389 (H): “I OD’d a few times on drugs.”

Participant 379 (L): “There was one occasion where I had to spend a night in ER due to excessive drinking.”

Both High and Low Mach substance users also described their use of alcohol or drugs to reduce their general motivation and influenced them to become lackadaisical (High Mach $n = 8$; Low Mach $n = 8$). Relatedly, being unable to keep commitments and responsibilities was another reported pattern that both High and Low Mach substance users endorsed (High Mach $n = 11$; Low Mach $n = 12$). Examples of commitments that users struggled to keep due to addictive behaviour, included social plans with peers, medical appointments, and family responsibilities:

Participant 10 (H): “Sometimes I get too drunk to the point where the following day is a complete write-off and I may even have to cancel plans with people or call into work because I am so hungover and lazy.”

Participant 323 (L): “haven’t been there for my family during times of grief.”

Chi-Square Tests of Independence were performed to examine the relationship between Machiavellianism and each of the coding subthemes, including substance use impairing academic functioning, functioning at work, negative impact on mental health, on user finances, on memory impairment, on medical concerns, on motivational issues, on commitment problems, and including denial of impairment in any life area. No significant relationships were found.

Alternate Coping Strategies

All codes for the theme of alternative coping strategies can be viewed in Table 20. Both High and Low Mach substance users acknowledged the use of various alternative coping strategies when their substance of choice was not available. Most commonly, users from both groups reported that they were able to naturally adjust to their day without the use of alcohol or drugs (High Mach $n = 63$; Low Mach $n = 87$). Descriptions of this adjustment to remaining sober did not appear to differ between High and Low Mach substance user groups. Participants reported that they were able to elect to remain sober and engage in their planned activity despite experiencing discomfort due to not using. Others stated that a transition to remaining sober was easily made:

Participant 367 (H): “Still continue the plans I had with friends but I would just be sober.”

Participant 394 (H): “If its unavailable, I just deal with it. Sometimes that means I’ll have a harder time falling asleep, but it doesn’t kill me.”

Participant 526 (L): “Do my chores without it, and I survive just fine.”

Participant 213 (L): “I carry on with my plans sober. I still have a good time not intoxicated.”

Table 20

Alternative Coping Strategies and Associated Codes

Theme	Comprising Codes
Alternative coping strategies	Adjust naturally Alternative substance Connecting with others Leisure activities Eating Sleeping Meditating Self-harm Exercise Be emotionally distressed

Other users in either group also specified the use of an alternative substance in the case of their substance of choice not being accessible (High Mach $n = 16$; Low Mach $n = 18$).

Descriptions of this alternative substances did not appear to differ between High and Low Mach substance user groups. Alternative substances included cannabis, alcohol, cocaine, melatonin, nicotine (cigarettes), electronic cigarette (“vaping”), prescription medication, lavender, and ashwagandha powder. A portion of participants who noted the use of alternative substances were willing to be flexible in their alternative substance use to manage distress or avoid withdrawal symptoms:

Participant 37 (H): “I would use whatever I could to get some kind of high. Including prescription drugs, and consuming household substances that could get me high. Honestly, not getting it was not an option. Withdrawal was too terrifying and painful to allow myself to not have a substance to get intoxicated off of.”

Participant 461 (L): “Attempt to find a substitute that could hold me off until my drug of choice was available.”

Connecting with others was another common pattern endorsed by both High and Low Mach substance users (High Mach $n = 20$; Low Mach $n = 31$). Descriptions of eliciting support

from others when in distress, did not appear to differ between High and Low Mach substance user groups. Participants provided accounts that indicated that conversing about their problems with friends, or spending time with friends, was often a useful alternative coping strategy to using substances:

Participant 495 (H): “Sometimes talking to a close friend will make me feel better.”

Participant 374 (H): “Just hangout with friends without alcohol or drugs.”

Participant 36 (L): “Now I try to talk about my problems instead of running from them like I use to.”

Participant 428 (L): “Spend time with friends.”

Distracting oneself by engaging in various leisure activities was also reported by both High and Low Mach substance users to cope with distress in the absence of their substance of choice (High Mach $n = 42$; Low Mach $n = 24$). Descriptions of leisure activities did not appear to differ between High and Low Mach substance user groups. Activities included watching television or movies, reading, listening to music, shopping, cooking, doing puzzles or sudoku, driving, playing video games, or masturbation.

Participants reported using a series of other alternative coping strategies, including eating (High Mach $n = 12$; Low Mach $n = 18$), sleeping (High Mach $n = 26$; Low Mach $n = 15$), meditating (High Mach $n = 5$; Low Mach $n = 5$), and self-harming in the form of cutting or hitting themselves (High Mach $n = 4$; Low Mach $n = 3$). Both High and Low Mach substance users also stated that exercise in the form of walking, running, weightlifting, playing sports, yoga, swimming, or hiking, were alternative coping strategies (High Mach $n = 12$; Low Mach $n = 18$). Differences in these experiences were not found between groups or could not be determined between groups due to briefer accounts being provided for these experiences.

Finally, both High and Low Mach substance users reported a pattern where the user resigned to experiencing the emotional distress previously managed by the effects of their substance of choice, rather than engage in an alternative form of coping (High Mach $n = 17$; Low Mach $n = 15$). Descriptions of this emotional distress did not appear to differ between High and Low Mach substance user groups. Participants specified that they would elect to endure anxious symptoms, including panic attacks and periods of intense worrying, as well as depressive symptoms, including experiencing a low mood, hopelessness, and periods of crying and screaming:

Participant 276 (H): “Emotionally explode, cry, or have an anxiety attack.”

Participant 211 (H): Have a day of mood swings and emotional breakdowns.”

Participant 434 (L): “Sit in my room anxiously.”

Participant 222 (L): “Get upset over the feelings I am having.”

Chi-Square Tests of Independence were performed to examine the relationship between Machiavellianism and each of the coding subthemes, including adjusting natural to not using, consuming an alternate substance, speaking to others for emotional support, distracting themselves through engaging in a leisure activity, eating, sleeping, meditating, self-harming, exercising, and resigning to be emotionally distressed. Some of the examined relationships were found to be significant. Specifically, a significant difference was found between Machiavellian group and adjusting naturally to not consuming substances, such that significantly more members of the Low Machiavellian group reported using the strategy of adjusting naturally to not using compared to the number of individuals reporting the use of this strategy in the High Machiavellian group, $\chi^2 (1, N = 488) = 3.97, p < .05, V = .09$. A significant difference was also found between Machiavellian group and distracting oneself using a leisure activity, such that significantly more members of the High Machiavellian group reported using a leisure activity to

distract themselves compared to the number of individuals reporting this strategy in the Low Machiavellian group, $\chi^2 (1, N = 488) = 6.75, p < .01, V = .12$. Finally, a significant difference was also found between Machiavellian group and sleep, such that significantly more members of the High Machiavellian group reported using this strategy compared to the number of individuals reporting the use of sleep in the Low Machiavellian group, $\chi^2 (1, N = 488) = 3.84, p < .05 V = .09$.

Attitudes Toward Treatment

The last theme found within the accounts' provided by High and Low Mach substance users were participants' attitudes towards receiving treatment for their alcohol or drug use. All codes for the theme of attitudes toward treatment can be viewed in Table 21. Both High and Low Mach substance users indicated that they approved of the idea of attending treatment (High Mach $n = 29$; Low Mach $n = 47$). Participants described various reasons for being in favor of substance use treatment. Many individuals, whose accounts indicated that they currently use substances, noted that they had previously attended treatment and were more appreciative of the potential benefits of therapy in retrospect. Relatedly, many individuals in both groups acknowledged that their substance use was negatively impacting their lives and were currently attending treatment to address these issues:

Participant 37 (H): "Yes, I completed treatment and attend numerous meetings for my addiction. I also go to therapy and participate in sponsoring other individuals with addiction issues."

Participant 323 (L): "Yes. I have. It took me a while to see that I needed it. But I did seek help many times. And I've relapsed many time. I wanted help because the pain of being ruled by a substance is excruciating."

Table 21

Attitude Towards Treatment and Associated Codes

Theme	Comprising Codes
Attitude towards treatment	Approving of treatment Treatment is unnecessary Feeling ambivalent toward treatment

It is noted that High and Low Mach substance users who acknowledged that their addictive behaviour was impairing their functioning, and who were not currently in treatment, still acknowledged treatment as an important component of their recovery. Other participants acknowledged the importance of treatment should their alcohol or drug use ever become debilitating:

Participant 468 (H): “If it did cause an issue in my life I’d definitely consider treatment.”

Participant 234 (L): “I would seek treatment and help if it ever became an issue.”

Participant 133 (L): I have not considered treatment besides therapy, as I feel therapy does offer the kinds of tools that I need to resolve my emotional burdens so that I no longer turn to alcohol to feel relieved.

A distinction observed between the content of High and Low Mach substance user accounts was that a portion of High Mach substance users specified that treatment would be critical due to their addictive behaviour threatening the success of the users’ future endeavors. This explanation was not provided by users in the Low Mach group:

Participant 182 (H): “I considered treatment, not because there were any real problems, but I can't see myself being successful in the career I wish to pursue if I have these tendencies.”

Participant 126 (H): “Yes I would, the plans for my future are too important to me to risk for alcohol consumption.”

High and Low Mach substance users also indicated that treatment was unnecessary, such that they opposed the idea of attending for substance use treatment (High Mach $n = 114$; Low Mach $n = 90$). Participants described various reasons for opposing the attendance of substance use treatment. Many individuals, in either group, endorsed the belief that their addictive behaviour did not cause any significant difficulties, rendering substance use treatment unnecessary:

Participant 521 (H): “My drinking or drug choice has not cause me any major problems in my life.”

Participant 315 (L): “I don’t have any problems from drinking or smoking.”

Though certain High and Low Mach substance users acknowledged that their substance use was potentially problematic, they held a belief that they had learned strategies to manage their substance use through experience, or that their addictive behaviour could be managed on their own. This entailed regulating their substance use without external assistance:

Participant 411 (H): “My boyfriend's concern for my drug use was enough to get me to stop, and I'm able to regulate my own drinking habits.”

Participant 156 (L): “I have taken tolerance breaks and also lessen my intake of marijuana in order to make myself feel better about smoking often.”

High Mach substance users provided other reasons for their disinterest in treatment that were not discussed in the accounts of Low Mach substance users. Two unique reasons were found to emerge from the data. One reason was that a portion of High Mach substance users did not believe that treatment would be effective due to treatment success being dependent on the user’s readiness to abstain from substances:

Participant 436 (H): “I don't believe that treatment can help me. At the end of the day, I'm responsible for my drinking, and I'll be the only one to control when I stop.”

Participant 126 (H): “No, because I'm insane and think I can handle everything on my own because the only way something will change is if I want it to. I have to make the active choice of wanting to better myself. So even if I got "treatment" it wouldn't work unless I choose to make it work. Therefore, I wait for when I'm ready or continue to handle myself by taking breaks after constant use.”

A second reason for opposition toward treatment that was unique to High Mach substance users was that there appeared to be a sense of embarrassment related to attending treatment. High Mach substance users did not want family or friends to know that the individual needed assistance in managing their alcohol or drug use:

Participant 475 (H): “No, because I didn't want my mom to know how bad it got.”

Participant 82 (H): “No, I would feel embarrassed seeking treatment.”

Accounts of High Mach substance users also reflected that a portion of these users were ambivalent about seeking treatment. This attitude was not endorsed by Low Mach substance users (High Mach $n = 7$; Low Mach $n = 0$). These individuals acknowledged having a significant substance use issue, as well as a desire to attend treatment. However, these users provided further reasoning for not having yet attended treatment, leading to a current state of undecidedness on whether to seek treatment for their addictive behaviour:

Participant 276 (H): “Yes, I have had therapy before for other mental health issues but not specifically for drugs and alcohol. I consider it because I had a good experience in therapy yet I hesitate because I'm ashamed I should need that help.”

Participant 472 (H): “I know that I shouldn't be using either, but I am not ready or willing to quit either.”

Participant 251 (H): “Yeah I've considered quitting or cutting down but then I remember how bad I'll feel after and how anxious I will feel in situations so I don't stop.”

Chi-Square Tests of Independence were performed to examine the relationship between Machiavellianism and each of the coding subthemes, including being in favor of substance use

treatment, being opposed to substance use treatment, or recording ambivalence about attending for substance use treatment. All examined relationships were found to be significant. Specifically, a significant difference was found between Machiavellian group and being in favor of treatment, such that significantly more members of the Low Machiavellian group reported being in favor of treatment compared to the number of individuals that were in support of attending substance use treatment in the High Machiavellian group, $\chi^2 (1, N = 488) = 4.06, p < .05, V = .09$. A significant difference was also found between Machiavellian group and being opposed to attending substance use treatment, such that significantly more members of the High Machiavellian group reported being opposed to attending substance use treatment compared to the number of individuals that were against attending substance use treatment in the Low Machiavellian group, $\chi^2 (1, N = 488) = 7.07, p < .01, V = .12$. Finally, a significant difference was also found between Machiavellian group and feeling ambivalent about attending for substance use treatment, such that significantly more members of the High Machiavellian group reported feeling ambivalent compared to the number of individuals reporting experiencing ambivalence in the Low Machiavellian group (Fisher's Exact Test; $p < .05, V = .10$).

Chapter V

Discussion

The purpose of this dissertation was to discern underlying difference between High and Low Mach substance users to distinguish between these two outwardly consistent groups in the service of planning and provision of substance use treatment interventions. Within this rationale, the study aimed to investigate the types of motivation and readiness for change in substance users who score high in trait Machiavellianism, as well as to explore treatment expectations held by High Mach substance users. Consideration of these study targets within the context of examining differences between High and Low Mach substance users was important, given that to our knowledge, this study was the first to examine these areas. Finally, the study sought to confirm the association between Machiavellianism and substance use, as observed in a relatively small pool of studies devoted to this relation.

Evaluating Hypotheses

Hypothesis 1: Association between Machiavellianism and Substance Use

The first hypothesis was that a significant and positive association would be found between Machiavellianism and each of alcohol and drug use, such that higher Machiavellian scores would be associated with higher scores of alcohol or drug use. This prediction was based on various studies that linked Machiavellianism to the use of alcohol and various drugs. The hypothesis was supported for alcohol use, but not for drug use. A potential reason for drug use not having a significant correlation with Machiavellianism is that Low Mach substance users reported engaging in the use of more serious drugs relative to High Mach individuals, leading to a non-linear relationship being found between Machiavellianism and drug use in the sample. For example, frequency counts from the qualitative data indicate at least seven Low Mach substance

users acknowledged the use of opioids over the past year, whereas no High Mach substance user endorsed this kind of drug use over the past year. Further, as Christie and Geis (1970) noted, severe substance use may not necessarily be a characteristic of those high on trait Machiavellianism, as use may impede goal-directed behaviour. It is possible that scores of Machiavellianism correlate linearly with DUDIT scores up until a certain point (a theoretical number in which drug use would inhibit goal-oriented action), after which higher Machiavellian scores would display a non-linear relationship with drug use scores. Another potential explanation for the lack of significant correlation between Machiavellianism and drug use, and for the modest correlation between Machiavellianism and alcohol use, may be that participants were required to provide an affirmative response to at least one CAGE-AID item to be recruited via the Participant Pool and all students recruited via either recruitment strategy were excluded from the final sample if scores on the DUDIT or AUDIT fell below the respective cut-offs for problematic alcohol use or drug-related problems. Following these inclusion criteria may have attenuated the range of scores on these substance use measures and potentially weakened linear relationships between these variables.

The positive and significant correlation between Machiavellian scores and alcohol use is consistent with prior research (Chabrol et al., 2009; Gardiner & Lawson, 2022; Krampen, 1980; Pugovkina & Popinako, 2014). Alcohol use is more socially accepted in Western society than the use of other psycho-active substances (Sudhinaraset et al., 2016), which may allow High Mach substance users to navigate their environments with greater success, while abusing alcohol, compared to navigating their environments while struggling with other substance use issues.

Hypothesis 2: Attachment Style and Social Connectedness

Hypothesis 2 was that substance users scoring higher on trait Machiavellianism would be identified by a dismissive-avoidant attachment style (2a) and feel less socially connected to others (2b), whereas Low Mach substance users were predicted to report attachment style profiles that were predominantly consistent with a fearful-avoidant attachment style and to feel relatively greater connection to others, compared to High Mach substance users. Results from Chi-Square Test of Independence indicated that Hypothesis 1a was not supported. Consistent with previously documented literature (Schindler, 2019), a significant portion of the substance user sample displayed a fearful-avoidant attachment style (44.4%) with this attachment style being most frequent in the sample. Yet, the frequencies of High and Low Mach substance users identified to have a fearful-avoidant attachment did not significantly differ. Similarly, the frequency of dismissive-avoidant attachment did not significantly differ among High and Low Mach substance users, with this attachment style being the least frequent in the sample (14.7%).

Instead, High and Low Mach substance users were found to significantly differ on both anxious-preoccupied and secure attachment styles. High Mach substance users were more likely to identify with an anxious-preoccupied attachment style compared to Low Mach substance users. Recent research has found positive associations between scores of high trait Machiavellianism and both anxious and avoidant attachment styles (Nickisch et al., 2020). In investigating emotional deficits associated with the Machiavellian personality type, Al Ain et al. (2013) found positive associations between Machiavellianism, and each of anxiety and depression, as well as negative associations between Machiavellianism and empathy and affective theory of mind. Those with higher scores on trait Machiavellianism were less capable of appreciating the emotions of others. These authors highlighted the role of these emotional deficits as vulnerabilities, which would increase the risk of developing Machiavellian traits.

Given that empathy is important in understanding others' feelings and behaviours and allows one to respond appropriately in relationships, it is possible that High Mach individuals struggle to understand the emotions of others, making it more difficult to comprehend others' behaviour. This would theoretically lead to distrust, anxiety, and depressive symptoms in their important relationships, and may culminate in an anxious-preoccupied attachment style where high levels of interpersonal distress are experienced. This would also be consistent with dissertation qualitative data, which found that High Mach substance users described more intense feelings of anxiety and depression, before engaging in substance use. It is conceivable that the findings of Al Aïn et al. (2013) are reflected in this study, where the experience of anxiety and depression in High Mach substance users is exposed via an anxious-preoccupied attachment style. It is also possible that a dismissive avoidant attachment style was not found to significantly differ among High and Low Mach substance users due to sample size. Relative to a dismissive-avoidant attachment style, higher rates of the anxious-preoccupied attachment style have been found in undergraduate (Gleeson & Fitzgerald, 2014; Simon et al., 2019) and community (Pielage et al., 2005) samples. A larger sample size may have been needed to detect a difference in dismissive-avoidant attachment style between High and Low Mach substance users. Future research should seek to clarify the predominant attachment style associated with high trait Machiavellianism.

A Chi-Square Test of Independence also found that Low Mach substance users were more likely to be securely attached than High Mach substance users. In Schindler's (2019) meta-analysis, it was concluded that substance users with secure attachment tended to be experimental users or healthy controls. With high frequency, Low Mach substance users in the dissertation sample provided qualitative accounts wherein concerns related to substance use, and negative impacts on several life domains and relationships, were denied. Also with high frequency were

qualitative data indicating that a significant portion of Low Mach substance users used for pleasure, relaxation, and in social contexts. Taken together, and despite validated cut-offs followed on the DUDIT and AUDIT, it is possible that a portion of Low Mach substance users in the sample would more closely resemble “experimental” or “healthy controls” than problematic substance users, which could account for the difference found.

Results from the multiple regression analysis support Hypothesis 2b, that High Mach substance users feel generally less socially connected to others, compared to Low Mach substance users. As expected, because individuals high on trait Machiavellianism are distrusting of others (Christie & Geis, 1970; Ináncsi et al., 2015; McHoskey et al., 1998), such individuals would be less likely to feel close to others, than those lower on trait Machiavellianism. As Ináncsi et al. (2015) note, High Mach individuals have a reduced need for psychological closeness, due to valuing autonomy and independence, which would theoretically facilitate a higher likelihood of successful endeavours. In line with this idea, High Mach individuals are understood to conceal their feelings and their limitations in order to avoid being perceived as vulnerable or weak (Ináncsi et al., 2015). Further, due to their utilitarian orientation, High Mach individuals tend to enter into short-term romantic relationships, (Holtzman & Strube, 2013; Jonason et al., 2009), where developing deep emotional connections, and the prospect of being vulnerable, can be avoided. If High Machs are guarded around others, do not tend to allow others to experience their authentic selves, and do not enter committed and long-term romantic relationships, it is understandable that developing authentic social connections would be challenging. The content of qualitative accounts provided by study participants in either group did not highlight difference in the experience of social connectedness between High and Low Mach substance users. However, this may be explained by the fact that qualitative prompts did

not target this experience directly, as the focus was on attitudes, beliefs, and behaviours related to substance use. Seeking emotional support from others was an alternative coping strategy to substance use that was endorsed by both High and Low Mach substance users. Though Low Mach substance users endorsed this strategy with higher frequency, the difference was not significant (High Mach $n = 20$; Low Mach $n = 31$, $p = .15$, $V = .07$). It is important to note that High Mach substance user accounts often displayed an effort to gain social support from others in a manner that did not necessarily entail the High Mach user be emotionally vulnerable. For example, “hanging out” with friends or engaging in leisure activities, such as games or movie-watching, were often endorsed, which are contexts in which a High Mach user may benefit from a superficial connection, without requiring to express personal insecurities or problems.

Another reason for a lack of differences in experience in social connectedness between groups within qualitative accounts could be that data collection took place during the COVID-19 pandemic and it is possible that both groups may have experienced difficulty in actively describing situations where they felt socially connected. Both groups would theoretically be subject to social distancing and lockdown protocols by public health officials, which was found to engender significant levels of loneliness (Bu et al., 2020). Research conducted during the COVID-19 period has also found that isolation from social networks and fear of missing out on social opportunities were also significant issues that many struggled with. Because all participants were potentially subject to the difficulties of COVID-19, it is possible that qualitative descriptions that would be related to social connectedness did not differ between High and Low Mach groups.

Hypothesis 3: Coping Strategies

Hypothesis 3 was that High Mach substance users would primarily use emotion-focused strategies in coping with distress, whereas it was predicted that Low Mach substance users would display a range of emotion-focused and avoidance strategies. This hypothesis was not supported as both groups displayed emotion-focused and avoidance strategies. Further, High Mach substance users were found to employ avoidance-coping strategies more often than Low Mach substance users. Within both High and Low Mach groups, five avoidance-focused and two emotion-focused coping strategies emerged from the qualitative accounts. Avoidance strategies included engaging in leisure activities (e.g., watching television), eating, exercising, sleeping, and self-harming. These strategies would be considered “mental disengagement” strategies (Litman, 2006), whereby activities are undertaken so that one is distracted and able to temporarily stop devoting mental energy to one’s stress-related issues. Emotion-focused strategies included seeking emotional social support (e.g., sharing feelings with friends or family; seeking sympathy from friends or family) and denial (e.g., refusing to believe that there is a problem). A potential third emotion-focused strategy found in the qualitative data was meditation, given that meditation is associated with cognitive reappraisal (Dahl et al., 2015), an emotion-focused strategy where one may reframe a stressor in more positive terms (Carver et al., 1989). Yet, due to very brief descriptions of meditating (e.g., “I meditate instead of alcohol.”), it cannot be determined if meditation was associated with cognitive reappraisal. The coping strategies endorsed by participants’ qualitative accounts is consistent with prior work (Azizi et al., 2019; Opalach et al., 2016), including the absence of problem-focused coping strategies endorsed by the sample (Valtonen et al., 2006).

High Mach substance users were more likely to engage in avoidance-coping strategies than were Low Mach substance users. Avoidance coping was a significant predictor of

Machiavellianism in logistic regression analysis, such that High Mach substance users were more likely to engage in avoidance-coping strategies than were Low Mach substance users. This finding was corroborated by multiple regression analysis. Interestingly, qualitative data indicated that the type of avoidance activities were similar between Machiavellian groups, with both High and Low Mach substance users providing accounts such as engaging in leisure activities (e.g., “distract myself by watching movies, TV or videos”; “stay on my phone for longer periods of time”), eating (e.g., “would eat some junk food”), exercising “ (e.g., “go for a walk or workout”), sleeping, or self-harming. It was the frequency of group members’ accounts that differed between High and Low Mach groups. Results from this dissertation suggest that this area may be an interesting area to pursue further research. Even though an avoidance-coping style was a significant predictor of Machiavellian grouping, both groups reported using the same types of coping styles, and the same strategies within an avoidance coping style, when their substance of choice was not available. A study investigating what makes High Mach substance users more likely to engage in avoidant coping strategies, compared to Low Mach substance users, may be a fruitful endeavor in understanding how to reduce the amount of avoidant-coping engaged in by High Mach substance users (or increase more adaptive coping behavior). Such a study should seek to clarify whether the avoidance behaviors of High and Low Mach substance users are similar, as found in this study.

Chi-Square tests of independence revealed that High Mach substance users tended to engage in leisure activities and sleep more often as alternative coping strategies to substance use, compared to Low Mach substance users. These activities are considered avoidant coping strategies (Carver et al., 1989). It is also acknowledged that the use of alcohol or drugs, is in itself, considered an avoidance-coping strategy (Kuper et al., 2010). Past research has found the

Machiavellian belief in tactics (belief that it is acceptable to engage in unethical behaviour for personal gain) to be associated with substance use behaviour (Kedzuch, 2021). Substance use has been found to be positively correlated with stress and anxiety (Taylor et al., 2021), suggesting that the use of this coping strategy may negatively influence stress levels (Kedzuch, 2021). Ongoing substance use, as well as other maladaptive avoidance-coping strategies, may perpetuate High Mach substance users' distress, and may account for the link between Machiavellianism and poor mental health and well-being outcomes (Jonason et al., 2015b).

Azizi et al. (2019) note that substance users likely embrace an avoidance-coping orientation due to having poorer social relationships and communication skills. Indeed, many addiction treatment programs target communication and social skills (e.g., Bartholomew et al., 2000; Botvin & Griffin, 2014; Lu et al., 2021) as a way to facilitate a shift to more adaptive coping strategies. These deficits may be even more apparent in those who score higher in trait Machiavellianism. As mentioned, due to an intense distrust of others and a cynical view of human nature (Christie & Geis, 1970; Ináncsi et al., 2015), High Mach substance users likely struggle to form supportive relationships. In addition, High Machs have been documented to lie (Padena et al. 2022) or use flattery, manipulation, and deceit in their communication (Dugan et al., 2019) which negatively impacts them in the long-term. It may be that High Mach substance users employ an avoidance strategy to cope with distress because such stratagems can be employed independently (e.g., sleeping or leisure activity) and thus would limit the potential for the development of social problems that may occur with High Mach substance users when implementing coping strategies that involve others (e.g., asking others for advice or seeking emotional support from others). Yet, in being distrusting or cynical of others, and employing

avoidance-based coping strategies, High Mach substance users may enjoy less opportunity to engage in problem-focused coping strategies that rely on social connection (Kedzuch, 2021).

Both qualitative and quantitative findings that High Mach substance users were more likely to employ avoidance-coping strategies are consistent with past work that examined coping strategies of High Mach individuals. As noted above, Birkás et al. (2018) found that High Mach individuals were more likely to employ coping skills that yielded immediate relief rather than employ coping skills that yield positive but delayed outcomes. The avoidance strategies described by participants could all be considered fast-life strategies. Also consistent with the dissertation findings was an earlier study by Birkás et al. (2016). Results from that study highlighted that Machiavellianism was negatively associated with planned problem-focused coping. Conceivably, if substance users consume alcohol or drugs to cope with their distress, an effort to find a similar type of coping would be made when alcohol or drugs cannot be accessed. That is, one would shift to another short-term strategy to attain relief that using substances previously afforded (e.g., sleeping), rather than modify their coping skills suite to include problem-focused coping strategies which likely necessitate being vulnerable and experiencing emotional discomfort (e.g., taking time to plan and come up with solutions to problems, concentrating efforts and behaviours on the problem area). Past work has also found that substance users are more likely to engage in avoidance-focused coping or emotion-focused coping, compared to problem-focused coping (Valtoren et al., 2006). This would be consistent with the finding that problem-focused coping subscale of the COPE was not a significant predictor of Machiavellian grouping and was not endorsed in qualitative accounts. A pattern of being more likely to switch from one avoidance coping skill to another was observed among High Mach substance users, compared to Low Mach substance users, in the dissertation sample.

Hypothesis 4: Stage of Change and Motivation

It was hypothesized that High Mach substance users would predominantly identify as being in the pre-contemplative stage of change, whereas Low Mach substance users would display a range of stages of change positions (4a). This prediction was based on literature that indicated that High Mach individuals are characterized by a dismissive-avoidant attachment style. Individuals with this attachment style tend to use substances to cope with distress (Schindler, 2019). Results of a Chi-Square Test of Independence did not find any differences between High and Low Mach substance users on any stage of change, despite High Mach pre-contemplation frequency being higher than frequency of Low Mach frequency (High Mach $n = 68$; Low Mach $n = 57$). Low Mach substance users were more frequent than High Mach substance users on other stages of change in the sample. The fact that no significant differences were found between Machiavellian groupings on any stage of change is surprising, though not inconsistent with general literature which has found that substance users may be found at any stage of change within the Trans-Theoretical Model (Norcross et al., 2010).

A potential reason for the lack of significant findings on this measure could be that because substance users consume alcohol or drugs to cope with distress (Alexander & Ward, 2018), they are naturally reluctant to relinquish this effective coping strategy. The reasons for their use may be “strong” enough or reach a ceiling, such that additional or more intense distress related to high trait Machiavellianism would not significantly change the user’s attitude toward the use of substances as a coping mechanism. As such, differences on the stages of change position between High and Low Mach substance users may not be detected. Future research that more closely examines the stages of change model among substance users that are high on trait Machiavellianism, may be able to explore the validity of this explanation.

Hypothesis 4b was that the High Mach substance users' motivation to stop using substances would be characterized by controlled motivation, given their goal-oriented nature toward external contingencies (Jones & Paulhus, 2009). It was predicted that Low Mach substance users would more likely be characterized by autonomous motivation rather than controlled motivation, due to the absence of Machiavellianism and more sincere self-interest to improve their lives (Schneider et al., 2004). This hypothesis was supported. Controlled motivation was a significant predictor of Machiavellian grouping in logistic regression analysis (and corroborated by the multiple regression analysis), such that High Mach substance users tended to have higher scores in controlled motivation to stop using substances, compared to Low Mach substance users. Qualitative data were also consistent with the alternative hypothesis. Only High Mach substance users discussed stopping to use alcohol or drugs due to substance use being incompatible with future success (in the context of attitudes toward substance use treatment). Autonomous motivation was also a significant predictor of Machiavellian grouping in multiple regression analysis. Descriptions of motivations for Low Mach substance user accounts appeared to be more consistent with an autonomous form of motivation. For example, Participant 133 (Low Mach) noted that they had (quote provided above in addition to here): "...not considered treatment besides therapy, as I feel therapy does offer the kinds of tools that I need to resolve my emotional burdens so that I no longer turn to alcohol to feel relieved." These types of remarks posed by Low Mach substance users qualitatively imply a desire to improve their own lives so that substance use would no longer be a necessity. These findings are in line with past research that has found that High Mach individuals are extrinsically motivated to attain status and are goal oriented (Genau et al., 2021; Jones & Paulhus, 2009). The findings are also consistent with past research that has found that substance users report autonomously motivated

reasons for stopping to use substances, such as gaining self-awareness and improving self-esteem (Schneider et al., 2004).

Hypothesis 5: Treatment Expectations

The fifth hypothesis was that High Mach substance users were predicted to have lower role and outcome expectations for therapy compared to Low Mach substance users. This hypothesis was partially supported, as role expectations was not a significant predictor of Machiavellian grouping in logistic regression analysis and did not account for a significant portion of variance, that explained Machiavellianism, in multiple regression analysis. Conversely, the outcome expectations variable was a strong predictor of Machiavellian grouping in model 2 of the logistic regression analysis and accounted for a significant portion of variance, that explained Machiavellianism, in all models of the multiple regression analysis.

Krampen (1980) found that alcohol users that were high in trait Machiavellianism were more likely to feel hopeless about themselves and their futures, compared to those lower in trait Machiavellianism or those who were not alcohol users. Krampen noted that this finding extends to how individuals who are addicted to alcohol, with high scores in trait Machiavellianism, would feel hopeless rather than hopeful in considering treatment for alcoholism. The present study's quantitative findings are consistent with Krampen's (1980) work. Regression analyses revealed that High Mach substance users possessed lower positive expectations for treatment than Low Mach substance users. The qualitative data provided further explanation as to why High Mach substance users hold this belief. Specifically, High Mach substance users espoused the view that only they possessed the ability to stop using substances, such that external forces (treatment) would be ineffective (only the user can stop their own substance use). This is in line with High Mach individuals desiring control and autonomy (Jones & Paulhus, 2009) and an

unwillingness to consider substance use treatment, a context in which at least some portion of control must be relinquished to the treatment provider. Notwithstanding, this attitude also suggests that High Mach substance users may possess good insight into their current motivation to discontinue the use of alcohol or drugs, highlighting that due to low personal motivation to change, or subjective belief that their substance use is not problematic, treatment will likely be ineffective. This pattern would be consistent with prior work that has found High Mach individuals to possess good self-insight (Maples-Keller & Miller, 2018).

Accounts from the qualitative data were also consistent with the Machiavellian cynical view of human nature and the belief that weaknesses must be hidden from others (Christie & Geis, 1970; Ináncsi et al., 2015). High Mach substance users described a desire to maintain the secrecy of their alcohol or drug use, holding a belief that entering into treatment would reveal their addictive behaviour to others as a flaw. Perceiving others judging them negatively may impede High Mach substance users from successfully navigating their environments via manipulating others. High Mach individuals may perceive the social stigma of seeking treatment to be high (Vogel et al., 2009), whereupon these individuals fear judgement from those in their social network. Higher levels of perceived social stigma for seeking mental health treatment, including for substance use, has been found to be associated with lower psychological functioning, such as low self-esteem and distress (Link et al., 2001; Owen et al., 2013), as well as negative attitudes towards seeking treatment (Komiya et al., 2000; Vogel et al., 2005). It may be profitable for future research to examine the relationship between Machiavellianism and perceived social stigma for seeking help to better understand how a potential link may influence High Mach substance users' expectations about treatment outcomes.

Role expectations was not a significant predictor of Machiavellian grouping. Though some therapy role expectations would conceivably be influenced by High Mach cynical view of others (e.g., having lower expectations that a therapist would be sincere), many role expectations are based on one's knowledge of the protocols of a therapy session or relationship. For example, a therapist may be sympathetic to a client's concerns, or a therapist may provide feedback to a client in a session. These kinds of role behaviours are components of a therapist's relationship with a client, and it has been well documented that most treatment seekers are generally familiar with the nature of the relationship between a client and therapist (Furnham & Wardley, 1990; Tzur Bitan & Lazar, 2019; Wong, 1994) and may expect these types of behaviours. It is possible that many individuals have a realistic understanding of the general roles of a therapist in a therapy relationship and both High and Low Mach participants may have provided similar responses to items related to role expectancies on the MPEQ, based on commonly accepted role expectations of therapists or clients in Western society.

Overlapping Core Between Machiavellianism, Psychopathy, and Narcissism

Psychopathy and narcissism (as found in the multiple regression analysis) were noted to be significant predictors of Machiavellian grouping. One reason for this may be because of what has been described as a "dark core", which may reflect shared underlying constructs among dark triad personality types (Muris et al., 2017; Schmitt et al., 2020). Specifically, callousness and manipulation represent a considerable portion of the dark core, with a recent study finding that these two variables accounted for 66% of the variance in the dark core (Bertl et al., 2017). Due to the dark core overlapping between Machiavellianism, psychopathy, and narcissism, it would seem logical that psychopathy and narcissism would be capable predictors of Machiavellianism. The decision to include psychopathy and narcissism in the regression analysis was important to

control for the overlapping effects of the dark core, revealing that independent of the effects of psychopathy and narcissism, High Mach substance users possess lower treatment outcome expectations than Low Mach substance users. Notwithstanding, given that there is considerable overlap between Machiavellianism, psychopathy, and narcissism personality sets, and that overlapping dark core features would be present in a High Mach substance user in real world settings, the practical importance of significant predictors in Model 2 of the logistic regression analysis, and Step 1 of the multiple regression analysis, remains. Measures of social connectedness, avoidance-coping, autonomous and controlled motivation, as well as treatment outcome expectations, should be given appropriate weight as features to examine when making efforts to delineate differences between High and Low Mach substance users, and for the planning and implementation of substance use treatment for these groups.

Treatment Implications

Results from this study highlighted important differences between High and Low Mach substance users. Specifically, High and Low Mach substance users differed in attachment style, in their feelings of closeness to others, in how they cope with distress, in their motivation to stop using substances, and in their treatment expectations. High Mach substance users were more likely to have an anxious-preoccupied attachment style, more likely to feel disconnected from others, more likely to use avoidance-focused coping strategies, more likely to hold a controlled motivation to abstain from alcohol or drugs, and more likely to have lower positive outcome expectations for therapy. Subject to replication of these findings, this is a useful profile to base a treatment plan on, in the service of offering effective intervention to High Mach substance users.

Ideally, substance users would complete a series of screening measures during a treatment intake process that would include a measure of social connectedness, of coping

orientation, of motivation to stop using substances, of substance use treatment outcome expectancy, and Machiavellianism. If scores on these measures are consistent with what would be expected based on the results discussed in this study, then a treatment plan could be made to support High Mach substance users in their addiction recovery efforts. Past studies have found that higher levels of autonomous motivation are associated with being farther along the transtheoretical model (or stage of change model), and being more engaged in treatment, compared to those with controlled motivation (Cornelius et al., 2017; Kennedy & Gregoire, 2009; Kushnir et al., 2016). Increasing High Mach substance user intrinsic motivation for abstaining from problematic substance use would be an important step in the recovery process. Motivational interviewing (MI; Miller and Rollnick, 2013) is a therapeutic approach that focuses on helping clients resolve ambivalence about change to promote behaviour modification. Although MI has been well documented as a therapeutic approach for increasing the intrinsic motivation in substance users (Csillik, 2015), a literature review failed to find past research examining the effectiveness of this treatment intervention with those high in trait Machiavellianism. One may hypothesize that MI may not be suitable for intervention with High Mach substance users given results from previous studies that suggest that MI is not effective in increasing motivation in individuals with core psychopathy traits and may even hinder recovery (Gillen, 2018; Swogger et al., 2016). As discussed above, numerous researchers agree about the “dark core construct”, which may suggest that High Mach substance users may also fail to benefit from MI. Alternatively, differences have been documented between those high on Machiavellianism and those high on psychopathy, and High Mach individuals may possess unique characteristics that would make them more likely to accrue a benefit from MI. For example, High Mach individuals tend to have better impulse control than those high in trait psychopathy (Jones & Mueller, 2021;

Szaho & Jones, 2019). Impulsivity has been noted to be a barrier to treatment engagement (Tetley et al., 2012). Further, High Mach individuals have been found to be superior to those high in trait psychopathy at impression management (Hart et al., 2020), which is important in the rapport building phase when interfacing with a treatment provider. Given, that High Mach substance users were significantly more likely to report feeling ambivalent about attending treatment for substance use, MI would be considered a suitable treatment option, as the approach of MI is focused on resolving ambivalence (Miller & Rollnick, 2013). Notwithstanding, should future studies find that MI is not effective in increasing motivation in High Mach substance users to abstain from substances, contingency management (CM) for reducing substance use behaviour may be an effective alternative. Meta-analytic data suggests that CM is effective in reducing substance use (Sayegh et al., 2017) and has been found to have no negative impact on intrinsic motivation already held by the user (Ledgerwood & Petry, 2006). Further, the extrinsically focused CM protocol may be a more natural fit for High Mach substance users, who were found in this study to more likely identify with a controlled motivation for stopping to use substances.

Considering how High Mach substance users felt less close to others and tended to predominantly use avoidance-coping strategies in coping with emotional distress, it would be important to conduct treatment using a therapy modality that has been found to effectively target those issues. A fitting treatment for these issues, that has also been found to be effective in the treatment of co-morbid substance use disorders and personality dysfunction, is dialectical behaviour therapy (DBT; Linehan 1993; 2015). As of the writing of this dissertation, no study was found involving the utility of DBT for High Mach individuals. DBT has been found to be effective in emotional regulation improvement (Rozakou-Soumalia et al., 2021) and in the treatment of substance-related issues (Haktanir & Callender, 2020). In theory, the emotion

regulation and distress tolerance skills learned in DBT (Linehan, 2015) would help High Mach substance users cope with their mental health concerns, allowing them to use new DBT skills in place of maladaptive avoidance-focused skills. Further, the various interpersonal and problem-solving skills taught across DBT modules (Linehan, 2015), would theoretically support High Mach substance users in connecting with others more authentically and in implementing more problem-focused coping strategies when in distress.

It should be acknowledged that group cognitive behavioural therapy has been found to be effective in treating problematic substance use (van Emmerik-van Oortmerssen, et al., 2019) and Low Mach substance users should receive this type of treatment for their substance use issues. Findings from the current study support DBT as a treatment strategy for High Mach substance users. This treatment modality theoretically targets the deficits of High Mach substance users found in this study, including avoidance-coping strategies and more significant mental distress, as related to quantitative results linking anxious attachment and Machiavellianism, as well as qualitative data that suggested High Mach substance users experience more intense depressive and anxious symptoms before using substances and more intense depressive symptoms subsequent to using substances. Given that High Mach substance users harbor an intense distrust for others (Ináncsi et al., 2015), manipulate others for personal gain (Jones & Paulhus, 2009), and were found to perceive social stigma related to their substance use (e.g., feeling embarrassed about attending for treatment; using alcohol and cannabis alone to cope with emotional distress), it would appear that individual DBT treatment sessions would be more appropriate than group sessions for these individuals, at minimum in the early stages of treatment when High Mach substance users' problematic substance use would likely still be pronounced. Though interventions that contain DBT group skills training have been found to be more effective than

DBT interventions that do not include group skills training (Linehan et al., 2015), the intervention of DBT individual therapy alone has still been found to be an effective treatment strategy (Andión et al., 2012; Hill et al., 2011; Linehan et al., 2015; Safer et al., 2001). Linehan (2015) notes that though group skills training is preferred, individual skills training is a viable option in circumstances where group training is not feasible, suggesting that individual DBT sessions that targets substance use, as well as offering skills training, would be an appropriate treatment strategy. Such a modification to a DBT intervention would be similar to how adaptations to DBT have been made in forensic and correctional facilities, where length of treatment and treatment components, have been found to vary greatly (Moore et al., 2018).

Finally, as with any therapy, a strong therapeutic alliance between High Mach substance user and clinician will be optimal for successful treatment outcomes (Meier et al., 2005). Strong rapport between High Mach substance user and clinician would be important in healthy boundary setting and mitigating the negative influence of client mistrust and cynicism. Further, given that a strong therapeutic alliance is associated with positive treatment outcome expectancy (Joyce & Piper, 1998), negative treatment outcome expectancies held by High Mach substance users may be improved if client and clinician can develop a strong partnership. The converse association would also be true, such that a weak rapport would be associated with lower treatment outcome expectancies (Visla et al., 2018). The importance of building a strong rapport is again highlighted, as a High Mach substance user's cynical and distrusting view of others and the world may influence initial treatment outcome expectations to be lower than Low Mach substance users' initial treatment outcome expectations.

Potential Stigmatization of Machiavellian Label

It is important to highlight that a mental health diagnosis or a label of Machiavellianism (which must be emphasized is not a mental health diagnosis) can engender stigmatizing beliefs about the self or about others with these labels. Research has found that those with mental illness have been described by others as “crazy” or “freaks” (Rose et al., 2007), while also viewing mental illness as a disability (Rose et al., 2007). Such self-stigmatizing views have been found to have negative impacts on self-esteem and self-efficacy (Corrigan et al., 2006). Diagnoses of more severe mental illness, such as schizophrenia, bring about stigmatizing views such as being “dangerous” or “unpredictable” (Wright et al., 2011), which has also been internalized by the individual with mental illness (Corrigan & Rao, 2012). Given the definition of Machiavellianism (or the other sets of Dark Triad traits), as described previously, it is understandable that one may experience stigmatization if described as an individual with such traits (e.g., disregard for others; being manipulative; being willing to deceive others for personal gain). Indeed, antisocial personality disorder, which comprises many traits within the constellation of the Dark Triad, has been found to be one of the most stigmatized labels among psychiatric diagnoses (Hazell et al., 2022).

Some utility to diagnostic labels should be acknowledged, such as having a shared language to describe a constellation of traits or symptoms for communication, intervention, or research purposes. Diagnostic labels allow for generalizations, where conditions are categorized in such a way that one can predict others features or symptoms experienced by an individual in the same category (Werkhoven et al., 2022). For example, one who experiences chronic sadness may also be predicted to experience sleep difficulty or change in appetite. Receiving a diagnosis may also be meaningful to the individual, exculpate the individual from their symptoms (Werkhoven et al., 2022), diminish self-blame, and inform therapeutic intervention.

Though there are clearly benefits to diagnostic labels, it is important to note that a label may be reductionistic, such that the human being is reduced to their label and feel that others view them as only their diagnosis. As alluded to above, diagnostic labels may also lead to stigmatization, in the form of stereotypes, prejudice, and discrimination (Corrigan & Watson, 2002). Though Machiavellianism does not have a diagnostic label (as it is not a DSM-V diagnosis), being labeled as “high in Machiavellianism” or “Machiavellian” may still result in similar stigmatizations. When research participants are categorized as (or data sets are dichotomized as) Machiavellian or not Machiavellian (or as high in Machiavellianism and low in Machiavellianism), this may give rise to the opportunity for labeling or an increase in stigmatization of the concept of Machiavellianism and those described with this term. It is important to guard against this danger through educating consumers of research. Further, research should be undertaken in a manner that advances knowledge of how to provide effective treatment to those who seek it. This treatment must focus on how to support these individuals in living meaningful lives and achieve their goals, taking a holistic view of the person. The position of where one falls on the Machiavellianism spectrum, that is, whether one has a label of Machiavellianism, should not be the reason for treatment.

Adopting an alternative framework to the DSM-V may also decrease stigma. The Power Threat Meaning (PTM) Framework (Johnstone & Boyle, 2018) assumes that what is commonly viewed as psychiatric symptoms are actually plausible responses in the context of being in difficult environments and that such responses are protective. This framework was developed largely as an alternative to psychiatric diagnosis and symptoms. It could be a useful lens in future research with those who display high Machiavellian traits. Such a person may have developed these traits (e.g., being manipulative and distrusting of others) in order to successfully navigate

adverse environments. Using an alternative framework, such as the PTM Framework may aid in decreasing stigma, as it encourages the conceptualization of the person and their behaviour rather than their disorder (Johnstone & Boyle, 2018).

Limitations

Multiple limitations existed in the study that should be acknowledged. First, over 80% of the sample of substance users was female. Past research has found sex differences among different aspects of Machiavellianism (Jones and Paulhus, 2009) and that associations between Dark Triad and substance use has been found to be stronger for males than for females (Chabrol et al., 2009). It will be important that this study be replicated with a sample that is more representative of sexual identities in the Canadian population, in order to ensure that results are generalizable in more authentic settings.

A second limitation involved the methodological decision to divide the continuous Machiavellianism variable into High and Low Mach groups based on the cut-off of Machiavellian scores at the 50th percentile. This decision was made in an effort to compare Machiavellian scores at the extreme ends of the continua, while still involving all eligible substance-using participants in analyses. As well, it was considered that by categorizing the data, the results would be easier to interpret. This approach is consistent with earlier research (e.g., Bolino & Turnley, 2002; Sheppard & Socherman, 1997; Wirtz & Kim, 2004). One problem in forming this cut-off is that all participants within each group are considered “equally” High or Low Mach. Yet, it is unlikely that a Low Mach participant who scores just below the median line would resemble a Low Mach participant with the lowest Machiavellian score in the context of the variables investigated. Further, that same Low Mach substance user who scored just below the median line may display a similar scoring profile across variables to a High Mach participant

who scored just above the median line. These two individuals would be considered different, when it is rather the case that they are similar. Like other sets of personality traits, Machiavellianism exists on a continuum, and there was no theoretical basis for dichotomizing the variable at the 50th percentile. MacCullum et al. (2002) note that when continuous variables are dichotomised, power is reduced and it is more difficult to find extant effects. In addition, variation in outcome between groups may be underestimated (Altman & Royston, 2006). This limitation prompted the execution of a multiple regression analysis, in order to corroborate the findings from the logistic regression. This analysis utilized a continuous Machiavellianism variable. All significant predictors observed in the logistic regression were also noted to be significant in the multiple regression analysis. Importantly, findings from multiple regression analysis revealed social connectedness and autonomous motivation as significant predictors, which may have been observed due to the increased power to find these effects. Future research involving the study of Machiavellian personality traits and substance use should utilize the measure of Machiavellianism as a continuous variable in quantitative analyses undertaken.

Another limitation was that classification for problematic substance use was based on self-reported measure of alcohol and drug use (as measured by the AUDIT and DUDIT). Past research has found that self-reported substance use can be overestimated (e.g., Hindocha et al., 2017). It is possible that self-reports of alcohol or drug consumption were not reliable. Notwithstanding, this limitation occurs frequently in research investigating substance use behaviour (Mercuri et al., 2018). Though more involved, researchers may employ the Time Follow Back Method (Sobell & Sobell, 1996) to more reliably record self-reported substance use.

The cross-sectional nature of this study was also a limitation. Since substance use data was collected at one time point, the results of the dissertation may not be representative of the potential effects that would have been uncovered if data was gathered longitudinally. For example, participants' identification of stage of change position is fluid and may have changed over time. Further, substance use patterns of participants may have changed over time. Data collection occurred during the COVID-19 pandemic. Protocols associated with lockdown procedures, such as social distancing, have been noted to engender or exacerbate mental health concerns, including substance use (Moreno et al., 2020). It is possible that the nature of participants' responses would have differed on the AUDIT, DUDIT, or qualitative responses, if data collection occurred prior to the COVID-19 pandemic. When context changes when conducting research, such as when collecting data during the COVID-19 pandemic, Prommegger et al., (2021) suggest that one action that can be taken to measure validity is to compare your results with previous research. Mean AUDIT and DUDIT scores in this dissertation project were found to be 8.93 and 9.02, respectively. In terms of AUDIT scores in undergraduate populations, prior to the COVID-19 pandemic, a wide span of AUDIT scores can be found, with mean scores ranging from 4.37 to 13.50 (Heather et al., 2011; Lindgren et al., 2016, Pillersdorf & Scoboria, 2019). A large span of DUDIT scores among undergraduate students, ranging from 2.11 to 15.72 has also been found in past work, before the COVID-19 pandemic (Lamis et al., 2014; Lipton et al., 2016; Sonneborn, 2017; Wolford-Clevenger et al., 2016). Given that a range of mean scores were found on these variables, and means from this dissertation fell within this range, more confidence may be placed in the validity of these data.

Finally, in the context of conducting a content analysis, the researcher (principal investigator) is considered the "instrument" of analysis (Jenkins, 2019). Thus, there is a risk of

coder bias that would influence the results of coding. In an attempt to mitigate this potential limitation, all coders were tasked with recording their initial impressions subsequent to reading the data set and with completing journal entries regularly throughout the data collection process. Via this strategy, all coders were afforded an opportunity to reflect on thoughts and feelings that may have impacted their coding. Nonetheless, the interpretation of qualitative results may be impacted, despite efforts to allay this potential issue.

Summary and Conclusion

In conclusion, findings from the current study are consistent with past research. Though High and Low Mach substance users may appear similar in behaviour and views, making it difficult to differentiate between them, this study found group differences on multiple variables related to treatment, including attachment style, social connectedness, coping orientation, motivation for abstaining from substance use, and treatment outcome expectancy. Psychopathy and narcissism were also found to be significant predictors of Machiavellian grouping. Compared to Low Mach substance users, High Mach substance users tended to identify with an anxious-preoccupied attachment style, to feel less socially connected to others, to employ an avoidance-coping orientation, to be extrinsically motivated to reduce substance use behaviour, to have less positive outcome expectancy for treatment, and to have higher scores of psychopathy and narcissism. As the literature suggests, Low Mach substance users will benefit from group CBT for substance use, whereas it is suggested that MI and individual DBT is recommended as a substance use treatment protocol for High Mach substance users, based on their more complex needs. A strong therapeutic alliance is indicated in the therapeutic intervention involving both High and Low Mach substance users.

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Appendix A
Email Advertisement

Dear Undergraduate Student,

I am doctoral candidate in clinical psychology at the university and am conducting a research study to investigate specific personality traits and substance use behaviours and attitudes. I am seeking volunteer undergraduate student participants to complete an online survey. The survey involves answering questions on rating scales and answering short-answer questions and will take approximately 60 minutes to complete.

Those who complete the survey will have the opportunity to provide their UWindsor email address to be entered into a draw for one of twenty \$50 (Canadian) Amazon.ca gift cards.

If interested, please click the link below to be directed to the study, where more information is provided in the consent form and you can decide after reading that information whether or not to participate. If you have any questions even before clicking the link about the study please feel free to email me at pillersd@uwindsor.ca.

Study Link: https://uwindsor.ca1.qualtrics.com/jfe/form/SV_6kTxmrWO65fTSEn

Thanks very much,

Daniel Pillersdorf, M.A.
Graduate Student, Department of Psychology

Appendix B

University of Windsor Psychology Participant Pool Advertisement

Participant Pool Advertisement

Title: Our personality and substances we use: What are the connections?

Researcher: Daniel Pillersdorf

Duration: 1 Hour

Credits: 1

Description: This study is seeking to investigate specific personality traits and substance use behaviours and attitudes. Participation involves completing an online survey. The survey involves answering questions on rating scales. Please note that individuals who have already participated in the study in response to the mass recruitment email are not permitted to participate in this study again for Pool bonus points.

Study Link: https://uwindsor.ca1.qualtrics.com/jfe/form/SV_01EkI3pVUEnwhIp

Appendix C

Demographic Form

Age in years and months:

Gender (please select):

- Female
- Male
- Transgender Female
- Transgender Male
- Gender variant/non-conforming
- Not listed: _____
- Prefer not to Answer

Ethnicity (please select)

- Black/African/Caribbean
- Chinese
- Filipino
- First Nations
- Japanese
- Latin American
- Mixed
- South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)
- Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, etc.)
- White
- Other: _____
- Prefer not to Answer

Appendix C (Cont.)

Which statement best describes your family's social status when you were growing up?

- A. Lower class
- B. Lower middle class
- C. Middle class
- D. Upper middle class
- E. Upper class

Which statement best describes your current social status?

- A. Lower class
- B. Lower middle class
- C. Middle class
- D. Upper middle class
- E. Upper class

Appendix C (Cont.)

How frequently have you consumed the following substances over the past 12 months?:

1. Alcohol

0	1	2	3	4	5	6	7
Never	Less than 12 times	Once a month	2-3 times a month	1-2 days a week	3-4 days a week	5-6 days a week	Everyday

2. Cannabis (e.g., marijuana)

0	1	2	3	4	5	6	7
Never	Less than 12 times	Once a month	2-3 times a month	1-2 days a week	3-4 days a week	5-6 days a week	Everyday

3. Cocaine

0	1	2	3	4	5	6	7
Never	Less than 12 times	Once a month	2-3 times a month	1-2 days a week	3-4 days a week	5-6 days a week	Everyday

4. Crack Cocaine

0	1	2	3	4	5	6	7
Never	Less than 12 times	Once a month	2-3 times a month	1-2 days a week	3-4 days a week	5-6 days a week	Everyday

5. Methamphetamine

0	1	2	3	4	5	6	7
Never	Less than 12 times	Once a month	2-3 times a month	1-2 days a week	3-4 days a week	5-6 days a week	Everyday

6. Heroin

0	1	2	3	4	5	6	7
Never	Less than 12 times	Once a month	2-3 times a month	1-2 days a week	3-4 days a week	5-6 days a week	Everyday

Appendix C (Cont.)

7. Other Opioids (e.g., opium, codeine, oxycodone, morphine, fentanyl, carfentanil)

0	1	2	3	4	5	6	7
Never	Less than 12 times	Once a month	2-3 times a month	1-2 days a week	3-4 days a week	5-6 days a week	Everyday

8. Hallucinogens/Psychedelics (e.g., LSD, PCP, Ketamine, Peyote, Psilocybin)

0	1	2	3	4	5	6	7
Never	Less than 12 times	Once a month	2-3 times a month	1-2 days a week	3-4 days a week	5-6 days a week	Everyday

9. MDMA/Ecstasy

0	1	2	3	4	5	6	7
Never	Less than 12 times	Once a month	2-3 times a month	1-2 days a week	3-4 days a week	5-6 days a week	Everyday

10. Sedatives /Hypnotics/Tranquilizers (e.g., Barbiturates, Benzodiazepines)

0	1	2	3	4	5	6	7
Never	Less than 12 times	Once a month	2-3 times a month	1-2 days a week	3-4 days a week	5-6 days a week	Everyday

11. Non-medical Use of Prescription Drugs (e.g., Adderall, Ritalin, Vyvanse)

0	1	2	3	4	5	6	7
Never	Less than 12 times	Once a month	2-3 times a month	1-2 days a week	3-4 days a week	5-6 days a week	Everyday

Appendix D

MACH-IV SCALE (Christie & Geis, 1970)

1. Most people are basically good and kind.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

2. Most people are brave.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

3. Generally speaking, people won't work hard unless they're forced to do so.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

4. It is wise to flatter important people.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

5. People suffering from incurable diseases should have the choice of being put painlessly to death.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

6. It is hard to get ahead without cutting corners here and there.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

Appendix D (Cont.)

7. Most people forget more easily the death of their parents than the loss of their property.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

8. P.T. Barnum was wrong when he said that there's a sucker born every minute.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

9. One should take action only when sure it is morally right.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

10. Never tell anyone the real reason you did something unless it is useful to do so.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

11. There is no excuse for lying to someone else.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

12. The best way to handle people is to tell them what they want to hear.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

13. Most people who get ahead in the world lead clean, moral lives.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

Appendix D (Cont.)

14. Honesty is the best policy in all cases.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

15. The biggest difference between most criminals and other people is that the criminals are stupid enough to get caught.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

16. It is possible to be good in all respects.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

17. When you ask someone to do something for you, it is best to give the real reasons for wanting it rather than giving reasons that might carry more weight.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

18. Anyone who completely trusts anyone is asking for trouble.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

19. All in all, it is better to be humble and honest than to be important and dishonest.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

20. It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Agree	Strongly Agree

Appendix E

Levenson Self-Report Psychopathy Scale (LSRP; Levenson et al., 1995)

1. Success is based on survival of the fittest; I am not concerned about the losers.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

2. I find myself in the same kinds of trouble, time after time.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

3. For me, what's right is whatever I can get away with.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

4. I am often bored.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

5. In today's world, I feel justified in doing anything I can get away with to succeed.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

6. I find that I am able to pursue one goal for a long time.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

7. My main purpose in life is getting as many goodies as I can.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

8. I don't plan anything very far in advance.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

Appendix E (Cont.)

9. Making a lot of money is my most important goal.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

10. I quickly lose interest in tasks I start.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

11. I let others worry about higher values; my main concern is with the bottom line.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

12. Most of my problems are due to the fact that other people just don't understand me.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

13. People who are stupid enough to get ripped off usually deserve it.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

14. Before I do anything, I carefully consider the possible consequences.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

15. Looking out for myself is my top priority.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

16. I have been in a lot of shouting matches with other people.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

Appendix E (Cont.)

17. I tell other people what they want to hear so that they will do what I want them to do.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

18. When frustrated, I often let off steam by blowing my top.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

19. I would be upset if my success came at someone else's expense.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

20. Love is overrated.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

21. I often admire a really clever scam.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

22. I make a point of trying not to hurt others in pursuit of my goals.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

23. I enjoy manipulating other people's feelings.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

24. I feel bad if my words or actions cause someone else to feel emotional pain.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

Appendix E (Cont.)

25. Please select option 1 for this item

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

26. Even if I were trying very hard to sell something, I wouldn't lie about it.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

27. Cheating is not justified because it is unfair to others.

1	2	3	4
Disagree Strongly	Disagree Somewhat	Agree Somewhat	Agree Strongly

Appendix F (Cont.)

- 20. Sometimes I avoid people because I'm concerned they won't acknowledge what I do for them.**
- | | | | | | |
|---|------------|---------|---|---|-------------------|
| 0 | 1 | 2 | 3 | 4 | 5 |
| | Not at all | Like Me | | | Very Much Like Me |
- 21. It's hard for me to feel good about myself unless I know other people like me.**
- | | | | | | |
|---|------------|---------|---|---|-------------------|
| 0 | 1 | 2 | 3 | 4 | 5 |
| | Not at all | Like Me | | | Very Much Like Me |
- 22. It irritates me when people don't notice how good a person I am.**
- | | | | | | |
|---|------------|---------|---|---|-------------------|
| 0 | 1 | 2 | 3 | 4 | 5 |
| | Not at all | Like Me | | | Very Much Like Me |
- 23. I will never be satisfied until I get all that I deserve.**
- | | | | | | |
|---|------------|---------|---|---|-------------------|
| 0 | 1 | 2 | 3 | 4 | 5 |
| | Not at all | Like Me | | | Very Much Like Me |
- 24. I try to show what a good person I am through my sacrifices.**
- | | | | | | |
|---|------------|---------|---|---|-------------------|
| 0 | 1 | 2 | 3 | 4 | 5 |
| | Not at all | Like Me | | | Very Much Like Me |
- 25. I often fantasize about being performing heroic deeds.**
- | | | | | | |
|---|------------|---------|---|---|-------------------|
| 0 | 1 | 2 | 3 | 4 | 5 |
| | Not at all | Like Me | | | Very Much Like Me |
- 26. I often fantasize about being recognized for my accomplishments.**
- | | | | | | |
|---|------------|---------|---|---|-------------------|
| 0 | 1 | 2 | 3 | 4 | 5 |
| | Not at all | Like Me | | | Very Much Like Me |
- 27. I can't stand relying on other people because it makes me feel weak.**
- | | | | | | |
|---|------------|---------|---|---|-------------------|
| 0 | 1 | 2 | 3 | 4 | 5 |
| | Not at all | Like Me | | | Very Much Like Me |
- 28. When others get a glimpse of my needs, I feel anxious and ashamed.**
- | | | | | | |
|---|------------|---------|---|---|-------------------|
| 0 | 1 | 2 | 3 | 4 | 5 |
| | Not at all | Like Me | | | Very Much Like Me |

Appendix G

Drug Use Disorder Identification Test (DUDIT; Berman et al., 2005)

1. How often do you use drugs other than alcohol?

- | | | | | |
|--------------------------|-------------------------------|--------------------------|--------------------------|---------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Never | Once a Month
or Less Often | 2-4 Times
a Month | 2-3 Times
a week | 4 Times a Week
or more |

2. Do you use more than one type of drug on the same occasion?

- | | | | | |
|--------------------------|-------------------------------|--------------------------|--------------------------|---------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Never | Once a Month
or Less Often | 2-4 Times
a Month | 2-3 Times
a week | 4 Times a Week
or more |

3. How many times do you take drugs on a typical day when you use drugs?

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 0 | 1-2 | 3-4 | 5-6 | 7 or more |

4. How often are you influenced heavily by drugs?

- | | | | | |
|--------------------------|---------------------------------|--------------------------|--------------------------|------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Never
a month | Less Often than
once a month | Every
month | Every
week | Daily or Almost
every day |

5. Over the past year, have you felt that your longing for drugs was so strong that you could not resist it?

- | | | | | |
|--------------------------|---------------------------------|--------------------------|--------------------------|------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Never
a month | Less Often than
once a month | Every
month | Every
week | Daily or Almost
every day |

6. Has it happened, over the past year, that you have not been able to stop taking drugs once you started?

- | | | | | |
|--------------------------|---------------------------------|--------------------------|--------------------------|------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Never
a month | Less Often than
once a month | Every
month | Every
week | Daily or Almost
every day |

7. How often over the past year have you taken drugs and then neglected something you should have done?

- | | | | | |
|--------------------------|---------------------------------|--------------------------|--------------------------|------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Never
a month | Less Often than
once a month | Every
month | Every
week | Daily or Almost
every day |

8. How often over the past year have you needed to take a drug the morning after heavy drug use the day before?

- | | | | | |
|--------------------------|---------------------------------|--------------------------|--------------------------|------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Never
a month | Less Often than
once a month | Every
month | Every
week | Daily or Almost
every day |

Appendix (GCont.)

9. How often over the past year have you had guilty feelings or a bad conscience because you used drugs?

- | | | | | |
|--------------------------|---------------------------------|--------------------------|--------------------------|------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Never
a month | Less Often than
once a month | Every
month | Every
week | Daily or Almost
every day |

10. Have you or anyone else been hurt (mentally or physically) because you used drugs?

- | | | |
|--------------------------|---------------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No | Yes, but not over the past year | Yes, over the past year |

11. Has a relative or a friend, a doctor or nurse, or anyone else, been worried about your drug use or said to you that you should stop using drugs?

- | | | |
|--------------------------|---------------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| No | Yes, but not over the past year | Yes, over the past year |

Appendix H

Alcohol Use Disorder Identification Test (Babor, De La Fuente, Saunders & Grant, 1992)

Because alcohol use can affect your health, it is important that we ask some questions about your alcohol use. Your answers will remain confidential so please be honest. Circle the number on the scales below that best describes your answer to each question.

1. How often do you have a drink containing alcohol?

Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week
0	1	2	3	4

2. How many drinks containing alcohol do you have on a typical day when you are drinking?

1 or 2	3 or 4	5 or 6	7 to 9	10 or more
0	1	2	3	4

3. How often do you have six or more drinks on one occasion?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

4. How often during the last year have you found that you were not able to stop drinking once you had started?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

5. How often during the last year have you failed to do what was normally expected of you because of drinking?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy night of drinking?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

7. How often during the last year have you had a feeling of guilt or remorse after drinking?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

8. How often during the last year have you been unable to remember what happened the night before because of your drinking?

Never	Less than monthly	Monthly	Weekly	Daily or almost daily
0	1	2	3	4

Appendix H (Cont.)

9. Have you or someone else been injured because of your drinking?

No year	Yes, but not in the last year	Yes, during the last
0	2	4

10. Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?

No year	Yes, but not in the last year	Yes, during the last
0	2	4

Appendix I

Relationship Questionnaire (RQ; Bartholomew & Horowitz, 1991)

Following are four general relationship styles that people often report. Place a checkmark next to the letter corresponding to the style that best describes you or is closest to the way you are.

____ A. It is easy for me to become emotionally close to others. I am comfortable depending on them and having them depend on me. I don't worry about being alone or having others not accept me.

____ B. I am uncomfortable getting close to others. I want emotionally close relationships, but I find it difficult to trust others completely, or to depend on them. I worry that I will be hurt if I allow myself to become too close to others.

____ C. I want to be completely emotionally intimate with others, but I often find that others are reluctant to get as close as I would like. I am uncomfortable being without close relationships, but I sometimes worry that others don't value me as much as I value them.

____ D. I am comfortable without close emotional relationships. It is very important to me to feel independent and self-sufficient, and I prefer not to depend on others or have others depend on me.

Now please rate each of the relationship styles above to indicate how well or poorly each description corresponds to your general relationship style.

			Style A			
1	2	3	4	5	6	7
Disagree			Neutral/Mixed			Agree
Strongly						Strongly

			Style B			
1	2	3	4	5	6	7
Disagree			Neutral/Mixed			Agree
Strongly						Strongly

			Style C			
1	2	3	4	5	6	7
Disagree			Neutral/Mixed			Agree
Strongly						Strongly

			Style D			
1	2	3	4	5	6	7
Disagree			Neutral/Mixed			Agree
Strongly						Strongly

Appendix J

Social Connectedness Scale – Revised (SCS-R; Lee et al., 2001)

Directions: Following are a number of statements that reflect various ways in which we view ourselves. Rate the degree to which you agree or disagree with each statement using the following scale (1 = Strongly Disagree and 6 = Strongly Agree). There is no right or wrong answer. Do not spend too much time with any one statement and do not leave any unanswered.

1. I feel comfortable in the presence of strangers

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

2. I am in tune with the world

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

3. Even among my friends, there is no sense of brotherhood/sisterhood

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

4. I fit in well in new situations

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

5. I feel close to people

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

6. I feel disconnected from the world around me

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

7. Even around people I know, I don't feel that I really belong

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

Appendix J (Cont.)

8. I see people as friendly and approachable

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

9. I feel like an outsider

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

10. I feel understood by the people I know

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

11. I feel distant from people

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

12. I am able to relate to my peers

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

13. I have little sense of togetherness with my peers

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

14. I find myself actively involved in people's lives

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

15. I catch myself losing a sense of connectedness with society

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

16. I am able to connect with other people

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

Appendix J (Cont.)

17. I see myself as a loner

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

18. I don't feel related to most people

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

19. My friends feel like family

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

20. I don't feel I participate with anyone or any group

1	2	3	4	5	6
Strongly Disagree	Disagree	Mildly Disagree	Mildly Agree	Agree	Strongly Agree

Appendix K

COPE Inventory (Carver et al., 1989)

We are interested in how people respond to stress when they confront difficult or stressful events in their lives. There are lots of ways to try to deal with stress. This questionnaire asks you to indicate what you generally do and feel, when you experience stressful events. Obviously, different events bring out somewhat different responses, but think about what you usually do when you are under a lot of stress.

Then respond to each of the following items by circling one response choice under each statement listed below. Please try to respond to each item separately in your mind from each other item. Choose your answers thoughtfully, and make your answers as true for you as you can. Please answer every item. There are no “right” or “wrong” answers, so choose the most accurate answer for you – not what you think “most people” would say or do. Indicate what YOU usually do when YOU experience a stressful event.

1. I try to grow as a person as a result of the experience

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

2. I turn to work or other substitute activities to take my mind off things

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

3. I get upset and let my emotions out.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

4. I try to get advice from someone about what to do

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

5. I concentrate my efforts on doing something about it

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

Appendix K (Cont.)

6. I say to myself “this isn’t real.”

1	2	3	4
I usually don’t do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

7. I put trust in God.

1	2	3	4
I usually don’t do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

8. I laugh about the situation.

1	2	3	4
I usually don’t do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

9. I admit to myself that I can’t deal with it, and quit trying.

1	2	3	4
I usually don’t do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

10. I restrain myself from doing anything too quickly.

1	2	3	4
I usually don’t do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

11. I discuss my feelings with someone.

1	2	3	4
I usually don’t do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

12. I use alcohol or drugs to make myself feel better

1	2	3	4
I usually don’t do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

13. I get used to the idea that it happened

1	2	3	4
I usually don’t do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

14. I talk to someone to find out more about the situation

1	2	3	4
I usually don’t do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

Appendix K (Cont.)

15. I keep myself from getting distracted by other thoughts or activities

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

16. I daydream about things other than this

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

17. I get upset, and am really aware of it.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

18. I seek God's help.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

19. I make a plan of action.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

20. I make jokes about it.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

21. I accept that this has happened and that it can't be changed.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

22. I hold off doing anything about it until the situation permits.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

23. I try to get emotional support from friends and family.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

Appendix K (Cont.)

24. I just give up trying to reach my goal.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

25. I take additional action to try to get rid of the problem.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

26. I try to lose myself for a while by drinking alcohol or taking drugs.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

27. I refuse to believe that it has happened.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

28. I let my feelings out.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

29. I try to see it in a different light, to make it seem more positive.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

30. I talk to someone who could do something concrete about the problem.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

31. I sleep more than usual

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

32. I try to come up with a strategy about what to do

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

Appendix K (Cont.)

33. I focus on dealing with this problem, and if necessary let other things slide a little.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

34. I get sympathy and understanding from someone.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

35. I drink alcohol or take drugs, in order to think about it less

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

36. I kid around about it.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

37. I give up the attempt to get what I want.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

38. I look for something good in what is happening.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

39. I think about how I might better handle the problem.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

40. I pretend that it hasn't really happened.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

41. I make sure not to make matters worse by acting too soon.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

Appendix K (Cont.)

42. I try hard to prevent other things from interfering with my efforts at dealing with this.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

43. I go to movies or watch TV, to think about it less.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

44. I accept the reality of the fact that it happened.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

45. I ask people who have had similar experiences what they did.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

46. I feel a lot of emotional distress and I find myself expressing those feelings a lot.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

47. I take direct action to get around the problem.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

48. I try to find comfort in my religion.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

49. I force myself to wait for the right time to do something.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

50. I make fun of the situation.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

Appendix K (Cont.)

51. I reduce the amount of effort I'm putting into solving the problem.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

52. I talk to someone about how I feel

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

53. I use alcohol or drugs to help me get through it.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

54. I learn to live with it.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

55. I put aside other activities in order to concentrate on this.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

56. I think hard about what steps to take.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

57. Please select option 3 for this item

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

58. I act as though it hasn't even happened.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

59. I do what has to be done, one step at a time.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

Appendix K (Cont.)

60. I learn something from the experience.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

61. I pray more than usual.

1	2	3	4
I usually don't do this at all	I usually do this a little bit	I usually do this a medium amount	I usually do this a lot

Appendix L

Readiness to Change Questionnaire (RCQ; Heather & Rollnick, 1993)

The following questionnaire is designed to identify how you personally feel about your alcohol or drug use right now. Please read each of the questions below carefully, and then decide whether you agree or disagree with the statements. Please tick the answer of your choice to each question. Your answers are completely private and confidential.

1. I don't think I consume alcohol or other addictive substances too much.

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Strongly
Disagree | Disagree | Unsure | Agree | Strongly
Agree |

2. I am trying to consume alcohol, or other addictive substances, less than I used to.

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Strongly
Disagree | Disagree | Unsure | Agree | Strongly
Agree |

3. I enjoy alcohol, or using another addictive substance, but sometimes I consume too much.

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Strongly
Disagree | Disagree | Unsure | Agree | Strongly
Agree |

4. Sometimes I think I should cut down on my drinking or my use of another addictive substance.

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Strongly
Disagree | Disagree | Unsure | Agree | Strongly
Agree |

Appendix M (Cont.)

5. It's a waste of my time thinking about my drinking or my use of another addictive substance.

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Strongly
Disagree | Disagree | Unsure | Agree | Strongly
Agree |

6. I have recently changed my drinking or substance use habits.

- | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Strongly
Disagree | Disagree | Unsure | Agree | Strongly
Agree |

Appendix L (Cont.)

7. Anyone can talk about wanting to do something about their drinking or substance use, but I am actually doing something about it.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

8. I am at the stage where I should think about drinking alcohol or using addictive substances less.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

9. My drinking or substance use is a problem sometimes.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

10. There is no need for me to think about changing my drinking or my use of an addictive substance.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

11. I am actually changing my drinking or substance use habits right now.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

12. Consuming less alcohol or other addictive substances would be pointless for me.

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree

Appendix M

Treatment Self-Regulation Questionnaire (TSRQ; Levesque et al., 2007)

The following questions relate to the reasons why you would either stop consuming alcohol or other addictive substances, or continue to do so. Different people have different reasons for doing that, and we want to know how true each of the following reasons is for you. All 15 responses are to the same question.

The reason I would not consume alcohol or another addictive substance is:

1. Because I feel that I want to take responsibility for my own health.

1	2	3	4	5	6	7
Not at all True			Somewhat True			Very True

2. Because I would feel guilty or ashamed of myself if I consumed alcohol or another addictive substance.

1	2	3	4	5	6	7
Not at all True			Somewhat True			Very True

3. Because I personally believe it is the best thing for my health.

1	2	3	4	5	6	7
Not at all True			Somewhat True			Very True

4. Because others would be upset with me if I consumed alcohol or another addictive substance.

1	2	3	4	5	6	7
Not at all True			Somewhat True			Very True

5. I really don't think about it.

1	2	3	4	5	6	7
Not at all True			Somewhat True			Very True

6. Because I have carefully thought about it and believe it is very important for many aspects of my life.

1	2	3	4	5	6	7
Not at all True			Somewhat True			Very True

7. Because I would feel bad about myself if I consumed alcohol or another addictive substance.

1	2	3	4	5	6	7
Not at all True			Somewhat True			Very True

Appendix M (Cont.)

8. Because it is an important choice I really want to make.

1	2	3	4	5	6	7
Not at all True			Somewhat True		Very True	

9. Because I feel pressure from others to not consume alcohol or another addictive substance.

1	2	3	4	5	6	7
Not at all True			Somewhat True		Very True	

10. Because it is easier to do what I am told than think about it.

1	2	3	4	5	6	7
Not at all True			Somewhat True		Very True	

11. Because it is consistent with my life goals.

1	2	3	4	5	6	7
Not at all True			Somewhat True		Very True	

12. Because I want others to approve of me.

1	2	3	4	5	6	7
Not at all True			Somewhat True		Very True	

13. Because it is very important for being as healthy as possible.

1	2	3	4	5	6	7
Not at all True			Somewhat True		Very True	

14. Because I want others to see I can do it.

1	2	3	4	5	6	7
Not at all True			Somewhat True		Very True	

15. I don't really know why.

1	2	3	4	5	6	7
Not at all True			Somewhat True		Very True	

16. Please select option six for this item.

1	2	3	4	5	6	7
Not at all True			Somewhat True		Very True	

Appendix N

Milwaukee Psychotherapy Expectations Questionnaire (MPEQ; Norberg et al., 2011)

Now I want you to imagine that you are experiencing a sufficient amount of distress and dissatisfaction with life due to your substance or alcohol use and are considering seeking therapy for this distress and dissatisfaction. If you are currently feeling a lot of distress, then you do not need to imagine, just focus on how you feel right now. However, if you are not currently experience a lot of distress, imagine that you are, and that life is not going the way you want it go. Imagine that you are thinking about talking to a therapist. Given any expectations you have about therapy, please answer the following questions.

1. I expect my therapist will provide support

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

2. My therapist will provide me feedback

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

3. I will be able to express my true thoughts and feelings

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

4. I will feel comfortable with my therapist

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

5. My therapist will be sincere

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

6. My therapist will be interested in what I have to say

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

7. My therapist will be sympathetic

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

8. I expect that I will come to every appointment

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

Appendix N (Cont.)

9. Therapy will provide me with an increased level of self-respect

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

10. After therapy, I will have the strength needed to better manage my substance or alcohol use

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

11. I anticipate being a better person as a result of therapy

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

12. After therapy I will be a much more optimistic person

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

13. Please select option 7 for this item

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

14. I expect that I will tell my therapist if I have concerns about therapy

1 2 3 4 5 6 7 8 9 10
Not at all Somewhat Very Much So

Appendix O



Study: Our personality and substances we use: What are the connections? (Recruitment via Email Advertisement)

You are asked to participate in a research study conducted by Daniel Pillersdorf under the supervision of Dr. Calvin Langton from the Psychology Department at the University of Windsor.

If you have any questions or concerns about this research, please feel free to contact Daniel Pillersdorf at pillersd@uwindsor.ca or Dr. Calvin Langton (research supervisor and professor) via email at clangton@uwindsor.ca.

PURPOSE OF THE STUDY

To explore the relationship between various personality traits and substance use behaviours and attitudes.

PROCEDURES

If you volunteer to participate in this online survey study, you will be asked to complete a series of questionnaires and short-answer questions pertaining to substance use, personality traits, and various factors that may be related to psychological treatment (although you do not need to be in treatment or feel you need treatment to participate). The questionnaire items require you select response options (mostly using rating scales) and the short-answer questions require that you type sentences in response to each question/prompt. The study will take no longer than 1 hour to complete and will be completed online using the University of Windsor Qualtrics system.

POTENTIAL RISKS AND DISCOMFORTS

You may feel uncomfortable being asked questions about specific personality characteristics or past or current personal illicit substance use. To manage concerns over any risk of participation and limits to confidentiality, please note that (i) your participation will be kept confidential, (ii) your actual responses, as an individual participant, to the items will not be looked at any time, (iii) all data, from all participants, will be analysed in aggregate only (that is, all together), (iv) the only identifying information that will be collected is your email address, which will be used to check your eligibility for the draw and then deleted, (v) at the time of retrieval from the survey website, all the data will be fully de-identified, and (vi) secure storage and analyses of all data will be with the anonymized dataset only. Importantly, we encourage you to complete the online survey in a private location (such as your home). We discourage you from providing any identifying information when completing the short-answer prompts (e.g., your name, address, etc.). As well, we note that you need only provide responses at a level of detail in which you feel comfortable. We also encourage you to consider deleting your browser history and clearing the cache of the computer used once you have submitted your full set of responses (instructions for doing this are available at:

Appendix O (Cont.)

<https://www.computerhope.com/issues/ch000510.htm>).

The final page of this consent form is a list of services and resources you may wish to access/use should you experience any adverse response to your participation in this study or if you would like to speak with someone about your substance use.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

Although there are no foreseeable benefits of participation in this research, you might appreciate the experience of contributing to psychological research. Results of this research will add to our understanding of the influence of personality traits on substance use behaviour and attitudes.

COMPENSATION FOR PARTICIPATION

Once you complete the survey and click submit, you have the option of entering your UWindsor email on a separate landing page in order to be entered into a draw for a chance to win one of twenty \$50 amazon.ca gift cards. Only participants providing their UWindsor email who have completed 90% of the total items comprising the questionnaires will be entered into the draw.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Your participation will be kept confidential to the degree permitted by the technology used. The only identifying information that will be collected from you will be your email address, which is to make sure we can check that you completed at least 90% of the survey and so are eligible for the draw. The data from all participants will be fully de-identified, retained indefinitely, and stored in anonymized form on a password protected computers of the researchers. No identifying information will be retained in the dataset. Your data will be accessible only to the researchers. In any resulting publications or presentations, all participants will be referred to in groups so as to protect individual identity.

PARTICIPATION AND WITHDRAWAL

You can withdraw your participation from this online study at any point (by discontinuing the survey), up to when you submit your completed survey. The investigator may withdraw you from this research if circumstances arise which warrant doing so. Once your data is submitted you will not be able to withdraw your data because no identifiers would have been collected so as to identify your specific responses. Only participants providing their UWindsor email who have completed 90% of the total items comprising the questionnaires will be entered into the draw.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

A summary of the research findings will be available on completion of the project.
Web address: <http://www1.uwindsor.ca/reb/study-results>

Appendix O (Cont.)

Date when results are available: December 30, 2021

SUBSEQUENT USE OF DATA

These data may be used in subsequent studies, in publications and in presentations. The anonymized data may be published or shared with other researchers.

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH PARTICIPANT/LEGAL REPRESENTATIVE

I understand the information provided for the study as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. We encourage you to save and print this document for your records.

- I consent to participate
- I do not wish to participate in this study

Below is a list of services and resources you may wish to access/use should you experience any adverse response to your participation in this study or if you would like to speak with someone about your substance use.

UNIVERSITY AND COMMUNITY MENTAL HEALTH/ADDICTION RESOURCES

Student Counselling Centre
University of Windsor
519-253-3000 ext. 4616

Psychological Services and Research Centre
2629 Riverside Drive West, Windsor, ON N9B 1B4

Brentwood Recovery Home
2335 Dougall Ave, Windsor, ON N8X 1S9
Tel: (519) 253-2441
Addiction services

Alcoholics Anonymous
12-step groups for individuals with alcohol problems
(519)256-9975

Appendix O (Cont.)

Narcotics Anonymous

12-step groups for individuals with drug problems

519.977.8063

Windsor Addiction Assessment & Outpatient Service

Hotel Dieu Grace Hospital, Western Campus

1453 Prince Rd, Windsor, ON

Tel: (519) 257-5220

Distress Centre of Windsor-Essex County (12 noon – 12 midnight)

Crisis Phone: (519) 256-5000

Community Crisis Centre of Windsor-Essex County

Jeanne Mance Bldg

1986 Ouellette Ave, 1st Floor, Windsor, ON

Tel: (519) 973-443

24-hr crisis phone & one-on-one crisis intervention

Appendix P



Study: Our personality and substances we use: What are the connections? (Recruitment via Participant Pool)

You are asked to participate in a research study conducted by Daniel Pillersdorf under the supervision of Dr. Calvin Langton from the Psychology Department at the University of Windsor.

If you have any questions or concerns about this research please feel free to contact Daniel Pillersdorf at pillersd@uwindsor.ca or Dr. Calvin Langton (research supervisor and professor) via email at clangton@uwindsor.ca.

PURPOSE OF THE STUDY

To explore the relationship between various personality traits and substance use behaviours and attitudes.

PROCEDURES

If you volunteer to participate in this online survey study, you will be asked to complete a series of questionnaires and short-answer questions pertaining to substance use, personality traits, and various factors that may be related to psychological treatment (although you do not need to be in treatment or feel you need treatment to participate). The questionnaire items require you select response options (mostly using rating scales) and the short-answer questions require that you type sentences in response to each question/prompt. The study will take no longer than 1 hour to complete and will be completed online using the University of Windsor Qualtrics system.

POTENTIAL RISKS AND DISCOMFORTS

You may feel uncomfortable being asked questions about specific personality characteristics or past or current personal illicit substance use. To manage concerns over any risk of participation and limits to confidentiality, please note that (i) your participation will be kept confidential, (ii) your actual responses, as an individual participant, to the items will not be looked at any time, (iii) all data, from all participants, will be analysed in aggregate only (that is, all together), (iv) the only identifying information that will be collected is your email address, which will be used to check your eligibility for the draw and then deleted, (v) at the time of retrieval from the survey website, all the data will be fully de-identified, and (vi) secure storage and analyses of all data will be with the anonymized dataset only. Importantly, we encourage you to complete the online survey in a private location (such as your home). We discourage you from providing any identifying information when completing the short-answer prompts (e.g., your name, address, etc.). As well, we note that you need only provide responses at a level of detail in which you feel

Appendix P (Cont.)

comfortable. We also encourage you to consider deleting your browser history and clearing the cache of the computer used once you have submitted your full set of responses (instructions for doing this are available at:

<https://www.computerhope.com/issues/ch000510.htm>).

The final page of this consent form is a list of services and resources you may wish to access/use should you experience any adverse response to your participation in this study or if you would like to speak with someone about substance use.

POTENTIAL BENEFITS TO PARTICIPANTS AND/OR TO SOCIETY

Although there are no foreseeable benefits of participation in this research, you might appreciate the experience of contributing to psychological research. Results of this research will add to our understanding of the influence of personality traits on substance use behaviour and attitudes.

COMPENSATION FOR PARTICIPATION

This study will take no more than 60 minutes of your time and is worth 1.0 bonus points if you are registered in the pool and you are registered in one or more eligible psychology courses.

CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Your participation will be kept confidential to the degree permitted by the technology used. The only identifying information that will be collected from you will be your email address, which is to make sure we can check that you completed at least 90% of the survey. The Psychology Participant Pool will retain a record of your participation in the study in order to ensure that you are awarded your participation credit (which is awarded within 48 hours of participation). The data from all participants will be fully de-identified, retained indefinitely, and stored in anonymized form on a password protected computers of the researchers. No identifying information will be retained in the dataset. Your data will be accessible only to the researchers. In any resulting publications or presentations, all participants will be referred to in groups so as to protect individual identity.

PARTICIPATION AND WITHDRAWAL

You can withdraw your participation from this online study at any point by discontinuing the survey. The investigator may withdraw you from this research if circumstances arise which warrant doing so. In order to completely remove your data from the study, you must email the principle investigator (pillersd@uwindsor.ca) and ask for your data to be removed, prior to April 1, 2021. After this date, data analysis will begin and we will be unable to remove your data.

Appendix P (Cont.)

Compensation will be commensurate with the proportion of the study completed. Full credit of 1.0 bonus points will be given to participants who complete 90% of the questionnaire items and short-answer questions. Careful consideration will be given to cases in which the participant withdraws from the study or completes less than 90% of the items in order to ensure that commensurate partial credit is awarded.

FEEDBACK OF THE RESULTS OF THIS STUDY TO THE PARTICIPANTS

A summary of the research findings will be available on completion of the project.

Web address: <http://www1.uwindsor.ca/reb/study-results>

Date when results are available: December 30, 2021

SUBSEQUENT USE OF DATA

These data may be used in subsequent studies, in publications and in presentations. The anonymized data may be published or shared with other researchers.

RIGHTS OF RESEARCH PARTICIPANTS

If you have questions regarding your rights as a research participant, contact: Research Ethics Coordinator, University of Windsor, Windsor, Ontario, N9B 3P4; Telephone: 519-253-3000, ext. 3948; e-mail: ethics@uwindsor.ca

SIGNATURE OF RESEARCH PARTICIPANT/LEGAL REPRESENTATIVE

I understand the information provided for the study as described herein. My questions have been answered to my satisfaction, and I agree to participate in this study. We encourage you to save and print this document for your records.

- I consent to participate
- I do not wish to participate in this study

Below is a list of services and resources you may wish to access/use should you experience any adverse response to your participation in this study or if you would like to speak with someone about your substance use.

UNIVERSITY AND COMMUNITY MENTAL HEALTH/ADDICTION RESOURCES

Student Counselling Centre
University of Windsor
519-253-3000 ext. 4616

Appendix P (Cont.)

Psychological Services and Research Centre
2629 Riverside Drive West, Windsor, ON N9B 1B4

Brentwood Recovery Home
2335 Dougall Ave, Windsor, ON N8X 1S9
Tel: (519) 253-2441
Addiction services

Alcoholics Anonymous
12-step groups for individuals with alcohol problems
(519)256-9975

Narcotics Anonymous
12-step groups for individuals with drug problems
519.977.8063

Windsor Addiction Assessment & Outpatient Service
Hotel Dieu Grace Hospital, Western Campus
1453 Prince Rd, Windsor, ON
Tel: (519) 257-5220

Distress Centre of Windsor-Essex County (12 noon – 12 midnight)
Crisis Phone: (519) 256-5000

Community Crisis Centre of Windsor-Essex County
Jeanne Mance Bldg
1986 Ouellette Ave, 1st Floor, Windsor, ON
Tel: (519) 973-443
24-hr crisis phone & one-on-one crisis intervention

Appendix Q

Codebook

Demographic: Substance Use

Demographic: Attended Substance Use Treatment
Demographic: Experienced a Trauma
Demographic: Alcohol Use
Demographic: Cannabis Use
Demographic: Heroin Use
Demographic: Cocaine Use
Demographic: Ecstasy Use
Demographic: Nicotine Use
Demographic: Non-specific Prescription Drug Use
Demographic: Non-specific Substance Use

Situations of Use

Situation: For social gathering/context
Situation: In preparation for social gathering
Situation: With one other person
Situation: Alone
Situation: During leisure time
Situation: Before going to sleep

Attitude Towards Treatment

Attitude: Treatment is Unnecessary/unhelpful
Attitude: Treatment would be helpful
Attitude: In treatment
Attitude: Ambivalence about seeking treatment

Impact on Relationships

Impact Rx: No negative impact on relationships
Impact Rx: Conflict/tension in relationships
Impact Rx: Judgement from family/friends
Impact Rx: Ruined relationship
Impact Rx: Concern from family/friends
Impact Rx: Family/friends encouragement to quit

Appendix Q (Cont.)

Impact on Life

Impact Lx: No negative impact on life
Impact Lx: Academic difficulty
Impact Lx: Academic enhancement
Impact Lx: Trauma
Impact Lx: Legal problems
Impact Lx: Financial problems
Impact Lx: Mental health problems
Impact Lx: Medical (physical) problems
Impact Lx: Memory problems
Impact Lx: Work/Career problems
Impact Lx: Motivation issues
Impact Lx: Unable to keep commitments/plans/responsibilities

Motivation for Use

Motivation for use: Pleasure/thrill-seeking
Motivation for use: Relaxation
Motivation for use: Social
Motivation for use: Coping with depression/low mood
Motivation for use: Cope with anxiety
Motivation for use: General coping with emotional distress/stress
Motivation for use: Manage appetite
Motivation for use: Sleep
Motivation for use: Celebration
Motivation for use: To focus
Motivation for use: Manage boredom
Motivation for use: To be more open-minded
Motivation for use: Enhance conversation/relationships
Motivation for use: Pressured/influenced by other
Motivation for use: Pain management
Motivation for use: Confidence
Motivation for use: Enjoy taste
Motivation for use: Cope with traumatic stress
Motivation for use: Avoid withdrawal

Appendix Q (Cont.)

Concerns Related to Substance Use

- Concern: No concern
- Concern: Health
- Concern: Losing control due to use
- Concern: Amount Used
- Concern: Stigma of being known as a “User”
- Concern: Becoming dependent
- Concern: Unable to keep commitments
- Concern: Self-medication
- Concern: Likelihood of relapse
- Concern: Mental health problems due to substance use

Alternate Coping

- Alt Cope: Adjust naturally to not using (positive)
- Alt Cope: Use alternative substance
- Alt Cope: Seek support from others
- Alt Cope: Distract with leisure activity
- Alt Cope: Self-harm
- Alt Cope: Exercise
- Alt Cope: Sleep
- Alt Cope: Meditate
- Alt Cope: Be emotionally distressed
- Alt Cope: Eat

Impact on User Pre-Use/During Use/Post-Use

- Impact: Planning use (pre/during)
- Impact: Positive anticipation of use (pre)
- Impact: Cravings (pre)
- Impact: Stress (pre)
- Impact: Anxiety (pre/during/post)
- Impact: Sadness/Depressed (pre/post)
- Impact: Guilt (pre/during/post)
- Impact: Bored (pre)
- Impact: Relaxed (during/post)
- Impact: Happy/Enjoyment (during/post)
- Impact: Becoming more social (during/post)
- Impact: Increased focus (during)
- Impact: Increased confidence (during/post)
- Impact: Becoming more introspective (during/post)
- Impact: Feeling numb (during/post)
- Impact: Regret (during/post)

Appendix R

Logistic Regression Model Results with Ethnicity Predictors

Table 22

Logistic Regression Model Results with Ethnicity Predictors

	Model 1	Model 2	Model 3
Gender, female	1.16(0.68, 2.00)	1.42(0.76, 2.64)	0.78(0.38, 1.58)
SS Growing Up – Lower Middle Class	1.43(0.65, 3.16)	1.24(0.52, 2.97)	1.44(0.54, 3.83)
SS Growing Up – Middle Class	0.96(0.45, 2.05)	0.79(0.34, 1.84)	1.14(0.44, 2.92)
SS Growing Up – Upper Middle Class	1.04 (0.43, 2.54)	1.06(0.39, 2.84)	1.47(0.49, 4.48)
SS Growing Up – Upper Class	1.76(0.23, 13.69)	2.59(0.26, 25.51)	2.39(0.19, 30.31)
Current SS – Lower Middle Class	0.95(0.44, 2.07)	0.88(0.39, 2.02)	0.80(.32, 2.03)
Current SS – Middle Class	0.95(0.44, 2.06)	1.11(0.48, 2.56)	1.08(0.43, 2.72)
Current SS – Upper Middle Class	0.79(0.32, 1.94)	0.87(0.33, 2.30)	0.66(0.23, 1.92)
Current SS – Upper Class	0.81(0.10, 6.43)	1.24(0.13, 11.85)	0.39(0.03, 5.31)
Ethnicity, Black	1.20(0.45, 3.16)	1.68(0.59, 4.76)	1.09(0.36, 3.31)
Ethnicity, South Asian	3.13(1.17, 8.35)*	2.83(.95, 8.46)	3.81(1.12, 12.99)*
Ethnicity, Latin-American	2.42(0.69, 8.47)	3.77(0.98, 14.52)	2.67 (0.67, 10.66)
Ethnicity, Filipina/o	4.59(0.50, 42.47)	6.00(0.50, 72.84)	4.15(0.41, 41.96)
Ethnicity, First Nations	0.55(0.10, 3.09)	0.34(0.46, 2.55)	0.41(0.06, 2.96)
Ethnicity, Middle Eastern	0.83(0.32, 2.14)	0.41(0.14, 1.20)	0.32(0.10, 1.00)*
Ethnicity, Multi-Ethnic	2.75(1.18, 6.41)*	2.43(0.97, 6.09)	2.84(1.05, 7.70)*
Age	0.94(0.90, 0.98)**	0.97(0.92, 1.02)	0.98(0.93, 1.04)
SCS-R	—	0.99(0.98, 1.00)	1.00(0.98, 1.02)
COPE-PF	—	1.00(0.97, 1.04)	1.01(0.98, 1.05)
COPE-EF	—	0.98(0.95, 1.02)	0.96(0.93, 1.01)
COPE-AF	—	1.08(1.03, 1.13)**	1.05(1.00, 1.11)
TSRQ-AUT	—	0.98(0.95, 1.00)*	0.99(0.97, 1.02)

TSRQ-CONT	—	1.05(1.01, 1.08)**	1.01(0.97, 1.04)
MPEQ-OUT	—	0.82(0.70, 0.97)*	0.84(0.70, 1.01)
MPEQ-ROLE	—	0.94(0.78, 1.13)	0.94(0.76, 1.15)
LSRP	—	—	1.13(1.09, 1.17)**
BPNI	—	—	1.01(1.00, 1.03)

Note. *Statistically significant ($p < 0.05$), **Statistically significant ($p < 0.01$). Data are given as odds ratios with 95% confidence intervals. Male option in the gender variable, Lower Class option in the Social Status Growing Up and Current Social Status variables, and White in the Ethnicity variable, were used for contrasting categorical variables in the regression. SCS-R is the Social Connectedness Scale – Revised. COPE-PF is the problem-focused subscale on the COPE Inventory. COPE-EF is the emotion-focused Subscale on the COPE Inventory. COPE-AF is the avoidant-focused subscale on the COPE Inventory. TSRQ-AUT is the Autonomous Motivation subscale on the Treatment Self-Regulation Questionnaire. TSRQ-CONT is the Controlled Motivation subscale on the Treatment Self-Regulation Questionnaire. MPEQ-OUT is the Treatment Outcome Expectations subscale on the Milwaukee Psychotherapy Expectations Questionnaire. MPEQ-ROLE is the Role Expectations subscale on the Milwaukee Psychotherapy Expectations Questionnaire. LSRP is the Levenson Self-Report Psychopathy Scale. BPNI is the Brief-Pathological Narcissism Scale. Ethnicity, Korean was excluded due to all participants (2) being classified as High in Machiavellianism. Ethnicity, Chinese was excluded due to having a cell count of five or less ($n = 5$). Ethnicity, European was excluded due to having a cell count of five or less ($n = 3$). Ethnicity, Indian was excluded due to having a cell count of five or less ($n = 2$).

A three-model hierarchical logistic regression was conducted in order to classify participants by Machiavellian group based on the independent variables noted above. The results of the analyses are reported in Table 22. The likelihood ratio for Model 1 was not significant ($\chi^2 = 26.29$, $df = 17$, $p = .07$). But, with the addition of the eight independent variables, Model 2 was found to be significant ($\chi^2 = 91.34$, $df = 25$, $p < .01$). Compared to the null (intercept-only) model, Model 2 displayed a 24.0% improvement in explaining variability in Machiavellian grouping (Nagelkerke pseudo R^2) and correctly classified 68% of cases. With the addition of the two covariates, Model 3 was found to be significant ($\chi^2 = 175.94$, $df = 27$, $p < .01$). Compared to the null (intercept-only) model, Model 3 displayed a 42% improvement in explaining variability in Machiavellian grouping (Nagelkerke pseudo R^2) and correctly classified 74% of cases.

Appendix S

Multiple Regression Results with Ethnicity Predictors

Table 23

Multiple Regression Results with Ethnicity Predictors

Step and Variable	<i>B</i>	CI	<i>SE B</i>	β	<i>t</i>	<i>sr</i> ²	<i>R</i> ²	ΔR^2
Step One							.14	.14
SCS-R	-.09	[-.17, -.02]	.04	-.13	-2.63**	.01		
COPE-PF	.01	[-.14, .16]	.08	.01	.09	.00		
COPE-EF	-.02	[-.20, .16]	.09	-.01	-.21	.00		
COPE-AF	.23	[.02, .44]	.11	.10	2.14*	.01		
TSRQ-AUT	-.18	[-.30, -.07]	.06	-.15	-3.09**	.02		
TSRQ-CONT	.23	[.07, .40]	.08	.13	2.74**	.01		
MPEQ-OUT	-1.10	[-1.93, -.27]	.42	-.18	-2.60**	.01		
MPEQ-ROLE	-.19	[-1.16, .78]	.49	-.03	-.39	.00		
Step Two							.38	.24
SCS-R	-.01	[-.07, .05]	.03	-.01	-.28	.00		
COPE-PF	.06	[-.07, .18]	.07	.04	.84	.00		
COPE-EF	-.13	[-.28, .03]	.08	-.08	-1.57	.00		
COPE-AF	.09	[-.09, .27]	.09	.04	.98	.00		
TSRQ-AUT	-.07	[-.17, .03]	.05	-.06	-1.43	.00		
TSRQ-CONT	-.01	[-.16, .13]	.08	-.01	-.19	.00		
MPEQ-OUT	-.77	[-1.49, -.06]	.36	-.12	-2.12*	.01		
MPEQ-ROLE	-.12	[-.95, .71]	.42	-.02	-.28	.00		
LSRP	.64	[.53, .75]	.06	.50	11.30**	.17		
BPNI	.06	[.01, .11]	.03	.11	2.31*	.01		
Step Three							.41	.03
SCS-R	-.01	[-.07, .06]	.03	-.01	-.22	.00		

COPE-PF	.10	[-.03, .23]	.07	.08	1.52	.00
COPE-EF	-.17	[-.33, -.01]	.08	-.10	-2.00*	.01
COPE-AF	.08	[-.12, .28]	.10	.04	.81	.00
TSRQ-AUT	-.07	[-.17, .03]	.05	-.06	-1.39	.00
TSRQ-CONT	-.01	[-.16, .15]	.08	-.01	-.06	.00
MPEQ-OUT	-.91	[-1.64, -.18]	.37	-.14	-2.45*	.01
MPEQ-ROLE	-.01	[-.85, .83]	.43	-.01	-.03	.00
LSRP	.64	[.53, .76]	.06	.50	10.90**	.16
BPNI	.06	[.01, .11]	.03	.11	2.26*	.01
Gender	-1.92	[-4.69, .86]	1.41	-.06	-1.36	.00
SS Growing Up - LMC	-1.46	[-5.30, 2.37]	1.95	-.05	-.75	.00
SS Growing Up - MC	-2.01	[-5.78, 1.62]	1.88	-.09	-1.10	.00
SS Growing Up - UMC	-1.91	[-6.24, 2.42]	2.20	-.06	-.87	.00
SS Growing Up - UC	-1.43	[-11.29, 8.43]	5.02	-.01	-.29	.00
Current SS - LMC	1.24	[-2.48, 4.96]	1.89	.05	.66	.00
Current SS - MC	1.67	[-2.01, 5.41]	1.91	.07	.88	.00
Current SS - UMC	2.36	[-1.96, 6.69]	2.20	.08	1.08	.00
Current SS - UC	.23	[-9.63, 10.08]	5.01	.01	.05	.00
Ethnicity, Black	-.09	[-4.85, 4.66]	2.42	-.01	-.04	.00
Ethnicity, South Asian	3.63	[-.69, 7.95]	2.20	.06	1.65	.00
Ethnicity, Latin-American	7.46	[1.69, 13.24]	2.94	.10	2.54*	.01
Ethnicity, Filipina/o	2.33	[-6.35, 11.02]	4.42	.02	.53	.00
Ethnicity, First Nations	2.33	[-5.64, 10.30]	4.06	.02	.57	.00
Ethnicity, Middle Eastern	-2.38	[-7.05, 2.30]	2.38	-.04	-1.00	.00
Ethnicity, Multi-Ethnic	5.21	[1.47, 8.95]	1.90	.10	2.74**	.01
Age	.06	[-.15, .27]	.11	.02	.53	.00

Note. *Statistically significant ($p < 0.05$), **Statistically significant ($p < 0.01$). Male option in the gender variable, Lower Class option in the Social Status Growing Up and Current Social Status variables, and White in the Ethnicity variable, were used for contrasting categorical variables in the regression. SCS-R is the Social Connectedness Scale – Revised. COPE-PF is the problem-focused subscale on the COPE Inventory. COPE-EF is the emotion-focused

Subscale on the COPE Inventory. COPE-AF is the avoidant-focused subscale on the COPE Inventory. TSRQ-AUT is the Autonomous Motivation subscale on the Treatment Self-Regulation Questionnaire. TSRQ-CONT is the Controlled Motivation subscale on the Treatment Self-Regulation Questionnaire. MPEQ-OUT is the Treatment Outcome Expectations subscale on the Milwaukee Psychotherapy Expectations Questionnaire. MPEQ-ROLE is the Role Expectations subscale on the Milwaukee Psychotherapy Expectations Questionnaire. LSRP is the Levenson Self-Report Psychopathy Scale. BPNI is the Brief-Pathological Narcissism Scale. Ethnicity, Chinese was excluded due to having a cell count of five or less ($n = 5$). Ethnicity, European was excluded due to having a cell count of five or less ($n = 3$). Ethnicity, Indian was excluded due to having a cell count of five or less ($n = 2$). Ethnicity, Korean was excluded due to having a cell count of five or less ($n = 2$).

Regression statistics are reported in Table 23. The hierarchical multiple regression revealed that at Step One, social connectedness, avoidance-focused coping, autonomous motivation, controlled motivation, and treatment outcome expectations, contributed significantly to the model, $F(8, 460) = 9.67, p < .01$, and accounted for 14% of the variation in Machiavellianism. The addition of the measures of psychopathy and narcissism in Step Two explained an additional 24% of variation in Machiavellianism. This change was significant, $F(2,458) = 88.346, p < .01$. Treatment outcome expectations, psychopathy score, narcissism score contributed significantly to the model. The addition of demographic variables, including age, gender, ethnicity, social status growing up, and current social status, did not explain a significant portion of additional variation in Machiavellianism, $F(17,441) = 1.35, p = .16$. Together, the 10 independent variables, (including measures of psychopathy and narcissism), and demographic variables, accounted for 41% of the variation in Machiavellianism.

Vita Auctoris

Daniel Pillersdorf was born in 1990 in Toronto, Ontario. He graduated from the Community Hebrew Academy of Toronto in 2008. From there he went on to McGill University where he obtained a B.A. in Psychology in 2012. In 2014, he obtained an M.A. in Counselling Psychology from Adler University. He is currently a candidate for the Doctoral degree in Clinical Psychology at the University of Windsor and hopes to graduate in Spring 2023.