



**A social science perspective on literature relating to medically prescribed
stimulants: A systematic review**

Bo Rode

214501079

Supervisor: Professor Steven Collings

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Master of Social Sciences: Counselling Psychology

Department of Psychology

School of Applied Human Sciences

College of Humanities

University of KwaZulu-Natal, Howard College Campus

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Dedication

To my parents, without you, none of this would have been possible. Thank you for your unwavering belief in me and the support you provided at every step of the journey. There are no words to capture my full appreciation and gratitude. I love you so much.

To my sister, thank you for being there at each stage, the good and the bad. To have you at my side is something I am forever grateful for; your fearlessness is inspiring.

To my partner, I do not know how I would have crossed the finish line without you. Your support was multifaceted, and I will be eternally grateful. Thank you forever. Here's to the next adventure.

To the master's class of 2020, we may have been the COVID-19 year, but the encouragement and friendships made along the way made it worth it. Thank you.

Abstract

Introduction: Ritalin, Concerta and Adderall are well-known medical drugs used to treat and manage attention-deficit/hyperactivity disorder (ADHD). Over the past couple of decades, there has been an increase in the medical prescriptions, consumption, and research of medically prescribed stimulants (MPS). A review of the literature indicated that common areas of enquiry were the use and wrongful use of MPS and suggested a great emphasis on academics and educational settings. The research indicated an ever-increasing presence of MPS and reinforced the need for a consolidated overview of the available literature so that there is a deeper understanding and a guide for future research.

Method: A systematic review was conducted; this was guided by the Cochrane Framework. A predetermined inclusion and exclusion were utilised, and various journal databases were searched using the JBI Reviewers Manual three-phase search strategy. The articles were analysed for eligibility for the study and then underwent coding. SPSS was used to analyse the data and measures of frequency and measures of central tendency were used.

Results: This review included 167 research articles. Of that, 67.1% of them were from the USA and 89.8% of them emerged from first-world countries. Questionnaires and surveys were the most common data collection method, with 59.9% of the reviewed articles using them, and statistical analysis was the most common data analysis method, recording 46.1% of articles with this analysis method. Adults (over 18s) were the most common sample group, recording 67.1% of articles and 66.5% of the articles focused and investigated student populations. The top emerging themes associated with MPS use were academics (46.1%), prescriptions (13.8%), socioeconomic/demographic factors (12%) and attitudes and perceptions (7.2%). The top emerging themes associated with MPS wrongful use were academics (46.7%), attitudes and perceptions (12%), socioeconomic/demographic factors (8.4%) and prescriptions (6%). The majority of the data collection took place in a tertiary education setting (57.5%).

Conclusion: This review recorded an abundance of MPS literature focusing on academics or an academic setting, suggesting these are frequently linked in the literature. There is an uneven representation in the literature, with minimal amounts of research emerging from developing/third-world countries. It also indicated the high concern over the wrongful use of

MPS and the need for further investigations into different settings to form a comprehensive understanding of MPS.

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List of Acronyms

APA	American Psychological Association
ADD	Attention-deficit/hyperactivity disorder
ADHD	Attention-deficit/hyperactivity disorder
CDC	Centers for Disease Control and Prevention
DoH	Department of Health
DSM-III	Diagnostic and Statistical Manual of Mental Disorders, Third Edition
DSM-III-R	Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
MPS	Medically prescribed stimulants
NHI	National health insurance
NSFAS	National student financial aid scheme
SPSS	Statistical package for social sciences
USA	United States of America

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CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 Introduction

Ritalin, Concerta, and Adderall are well-known medical drugs used to treat and manage attention-deficit/hyperactivity disorder (ADHD). ADHD is characterised by various symptoms including persistent inattention, impulsivity, and hyperactivity (Renous et al., 2016). ADHD is a neurodevelopmental disorder and symptoms may be present from childhood through to adulthood, interfering with a person's daily functioning or overall development (American Psychological Association [APA], 2013). Population surveys have suggested that ADHD is recorded in most cultures at around 5% of children and 2.5% of adults (APA, 2013). Ritalin and Concerta contain the medical stimulant methylphenidate and Adderall contains amphetamine. They are commonly referred to as medically prescribed stimulants (MPS). Substances are organised into different schedules (categories) based on their risk and abuse potential from Schedule I to Schedule V; this allows for the control of these substances through prescriptions and importing/exporting processes (Lohman & Barrett, 2020). Schedule I medications have the highest abuse potential, and Schedule V have the least potential for abuse (Lohman & Barrett, 2020). MPS are considered to have a high potential for misuse and thus are categorised as a Schedule II medication. A medical diagnosis for ADHD and a prescription must be obtained before these Schedule II drugs are distributed to the public (Markowitz et al., 2003).

Medically prescribed stimulant usage has been gaining momentum over the past decade. Prescription rates have soared, and methylphenidate has been recorded as the most prescribed drug among children and young adults (Piper et al., 2018; Renous et al., 2016). Increased prevalence of MPS has been recorded in many countries, such as Canada, the United States of America, Hong Kong, Israel, and the United Kingdom (Renous et al., 2016); and now, more than ever, more and more people are coming into contact with them – directly and indirectly. Individuals who do not require MPS medications may come into contact with them indirectly through their peers who are taking it, through family members, through the media or being around it in various contexts, for example, at schools. This has been attributed to both an

increase in the number of people diagnosed with ADHD and more people being treated with medically prescribed stimulants (Renous et al., 2016).

Similarly, there has been an overwhelming response to explore and investigate MPS through empirical research (Connolly et al., 2015; Scheffier et al., 2007; Van Zyl et al., 2017). A systematic review was the most appropriate response to the significant research volume, functioning to consolidate available research and direct future research. This review was positioned from a social science perspective and allowed for an in-depth investigation. Social science, very simply, studies society, human behaviour, and various social and cultural aspects (Omosulu, 2013). According to Moon and Blackman (2014), there are three fundamental features of social science research: things in the human world that researchers can gather knowledge on, how the understanding/knowledge is generated, and the philosophical orientation that guides the research (Moon & Blackman, 2014). Social science research differs from other disciplines through its guiding principles and assumptions used throughout each research stage. The research outcomes provide insight into particular social, cultural, and behavioural phenomena (Moon & Blackman, 2014).

Medically prescribed stimulants do not exist in isolation. Humans interact with these medical drugs, and according to research, many humans have come into contact with MPS, directly or indirectly (Connolly et al., 2015; Piper et al., 2018). It is valuable to leverage the growth of research of the past decade and use it to understand where it sits concerning human behaviour and then more extensive social contexts. The relevancy of this review is not missed at a national level either, as South Africa is working to build the National Health Insurance (NHI) Bill. All research assisting in understanding how humans interact with MPS and placing MPS within a social context can help inform policymakers engaged in this process. Working to explore characteristics, trends and key themes, this systematic review investigated how available research informs our current and future understandings of MPS.

1.2 Aim and objectives

Study Aim

This review aimed to provide a social science perspective of medically prescribed stimulants from the available research literature to explore current and future understandings, inform policymakers, enhance institutional awareness, and direct future research.

Study Objectives

This review implemented a scientifically rigorous method for summarising available medically prescribed stimulant literature. The key objectives of this study were as follows:

1. To identify the sample characteristics and trends from the studies.
2. To identify the key themes that have emerged from medically prescribed stimulant research.
3. To consider how the information from the review can inform contemporary and future understandings, both nationally and internationally.

1.3 Ethical considerations

A systematic review, by nature, does not interact with primary data; however, ethical considerations were still made. Careful consideration of what articles to include in this review was imperative to uphold the integrity and quality of the research (Vergnes et al., 2010). The research process was documented throughout this review to allow for transparency and any future duplication (Suri, 2020). As Suri (2020) suggested, the researcher worked to remain reflexive to prevent personal biases from influencing the findings.

1.4 Outline of the dissertation

Chapter 1, Introduction: This dissertation provides a comprehensive analysis of the available literature relating to medically prescribed stimulants from a social science perspective. This chapter introduced medically prescribed stimulants and their rising prevalence in society, presented the need for a consolidated overview of the available literature and provided a brief overview of systematic reviews and the social sciences. The argument is given on why this research will add value to the existing body of research and its relevancy in South Africa. Furthermore, the aim and objectives were presented, and the ethics of this study were considered.

Chapter 2, Literature Review: This chapter maps out all of the existing research on medically prescribed stimulants. It provides more information on the development of medical stimulants and how they are used for the treatment of ADHD. This chapter is led by the study objectives: presenting and discussing various study trends and the samples from existing studies. These themes emerged from reviewing the literature and the contemporary understanding of MPS.

The trends, common research areas and gaps in the research are presented. Bronfenbrenner's Ecological System Theory is introduced as the theoretical framework governing this review.

Chapter 3, Methodology: Chapter three provides the methodology of the review, outlining the steps taken when gathering research articles and analysing the data. The Cochrane Framework is introduced to guide the research methodology. The selection criteria, search strategy, data extraction, data coding, and data analysis are detailed.

Chapter 4 Results: The findings from this review are presented in the form of tables and pie charts. A total of 167 research articles were included in this review and analysed using SPSS. The findings are presented in relation to the objectives of this review and showed an overwhelming uneven distribution of research and various contributing factors to the use and wrongful use of medically prescribed stimulants.

Chapter 5 Discussion: The findings are discussed in chapter five, with each objective presented separately to provide an in-depth analysis. The findings were analysed within the context of existing research and in relation to Bronfenbrenner's Ecological Systems Theory to provide a contemporary understanding of medically prescribed stimulants. Furthermore, in this chapter, limitations and recommendations are offered for this review.

1.5 Conclusion

Medically prescribed stimulants have garnered much attention over the past two decades, among the public and throughout academic research (Piper et al., 2018). Through its increasing presence, this review identified the need for a central, consolidated overview of available research on medically prescribed stimulants. By doing so, this review presents how medically prescribed stimulants are being understood in the available literature, as well as in society. It offers information on where future research may be directed.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Medically prescribed stimulants have been a common area of research over the past decade, with a sizable body of literature available to researchers (Piper et al., 2018; Van Zyl et al., 2017). This chapter reviewed MPS literature and worked to provide insight into the research area and inform on commonalities/differences. This literature review created an opportunity to map out this study's research objectives and identify trends, key themes, MPS understandings and gaps in the available literature. The findings from this literature review were then summarised and reflected as areas of research interest in the subsequent chapters.

2.2 Attention-deficit/hyperactivity disorder (ADHD)

Attention-deficit/hyperactivity disorder (ADHD) is classified as a neurodevelopmental disorder in the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders) (Meerman et al., 2017). It is characterised by severe and persistent hyperactivity, impulsivity and difficulty concentrating that are not attributed to other reasons and impacts a person in social, academic and occupational settings (American Psychological Association [APA], 2013). It is important to mention that some academic articles relating to ADHD may also refer to it as attention-deficit disorder (ADD). ADD was the name used in 1980, with the release of the DSM-III, where the focus of the disorder was on attention, impulsivity and hyperactivity; it was coined attention-deficit disorder (with or without hyperactivity) (Epstein & Loren, 2014). However, with the release of the DSM-III-R in 1994, the term ADD was removed (Epstein & Loren, 2014). For the purpose of this review, and in line with the DSM-5, the disorder will be referred to as ADHD.

As of 2013, ADHD was reported to affect 5% of children, however, the Centers for Disease Control and Prevention (CDC) recorded this figure at 9.4% in 2015 (APA, 2013; Centers for Disease Control and Prevention [CDC], 2021). The DSM-5 acknowledges a difference in ADHD prevalence rates across contexts/settings and suggests this is due to varying diagnostic methods and culturally based differences in understanding children's behaviours (APA, 2013). Individuals with ADHD are at risk for various co-morbid disorders, such as mood and anxiety

disorders and substance use disorders (APA, 2013; Wilens & Spencer, 2010). If left untreated, ADHD may have far-reaching implications, impacting individuals in various capacities: academically, socially, and occupationally (Wilens & Spencer, 2010). This highlights the importance of effective treatment methods to help manage ADHD.

2.3 Medically prescribed stimulants

Medically prescribed stimulants are used to treat and manage ADHD and are more commonly known by their brand names: Ritalin, Concerta and Adderall. As mentioned, ADHD is among the most common neurobehavioral disorders among children, impacting school performance and social interaction (Briars & Todd, 2016). If left untreated, it may lead to lower grades, isolation from peers, and possible disruptive behaviours (Briars & Todd, 2016). In the adult population, ADHD has been linked to unemployment, substance abuse and other co-morbid disorders (Briars & Todd, 2016). An effective way to treat and manage these disorders is with pharmacological interventions; psychostimulants have been the medication of choice for more than 60 years (Briars & Todd, 2016).

In the 1950s, research began to identify various stimulant drugs and explore their relevance in treating and managing ADHD (Connolly et al., 2015). Shortly after, stimulants began being synthesised and marketed as Ritalin (Connolly et al., 2015). By the 1970s, well-established data demonstrated these stimulant medications' effectiveness for treating and managing ADHD (Daughton & Kratochvil, 2009). Initially, the treatment of ADHD included stimulant medications that used a primary release mechanism and required multiple doses a day (Daughton & Kratochvil, 2009). However, over the past 40 years, various forms of stimulant medication have been developed, with slow-release and longer-lasting options (Daughton & Kratochvil, 2009). Today stimulant medication is the most common medication for treating and managing ADHD, and is available in various forms (Connolly et al., 2015). Methylphenidate and amphetamine are among the most effective and popular medical stimulants prescribed for ADHD (Connolly et al., 2015). Both have similar clinical benefits and have repeatedly demonstrated their efficacy across short- and long-acting preparations and ages ranging from preschool to adulthood (Connolly et al., 2015).

Ritalin and Concerta are made up of methylphenidate, while Adderall contains amphetamine and is considered to be slightly stronger (Bailey, 2022). The two chemical compounds differ

in their timed response and how long they stay in someone's system (Bailey, 2022). Methylphenidate and amphetamine both work to increase a person's dopamine and norepinephrine activity (Faraone, 2018; Markowitz et al., 2003), and they both limit the reabsorption of dopamine and norepinephrine in the prefrontal cortex to impact and increase attention (Markowitz et al., 2003). Today they are available in various formulations: fast release or slow-release, as pills or in a liquid form or as a patch attached to the body (Briars & Todd, 2016).

The use of medical stimulants has steadily grown across countries (Scheffier et al., 2007). Between 2000 and 2003, there was a 16.8 percent growth in individuals using MPS globally (Scheffier et al., 2007). This growth has continued to increase steadily; according to *Drug Usage Statistics*¹, in 2018, there were over 17 million prescriptions for medically prescribed stimulants in the United States of America. In the United Kingdom, there is a notable increase in medically prescribed stimulant usage across all age groups and methylphenidate was the most prescribed drug during the years 1995 and 2015 (Renous et al., 2016). This upward trend of medically prescribed stimulant use is also noted in Canada and Spain (Brault & Lacourse, 2012; Treceno et al., 2012). In Israel, there was a drastic increase in medically prescribed stimulant usage throughout the years 2005-2012, this was accredited to a reduction in medication cost and changes in prescription patterns (Ponizovsky et al., 2014). However, there is limited available data from developing or third world countries and little updated data that reports on the past four years.

2.4 The sample characteristics and study trends in the available literature

When exploring available MPS research, a significant number of the study samples were comprised exclusively of students. More specifically, students from tertiary institutions (colleges or universities). Some studies narrowed this down further to investigate students from specific courses, most commonly medical students (Van Zyl et al., 2017; Beyers et al., 2012). MPS are not solely intended for academic purposes and they are not limited to any specific age group, so this suggests that there has been a research focus on educational environments. In contrast, less attention has been placed on younger and middle-aged individuals or contexts beyond academic settings. Most of the available research has emerged from the global north

¹ <https://clincalc.com/DrugStats/Drugs/Methylphenidate>

and developed countries (Jeffers & Benotsch, 2014; Lakhan & Kirshgessner, 2012; Beyer et al., 2014). Until recently, MPS was primarily explored through medical paradigms. However, the scope of research has expanded to include psychosocial elements of the medical drug (Racine & Forlini, 2010; McCabe & West, 2013). Furthermore, studies have predominantly comprised primary research and used self-reporting methods for data collection (Van Zyl et al., 2017; Brandt et al., 2014).

2.5 Key research themes

After reviewing relevant medically prescribed stimulant literature, two main themes began emerging: the use of MPS and themes discussed in relation to the use of MPS. The following section will explore these different themes.

2.5.1 Use of medically prescribed stimulants

As mentioned above, MPS primarily treats ADHD and ADD in both children and adults. Due to its classification as a Schedule II medication, access to it requires a prescription from a medical doctor (Weyandt et al., 2017). Over the past two decades, the prescription rates for MPS have substantially increased. There are various presented arguments as to why this is occurring; firstly, ADHD may be diagnosed more often and therefore, there is a rise in the number of people being treated with medication (Renous et al., 2016). Secondly, it is hypothesized that ADHD is over-diagnosed in the United States of America while it was being under-diagnosed in other countries, and so the rise in prescriptions may be attributed to better diagnosis and treatment systems of a previously under-recognized behavioural disorder (Renous et al., 2016). And thirdly, physicians are now more prone to initiate pharmacological treatment for ADHD as there is an increase in the number of people prescribed MPS at the time of diagnosis (Renous et al., 2016). General Practitioners (GPs) are reported to be more involved in the initiation and management of ADHD and MPS, whereas previously this was done by specialists (Renous et al., 2016). Increased prescription rates mean greater access to these medications (McCabe & West, 2013) and thus, increased opportunity to engage in wrongful use practices (McCabe & West, 2013). The wrongful use of MPS is arguably the most significant contributor to research exploring MPS use. The term '*wrongful use*' refers to the use of MPS in ways that it was not intended and can include the terms overuse, misuse, nonmedical use, and any administration methods that vary from the recommended methods of use (Arria et al., 2008; Korn et al., 2018).

The literature exploring the misuse and overuse of MPS has framed it as taking stimulants without a prescription or using them other than as prescribed (Weyandt et al., 2017). Most research exploring this phenomenon occurs on college and university campuses (McCabe & West, 2013). The availability, use, and misuse/overuse of MPS have risen among college students without an ADHD diagnosis (Benson et al., 2015). However, although based on distinctly less research, other authors have reported wrongful use to be present and increasing among the public beyond a college setting (Novak et al., 2007). Various studies have been exploring different demographic indicators of MPS wrongful users. Teter et al. (2010) suggested that males were more likely to engage in the wrongful use of MPS than females, while females were more likely to meet the criteria for stimulant dependence (Teter et al., 2010). Another avenue of MPS wrongful use research also involves a diversion from the prescribed methods of administration (DuPont et al., 2008). MPS come in the form of a pill intended to be consumed orally. However, there are reports of users consuming the medication intranasally (Bruggisser et al., 2011). Additional research has found that it has also been consumed through injections, which raises concerns as this may result in severe toxicity and health complications (Bruggisser et al., 2011).

An accepted definition of wrongful use of MPS, provided by the Substance Abuse and Mental Health Services Administration, is that it is the *“use of any form of prescription stimulants that were not prescribed for you or that you took only for the experience or feeling they caused”* (Arria et al., 2008, p.157). Although this definition appears to be broad in its understanding, other researchers have noted that the wrongful use of MPS may not be as straightforward as separating users with an ADHD diagnosis and medical prescription and those that do not have either. In one study, the authors noted that most participants who reported stimulant misuse and abuse had prescriptions (Bruggisser et al., 2011). In addition to this, some individuals have been recorded acquiring legitimate prescriptions for MPS from valid medical professionals while lacking a medical need (Wasserman et al., 2014). While medical guidelines discourage giving MPS prescriptions to individuals without an ADHD diagnosis, many individuals have reported getting these medical drugs from their general practitioners without a diagnosis (De Bruyn et al., 2019).

The terms *“off-label practices”* and *“diversion of prescriptions”* have been used to describe the act of wrongful practices as they pertain to those who do have a legitimate prescription (Van Zyl et al., 2017; De Bruyn et al., 2019). However, there has also been a reported illegal

trade of MPS where individuals may access these medications without a valid prescription (Van Zyl et al., 2017). Research conducted at the South African University of the Free State found these activities occurring among students with MPS obtained from friends, acquaintances, or family members (De Bruyn et al., 2019). Furthermore, South African research has found that students use fabricated prescriptions or purchase the medication from pharmacies without prescriptions (Dreyer et al., 2016). This research indicates that the wrongful use of MPS includes both those who have legitimate prescriptions and those that do not. A big question is raised: What motivates and influences individuals to use these medications, use them in unintended ways, and encourage them to source them when they may not medically require them?

2.5.2 Themes associated with the use and wrongful use of medically prescribed stimulants

Beyond the research on how MPS is used, research has also explored and discussed various things that may impact and influence the use of these medications. These factors exist within societal structures, so it would be amiss not to explore these when mapping out how MPS is discussed in the research. Firstly, research has acknowledged attitudes as a significant influencing factor in MPS use (Berger et al., 2008; Ghanizadeh, 2008). They can significantly impact both intended use and wrongful use by influencing the likeliness and adherence to the medication (Ghanizadeh, 2008). One contributor to the formation of attitudes is the knowledge and biases a person has on MPS, which is passed through doctors, pharmacists, the media, and the general public (Singh, 2004). Singh (2004) has presented research that suggests general knowledge of the causes and aetiology of ADHD influences attitudes toward its treatment. An example is an observed narrative of blame towards mothers with children with ADHD and a negative stigma toward medication as a “quick fix” (Singh, 2004).

Another influence over the use and wrongful use of MPS is how it is perceived and understood by the users. Students have been the focus of much research when exploring MPS use, and a pervasive narrative used across much of the literature is the use of MPS as a ‘*cognitive enhancer*’ (Franke et al., 2014; Racine & Forlini, 2010; Bossaer et al., 2013). Healthy individuals mainly define this use of MPS as a cognitive enhancer to enhance their work performance (Ilieva & Farah, 2011). Various terms have emerged in the research related to cognitive enhancement, some being “*brain doping*”, “*study drugs*”, and “*steroids for*

SATs” (Svetlov et al., 2008; Abelman, 2017; Partridge et al., 2013; Bell et al., 2013). MPS’ wrongful use on college or university campuses is often linked to the perception that the medication will assist academics and academic performance (Lakhan & Kirchgessner, 2012). Looby and Earleywine (2009) note that a person’s beliefs about a substance will contribute to their decisions about whether or not to use that substance. To be more specific, the motivating factors believed to assist with a student’s academic performance are increased wakefulness, keeping up with academic demands, getting ahead, increased energy, being more productive, and combatting fatigue/sleep deprivation and perceived stress (King et al., 2020; De Bruyn et al., 2019; Partridge et al., 2013; Fond et al., 2016).

Research has lent into this conceptualisation of cognitive enhancement and has further explored various factors which may leave students more susceptible to the wrongful use of MPS. Riddell et al. (2018) suggested that different dysfunctional coping strategies can be associated with an increased likelihood of MPS wrongful use. They found that individuals with emotion-focused and avoidant coping styles may be a risk factor linked to the wrongful use of MPS (Riddell et al., 2018). Various personality traits identified to influence the wrongful use of MPS include sensitivity, hopelessness, sensation-seeking, and impulsivity (Chinneck et al., 2018). Additionally, peer pressure can influence the wrongful use of MPS (Jalilian et al., 2013). Other things affecting MPS use have included psychological distress, such as the presence of symptoms of depression or anxiety (Thornton et al., 2020).

A person’s perception and how they frame MPS as being both physically harmless and morally acceptable has also been documented to influence the wrongful use of MPS (DeSantis & Hane, 2010). There is a higher level of wrongful use among those who have normalised and justified the medication as a helpful resource (Cutler, 2014; Nutley et al., 2020). These different justifications for the wrongful use of MPS have also been explored through research. A 2010 study presented four arguments commonly used by individuals to motivate/explain their wrongful MPS use, (1) compared to other ‘worse’ drugs, it is acceptable, (2) it was only being used in moderation, (3) used as a tool to self-medicate undiagnosed disorders and (4) actively minimising the severe nature of MPS by thinking of them as harmless and acceptable (DeSantis & Hane, 2010). Furthermore, research exploring different beliefs associated with the wrongful use of MPS found a common trend among their participants to draw on “conventional middle-class beliefs” or significant cultural stories to frame the use as acceptable (Kerley et al., 2015). Conventional middle-class beliefs expressly referred to moderation and success. Participants

claimed they differed from severe wrongful users of MPS as they were motivated by academics (Kerley et al., 2015). This justification allowed participants to continue engaging in illegal behaviours (wrongful use of MPS) while maintaining an identity as a conventional, law-abiding, citizen (Kerley et al., 2015).

The academic environment may also be contributing to the wrongful use patterns of MPS by cultivating a favourable perception of them in relation to academics. As much research has been conducted within a university or college setting, Albert Bandura's Social Learning Theory may be a helpful tool to understand the development and reinforcement of wrongful use behaviour. Bandura's Social Learning Theory recognised that learning is a multifaceted process, influenced by various factors. Bandura suggested that learning can occur through observation, and his theory emphasised the social aspect of learning (Bandura, 1977). The Social Learning Theory is comprised of three components: learning through observation, the importance of internal mental states in the learning process and there is a distinction between learning and behaviour change – learning does not guarantee behaviour change (Bandura, 1977). The lynchpin of this theory is that behaviour can be learnt through observing and modelling others, it's through observation that one may understand and learn the new behaviour and this new information can work as a guide for the behaviour at a later stage (Bandura, 1977). Led by the research, one can make the assumption that there are high levels of MPS wrongful use in academic environments (Brandt et al., 2014). The Social Learning Theory suggests that by students frequently observing this behaviour in these environments, it may result in learning such behavior. To dive in further, if students have consistently observed this behaviour and have impaired mental states due to high-pressure environments, lack of coping skills, or fear of failure (Kinman et al., 2017), they may be more inclined to engage in this behaviour as they have learnt to do so (Bandura, 1977), meaning that these settings are not only instigating the wrongful use of MPS but creating cycles where these ideas can be learned and passed on through behaviour.

As mentioned, the use and wrongful use of MPS has been linked to academia; however, other scenarios have been identified as well. The use and wrongful use of MPS or stimulant medications have been linked to recreational motives (to stay awake when partying, achieve a high or in conjunction with other substances such as drugs or alcohol) (Brandt et al., 2014). This has been backed up by other researchers, who have indicated that the wrongful use of MPS may exist in a broader pattern of substance abuse (Cole & Hussong, 2020). With one of

the side effects of MPS being a decreased appetite, Jeffers and Benotsch (2014) found that individuals used MPS to facilitate weight loss. This is alarming for researchers as this may have disastrous effects on users' psychosocial functioning, including addiction, dependence, psychosis, seizures, and cardiac functioning (Carroll et al., 2006).

Beyond the university setting, other environments also influence the likelihood of the wrongful use of medical stimulants – namely the family environment (Wang et al., 2019). Various factors of the family environment have been correlated with medical stimulants being used in the wrong ways, some being: living arrangements, a family's economic status and parental relationships (Wang et al., 2019). Additionally, family environments that have reported parental drinking or drug use are considered more susceptible to using medical stimulants in ways other than intended (Wang et al., 2019). This indicates that a person's context influences their perceptions and understanding of MPS and its use and wrongful use.

The wrongful use of MPS is of critical concern to researchers and medical professionals as it has a high likelihood to be abused, has lasting effects on developing and developed brains and can cause someone to go into a dangerous withdrawal (Daniali et al., 2013). It can result in hallucinations, addiction, anxiety, blurred vision, aggressiveness, and headaches (Daniali et al., 2013; Sussman et al., 2006). It also may lead to long-term medical complications by raising blood pressure and placing users at high risk for heart attacks (Sussman et al., 2006). It has been predicted that the wrongful use of MPS is predicted to increase tremendously as a direct result of increased availability (Daniali et al., 2013; Sussman et al., 2006). There is a call for immediate policy revision and changes to protect people from harmful side effects (Sussman et al., 2006).

2.6 Contemporary understanding of medically prescribed stimulants in society

These research themes may assist with informing our understanding of MPS within societal structures. Bronfenbrenner's Ecological Systems Theory provides a framework from which to do that and works off the premise that all things exist in a context and engage in a significant dual relationship (Bronfenbrenner, 1979). The theory was developed by psychologist Urie Bronfenbrenner and presented a way to understand how human development is influenced by different environmental systems (Ettelak & Mahoney, 2017). It has now become a widely used tool to understand things in ecological contexts and emphasises the influence that these

different contexts can have (Bogg & Finn, 2009; Neal, 2013). Bronfenbrenner suggested that environments can be sorted into different systems, and each has a significant impact on development. These systems are labelled the microsystem, mesosystem, exosystem, macrosystem and chronosystem (Bronfenbrenner, 1979). To give a brief overview of this theory, the microsystem is the first level and contains things that are in direct contact with someone, the mesosystem focuses on interactions between elements in the microsystem, the exosystem includes social structures that indirectly impact someone, the macrosystem includes cultural elements/socioeconomic statuses and the chronosystem encompasses the environmental changes that happen over a person's lifetime (Bronfenbrenner, 1979). A cornerstone of his theory was that these systems influence an individual and that an individual is also able to influence the different systems.

By applying this to medically prescribed stimulants and using this understanding, not only is the understanding of these medical drugs influenced by social structures, but it also has the ability to impact various societal structures. With the wrongful use of medically prescribed stimulants in an academic setting, some authors have suggested that this has implications for society. Some researchers have conceptualised medical stimulants as academic enhancement drugs (Beyer et al., 2014). Thus, through the lens of educational enhancement, it is proposed that it can potentially undermine achievements or professions when used by students who do not have a prescription or need to manage or treat ADHD (Partridge et al., 2013). Beyer et al. (2014) take it a step further and ascertain that using medical stimulants for academic assistance when not medically needed may contribute to the economic gap. This is explained through the access to these drugs; access may be limited for those without adequate resources, and those who may need them might not have access to them - putting them at a disadvantage in an academic or occupational setting (Beyer et al., 2014). This is most notable when investigating the use of MPS as a "cognitive enhancer", as one participant in a study described using MPS when it was not medically required as a *"white version of cheating"*, whereby it was reported to be more common among white, male, students from a higher socioeconomic background (Aikins, 2019), ultimately showcasing how individuals who do not medically require it yet have the resources to access medical drugs may benefit academically.

The amount of research exploring the use and wrongful use of MPS within tertiary education indicates the weight and seriousness of the prevalence in this setting. Aikins et al. (2017) explored university policy handbooks for any mention of the wrongful use of MPS and out of

191 policy handbooks examined, only one mentioned prohibition for MPS use (Aikins et al., 2017). This brings attention to the ethics of using MPS as a cognitive enhancement tool and various policies that exist to monitor this. Cakic (2009) considers this an era of 'cosmetic neurology', whereby healthy individuals use MPS to enhance cognitive ability. However, they argue about improving within the academic realm in comparison to performance-enhancing drugs used in the sporting realm (Cakic, 2009). As the pervasive argument is that performance-enhancing drugs should be prohibited as they create an uneven playing field, the concern is that this use will indirectly coerce non-users to begin wrongfully using this medication to compete (Cakic, 2009). Therefore, policies are more critical now than ever as trends have shown a steady increase in wrongful use, indicating that wrongful use will become even more prevalent in the future.

Socioeconomic and sociodemographic factors affect many different aspects of medical stimulant use: the incidence of use, amount of access someone has to it, the likelihood of treatment adherence, and the patterns of use (King et al., 2020; Efron et al., 2020; Haas et al., 2019). MPS have been reported to have high and ever-increasing sales (Renous et al., 2016), however, the usage trends vary by location (Cunliffe et al., 2019). The cost of these medications has steadily increased over the years (Briars & Todd, 2016); thus, individuals with lower socioeconomic status may not have constant access to these medications (Munasur-Naidoo & Truter, 2019). Studies exploring long-term use of the medications found that children from disadvantaged families were less likely to receive continuous medication for ADHD treatment due to financial resources (Efron et al., 2020). However, a study comparing two years of prescription data found that an individual's socioeconomic status may predict the use of medical stimulants and that there was a relationship between an individual's lower socioeconomic status, and a higher reported MPS use (Brownell et al., 2006). This may result from an over-diagnosis or misdiagnosis of children or adolescents in areas with a lower socioeconomic standing, where classes have more students and teachers do not have adequate time to assist children.

There is a reported concern about the overdiagnosis/misdiagnosis of ADHD among children and young adults (Ford-Jones, 2015). This overdiagnosis/misdiagnosis spans gender, socioeconomic status, sociodemographic standing, and culture groups, as these factors may not be considered during the diagnosis phase (Ford-Jones, 2015). Studies have found that prescription rates are much higher among boys than they are among girls in every age group,

and it is argued that this is because girls may present with symptoms differently (Renous et al., 2016). Kriegler (2014) suggested that a careless implementation of the biomedical model of child psychiatry without considering socioeconomic or cultural factors may stigmatise children. This leads to an overdiagnosis of disorders and over-medicalisation in response to such disorders (Kriegler, 2014). Additionally, some students have reported getting prescriptions from their doctors even though they do not have a medical diagnosis of ADHD (Petersen et al., 2015). With South Africa being such a diverse country, housing many different cultures and people, this may be an area of concern.

2.6.1 Relevance of medically prescribed stimulant research in South Africa

The history of mental health care in South Africa has been shaped by various factors, with a significant influencing factor being politics. There was an uneven distribution of mental health care resources in the past, and due to Apartheid, this was mainly racially motivated. Since 1994 efforts have been made to rectify this, and in 2004 the Mental Health Care Laws were introduced (Szabo & Kaliski, 2018). Currently, South Africa is working towards implementing a National Health Insurance (NHI) system - a financing system with the primary goal to make sure all South African citizens have access to essential health care and appropriate medications regardless of their employment status or ability to contribute financially (Department of Health [DoH], 2019). Medically prescribed stimulant research may be significant for this new policy and its implementation for two reasons: global research trends identifying areas that should be considered with the increased access to MPS and potential overdiagnosis/over-prescription of medical drugs due to various factors.

A study investigating the cost implications of MPS has suggested that financial constraints negatively impact the consistent use of these medications as people may not be able to afford repeat prescriptions (Munasur-Naidoo & Truter, 2019). This may result in further illegal sourcing of these medications or people who desperately need not having consistent and regular access to it. South Africa is in the tentative stages of developing plans to implement the NHI bill. Thus, access to these medical stimulants may increase as socioeconomic factors (among other barriers) might no longer be a barrier. The question remains, what will an adjusted ease of access mean for MPS? Revisiting Bronfenbrenner's Ecological Systems theory, as discussed earlier, a context does not exist in isolation but rather in an influential dual relationship.

Therefore, when changing a context, this theory might suggest changes in other areas of society.

When seeking to explore how increased access to MPS may impact different aspects of its use, it can be helpful to apply a theoretical framework. In this case, the Theory of Planned Behaviour offers an understanding of how this would look, explicitly understanding the impact that attitudes and perceived control have over behaviour (Armitage & Christian, 2003). The theory ascertains that attitudes may strongly influence behaviour and an individual's perceived control over that behaviour (Armitage & Christian, 2003). Thus, the easier the behaviour may appear, the more likely one's intention to perform it. When applying this to MPS, despite an individual's attitudes towards the medication, it is also how easy they may believe it to be obtained that influences them taking it. Thus, if getting the drug becomes more accessible, this may result in an increased consumption behaviour – this increase in consumption is concerning when it is related to wrongful use. It has been noted that this medication has previously been sourced, for wrongful use, through fraudulent scripts, friends, pharmacies etc. (Dreyer et al., 2016). Consequently, if they are more available, it might be perceived that they are easier to get and accordingly, the wrongful use behaviour will increase.

2.7 Summary of the key findings

MPS are not a new phenomenon, but it has only been more recently that research has started exploring their psychosocial aspects. The global north and developed countries have dominated this research area while developing countries and South Africa specifically have significantly less available research within their context. There were also specific sample characteristics that dominated the study, namely student populations. From the MPS research landscape, the most common theme of the investigation was MPS use and wrongful use and then what may influence these (Benson et al., 2015; Cunliffe et al., 2019). Within this overarching theme, different factors were explored: attitudes, knowledge, environments, demographics, and interactions with MPS, among others (Cutler, 2014). It was also acknowledged that MPS exist in a broader societal context, and some research explored this. Higher-pressure environments, poor coping skills, and socioeconomic status are all contexts that have been linked to MPS use, specifically the wrongful use (De Bruyn et al., 2019). The conceptualisation of MPS as a performance enhancer (someone is using them when they do not medically require them to assist cognitive performance) has also been debated through the research (Aikins, 2019). This

has far-reaching implications, specifically for policymakers at institutions to regulate and manage the unauthorised use of MPS. Furthermore, it potentially gives some students who have easier access to these medications (through monetary means or friends) an unfair advantage (Aikins, 2019). The current research shows us valuable psychosocial information on MPS, allowing us to deepen an understanding of contemporary views and predict possible implications for the future.

CHAPTER 3

METHODOLOGY

3.1 Introduction

The argument for the importance of further research on medically prescribed stimulants was made and presented in chapters one and two of this study. In this chapter, the specific methods by which this review was guided are discussed, including the nature of the research, selection criteria, search strategies and data extraction. Additionally, it will present the code book that was used to organise the data and the data analysis methods.

3.2 Nature of the research

A systematic review was the most appropriate design for this study. Systematic reviews respond to the ever-increasing volume of research literature by providing an up-to-date summary of the research (Higgings & Thomas, 2019). Designed to “locate, appraise and synthesise” (Boland et al., 2017, p. 35), it is considered the gold standard to present a consolidated summary of several studies. An exhaustive search of the literature, appropriate balance of sensitivity and specificity, defined steps, and using pre-determined eligibility criteria are all elements of systematic reviews that distinguish them from other forms of research (Boland et al., 2017). Furthermore, its more restrictive yet in-depth nature for handling information/data sets it apart from other reviews (narrative reviews, rapid reviews, and scoping reviews) (Boland et al., 2017).

Due to the volume of research, avoiding the unnecessary duplication of existing research and providing an overview of available literature, a systematic review of MPS research was conducted. This research used the Cochrane Framework (Higgings & Thomas, 2019) to guide the methodology discussed below. While this study was exploratory in nature, it exists in a positivist research paradigm framework; by using objective and quantifiable means to extract the data and undergo analysis from which inferences were made (Neuman, 2014).

3.3 Research methodology

The Cochrane Framework (Higgings & Thomas, 2019) was used to guide the below methodology.

3.3.1 Selection criteria

According to Cochrane, one feature distinguishing a systematic review from other research reviews is the pre-specified criteria for including or excluding research articles (Higgings & Thomas, 2019). The requirements for what studies would be included were determined before the data collection. The inclusion criteria for this study were the following:

- Research has been published in and between the years 2005 and 2020. To ensure a broad yet relevant commentary on a recent study.
- The research must be empirical and published in peer-reviewed journals.
- The research article must be published in English. To eliminate any translation errors.
- A full-length copy of the article needs to be available to the researcher.

3.3.1a Exclusion criteria for research articles

The search covered various fields such as psychology and sociology but excluded medical articles which dealt primarily with the chemical compounds of MPS or biomedical research. This was implemented to ensure that the focus of this study was on the social and behavioural elements of MPS, specifically the human experience. The search was not restricted to any geographic location.

Any grey literature, blogs or unpublished research were excluded from this review. Torgerson (2003) suggests that focusing on peer-reviewed journal articles allows for an up-to-date understanding of the subject-subject identification. Furthermore, it protects the reviews integrity by ensuring all studies included are of sufficient quality and went through an ethical review process (Torgerson, 2003).

3.3.2 Search strategy

Initially, a scoping search was conducted to identify keywords and prominent authors in the field. The scoping search assisted in identifying the following key terms:

methylphenidate, amphetamine, ADHD, Attention-Deficit Hyperactivity Disorder, ADD, Attention Deficit Disorder, Ritalin, Concerta, Adderall, MPS, medically prescribed stimulants, medical stimulants, socioeconomic, sociodemographic, attitudes, use, abuse, misuse, overuse, non-medical use, behaviour/s, child, adolescence, adult, parent.

Once these were established, this systematic review made use of the JBI Reviewers Manual three-phase search strategy (Aromataris & Munn, 2017):

Phase One: The initial key terms were identified and used in the first search; additional key terms found in abstracts and titles were added to the list.

Phase Two: These key terms were then used to perform database-specific searches.

Phase Three: The reference lists of the collected articles were examined for additional studies to be included. Searches were also now conducted on authors prominent within the specific research field.

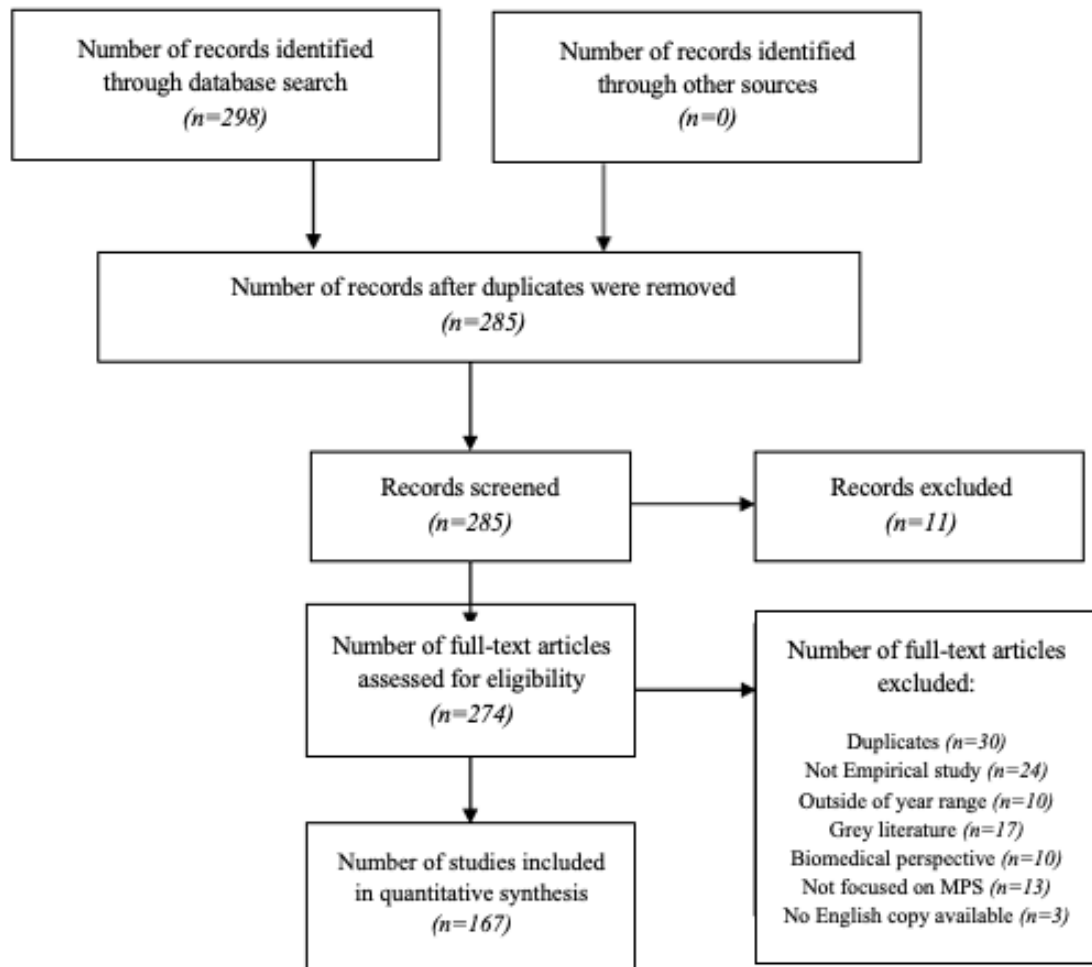
Various databases were used to reduce selection bias; these include:

- APA's PsychInfo
- PubMed
- SciELO
- JSTOR
- Google Scholar
- Scopus
- Web of Science
- UKZN Library Database
- WorldCat
- Taylor and Francis Journals

3.3.3 Data extraction

The collected research literature was evaluated based on the previously determined inclusion and exclusion criteria. During the evaluation, all exclusions were documented using the PRISMA flow diagram (Moher et al., 2009).

Figure 3.1: PRISMA Flow Diagram



Source: (Moher et al., 2009)

3.3.4 Data coding

The academic articles that meet the inclusion criteria were then coded, a process where the articles are systematically reorganised into raw data, a format where they can be analysed (Neuman, 2014). This was led by the codebook developed for this study which outlines the specific information that was extracted from the data and a corresponding numeric value (DeCuir et al., 2011). The dataset was coded using Microsoft Excel. For cases where information is missing or not available, it was indicated in the coding.

Table 3.1: Codebook used to extract data for objective 1

Objective 1: Study characteristics			
<i>Specific characteristic</i>	Characteristic definition	Example	Variable (numeric code)
<i>Year of study</i>	The year that the research was published.	2005, ..., 2020	2005 (1) 2006 (2) 2007 (3) 2008 (4) 2009 (5) 2010 (6) 2011 (7) 2012 (8) 2013 (9) 2014 (10) 2015 (11) 2016 (12) 2017 (13) 2018 (14) 2019 (15) 2020 (16)
<i>Country of origin</i>	The country where the research was conducted.	United States, Canada etc.	United States (1) Canada (2) South Africa (3) Iran (2) Israel (5) Various Countries in Europe (6) Ireland (7) Switzerland (8) Pakistan (9) Australia (10) Malaysia (11) China (12) Finland (12) Brazil (14) Germany (15) Turkey (16) France (17) Denmark (18) Taiwan (19) Korea (20) UK (21) Iceland (22) New Zealand (23) Belgium (24) Saudi Arabia (25) Italy (26)
<i>Country classification</i>	Different category of the country depending on the economy of the country.	First world etc.	First World (1) Second/Third World (developing country) (2)
<i>Data collection method's</i>	The process of gathering information from the participants.	Questionnaire was administered to participants, or an interview was conducted etc.	Questionnaire/survey (1) Interviews (2) Database Collection (3) Mixed Methods (4)
<i>Data analysis</i>	The process of applying techniques to organise data (describe, consolidate, evaluate data)	Statistical analysis, descriptive analysis etc.	Statistical Analysis (1) Descriptive Analysis (2) Thematic Analysis (3) Mixed Methods (4) Inductive Analysis (5) Other (6)
<i>Participant age</i>	The age group of the participants.	Children, adolescent etc.	Children/adolescent (0-18) (1) Adult (18+) (2) All ages (3) N/A (4)
<i>Participant group</i>	Do the participants belong to a specific group or cohort (Do they share an identifier)	Parent and/or child etc.	Parent and/or child (1) School/college/university student (2) Professional Group (3) Other (4)

Table 3.2: Codebook used to extract data for objective 2

Objective 2: Identified themes			
<i>Specific themes</i>	Definition of theme	Example	Variable (numeric code)
<i>Use patterns</i>	Does the research look at/explore/make mention of the use patterns of MPS?	Yes, the research explores/makes mention of the use patterns of MPS or not.	Yes (1) No (2)
<i>Wrongful use patterns</i>	Does the research look at/explore/make mention of the wrongful use patterns of MPS?	Yes, the research explores/makes mention of the wrongful use patterns of MPS or not.	Yes (1) No (2)
<i>Factors for use</i>	Does the research identify/discuss/explore any factors that have been noted to influence the use patterns of MPS?	Academics, gender etc.	Academics (1) Socioeconomic/demographic factors (2) Attitudes/perceptions (3) Prescriptions (4) Recreational Use (5) Family Environment (6) Other (7) Access to medical care (8) Medical Use (9) N/A (10)
<i>Factors for wrongful use</i>	Does the research identify/discuss/explore any factors that have been noted to influence the wrongful use patterns of MPS?	Academics, gender etc.	Academics (1) Socioeconomic/demographic factors (2) Attitudes/perceptions (3) Prescriptions (4) Presence of addictive behaviours (5) Recreational Use (6) Family Environment (7) Other (8) N/A (9)
<i>Recorded ways of wrongful use</i>	Does the research identify, discuss or explore ways that MPS is used wrongfully?	Used in ways that it wasn't intended etc.	Used in ways that it wasn't intended (consumption) (1) Used in conjunction with other substances (2) Both (3) N/A (4)

Table 3.3: Codebook used to extract data for objective 3

Objective 3: Implications for current and future understandings			
<i>Specific implication</i>	Definition of Implication	Example	Variable (numeric code)
<i>Location of study</i>	Is there a specific location that is indicated by the research as to where the data was collected from?	Schools, professional setting etc.	Primary/middle/high school (1) Tertiary education (college & university) (2) Professional setting (3) Other (4)
<i>Socioeconomic/ demographic</i>	Does the study identify/discuss or mention socioeconomic and sociodemographic factors of participants?	The study does make mention/explore the socioeconomic or demographic standing or not.	Yes (1) No (2)
<i>Prescription patterns</i>	Does the research look at/explore/make mention of the prescription patterns of MPS?	Yes, the research explores/makes mention of the prescription patterns of MPS or not.	Yes (1) No (2)
<i>Illegal sourcing</i>	Does the Study note a presence of illegal sourcing for the medication?	It does mention illegal sourcing of MPS, it does not.	Yes (1) No (2)

3.3.5 Data analysis

This review was interested in descriptive data and thus used descriptive statistics to sort the dataset (Boland et al., 2017). This was done using SPSS, and the results were presented using tables and other forms of visual representation where applicable.

Objective 1: Study characteristics and trends

Descriptive statistics (measures of frequency and central tendency) were conducted on each identified characteristic and corresponding variable (Larson, 2006). These analyses were then used to summarise the data and extract relevant insights. Relationships between the traits were explored.

Objective 2: Key themes

Descriptive statistics (measures of frequency and central tendency) were conducted on each identified theme and corresponding variable (Larson, 2006). Similar to the methods for objective one, this allowed for a summary of the dataset and insight exploration. Identified relationships were explored.

Objective 3: Contemporary understanding

Descriptive statistics (measures of frequency and central tendency) were conducted on each identified implication and corresponding variable (Larson, 2006). The research findings are discussed and explored using Bronfenbrenner's Ecological System's Theory.

CHAPTER 4

RESULTS

4.1 Introduction

Medically prescribed stimulants are not a new research focus area; they have been studied over the past couple of decades and have cemented themselves in society. This study aimed to provide a social science perspective on available medically prescribed stimulant literature. Guided by the study objectives, quantitative data was extracted from the study samples, study methods, and the key themes in relation to MPS; these are presented below.

4.2 Search results

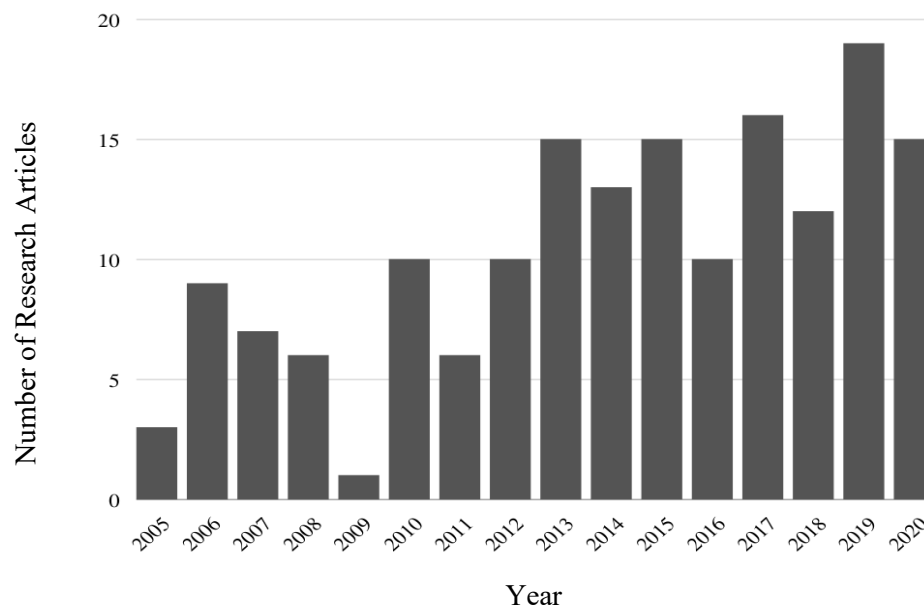
In line with the Cochrane Framework (Higgins & Thomas, 2019), the data collection process for this study was a multipart search that generated 298 articles. After the duplicates were removed, the dataset was reduced to 285 articles. The articles underwent a screening process whereby 11 were excluded because they were published outside the time frame (2005 – 2020), were grey literature, or only explored the biomedical aspect of MPS. After this screening, the dataset was made up of 274 articles, these were then assessed (in their full text) for their eligibility, and 107 were excluded. The total number of articles included in this study was n=167.

4.2.1 Objective 1: Study characteristics and trends

Table 4.1: Descriptive statistics for objective 1

	Year	Country	Country Classification	Data Collection Method	Data Analysis	Age of participants	Participant Group
N Valid	167	167	167	167	167	167	167
Mean	10.20	4.36	1.1	1.72	2.06	2.26	2.46
Median	11	1	1	1	2	2	2
Mode	15	1	1	1	1	2	2
Range	15	25	1	3	5	3	3
Minimum	1	1	1	1	1	1	1
Maximum	16	26	2	4	6	4	4

Figure 4.1: Number of articles published in each tear 2005 - 2020



4.2.1a Origin of articles

Most of the 167 articles included in this study emerged from the United States of America (USA) (67.1%, $n=107$). Canada and South Africa each produced the second most amount of MPS research articles (2.6%, $n=8$). Although South Africa had the second-largest amount of MPS research recorded in this review, there is still a considerable gap between the USA and South Africa and the other countries identified. Furthermore, of the 167 articles, 89.8% ($n=150$) are from countries that have been classified as first-world/developed countries; this is a staggering majority compared to the 10.2% ($n=17$) that came from second/third world/developing countries.

Figure 4.2: Number of articles published in each country

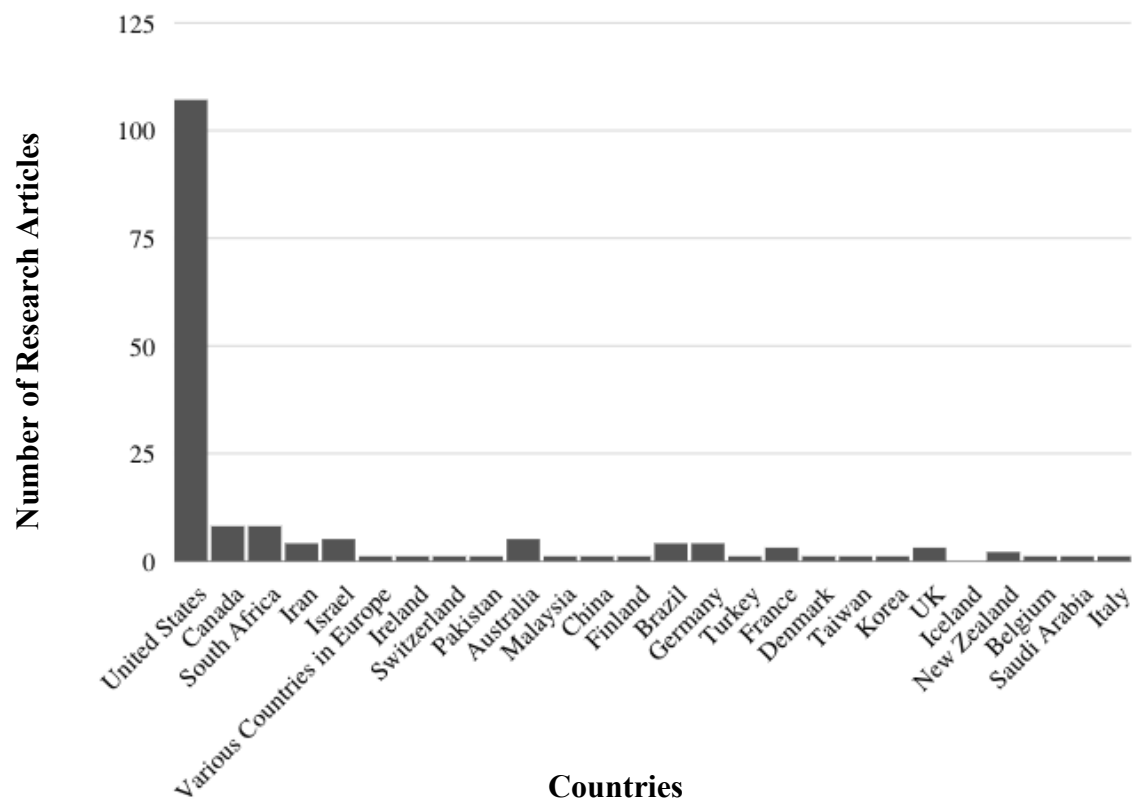
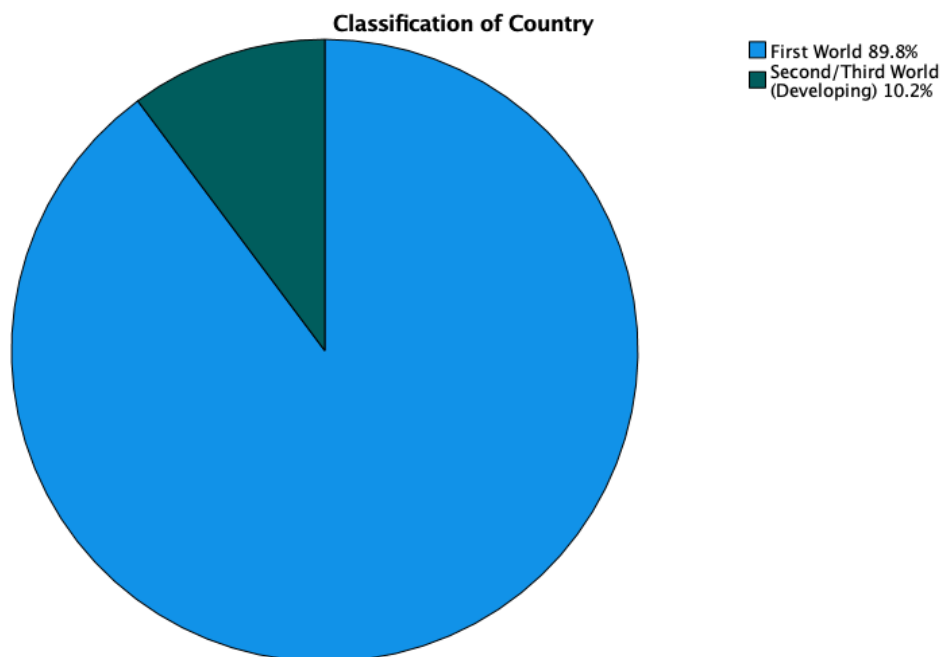


Figure 4.3: Classification of the country



4.2.1b Research article information

This review identified the most common data collection method as questionnaires and surveys, with 59.9% ($n=100$) of the reviewed articles. The next most common data collection method was a database collection with 25.7% ($n=43$) of articles. Interviews (11.4%, $n=19$) and mixed methods (3%, $n=5$) were the least commonly used methods.

The data analysis methods were also recorded from studies, and statistical analysis was the most used method of data analysis (46.1%, $n=77$). At the same time, descriptive statistics were employed for 34.7% ($n=58$) of articles. A mixed-methods approach was used in 3% ($n=5$) of the articles and a thematic analysis was used in 6% ($n=10$) of the articles. Only 0.6% ($n=1$) of articles used inductive analysis methods, and 9.6% ($n=16$) of the articles in this review were recorded as other.

Figure 4.4: Data collection methods

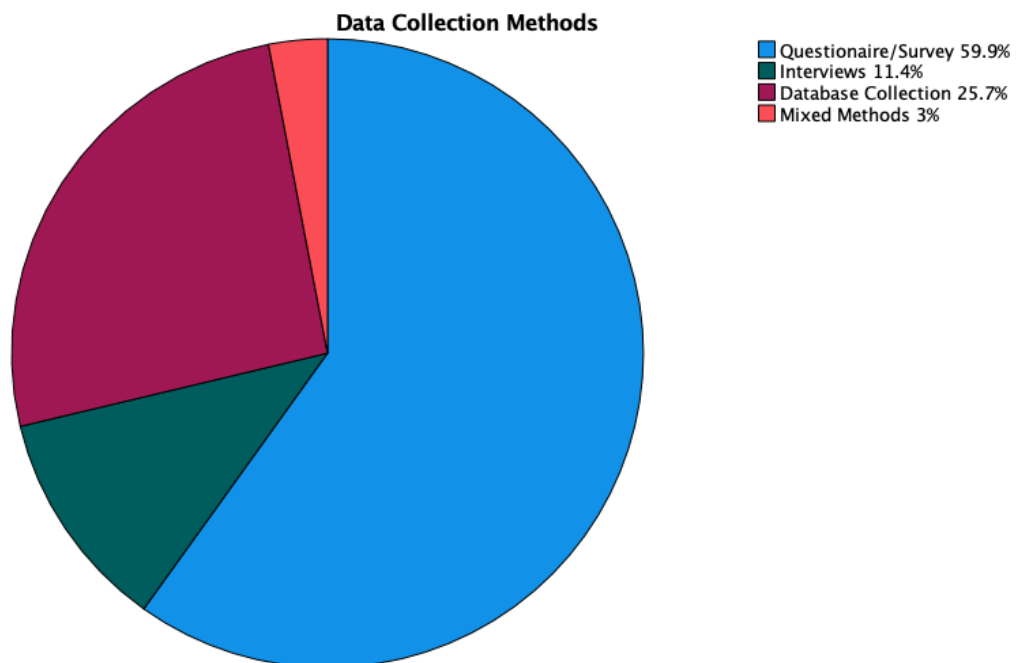
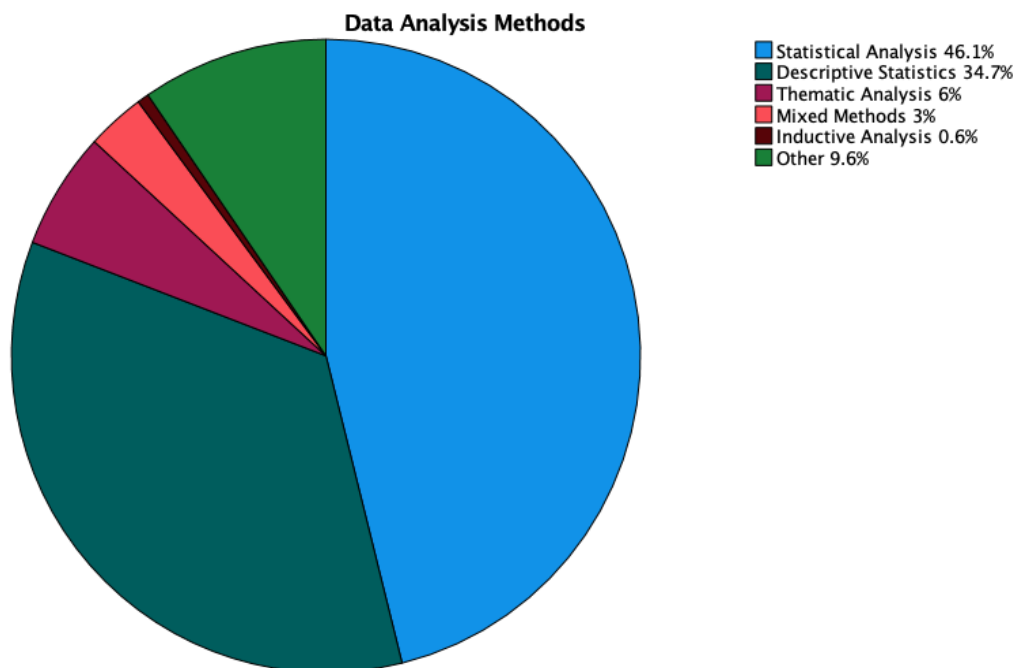


Figure 4.5: Data analysis methods



4.2.1c Participants in articles

This review also wanted to investigate the participants in the research articles, extracting data about their ages and whether they belonged to an identifiable cohort. “Adult” (18+) was the most common age group of participants in studies, with 67.1% ($n=112$) of studies using this age group. Children and adolescent participants only made up 10.8% ($n=18$) of studies, and 7.8% ($n=13$) used all ages in their research. This did not apply to 14.4% ($n=24$) of studies as they did not have participants.

Regarding the participant's groupings, school/college or university students were the most popular among the articles, recording at 66.5% ($n=111$). In this review, parents and children had 6% ($n=10$) articles, and only 3.6% ($n=6$) were a professional group. The other was recorded at 24% ($n=40$).

Figure 4.6: Age of participants

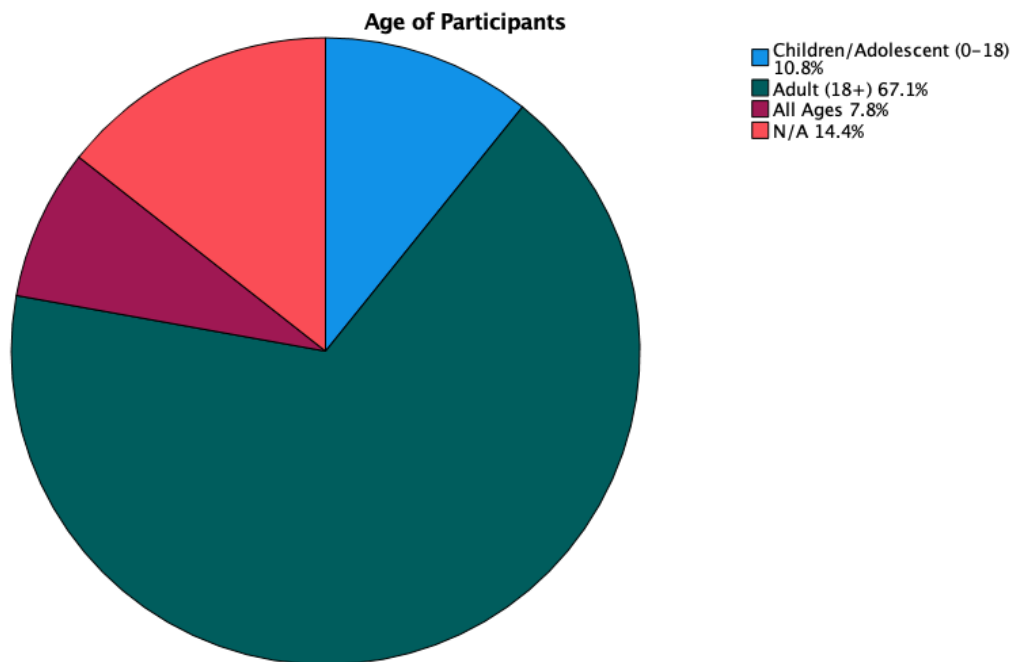
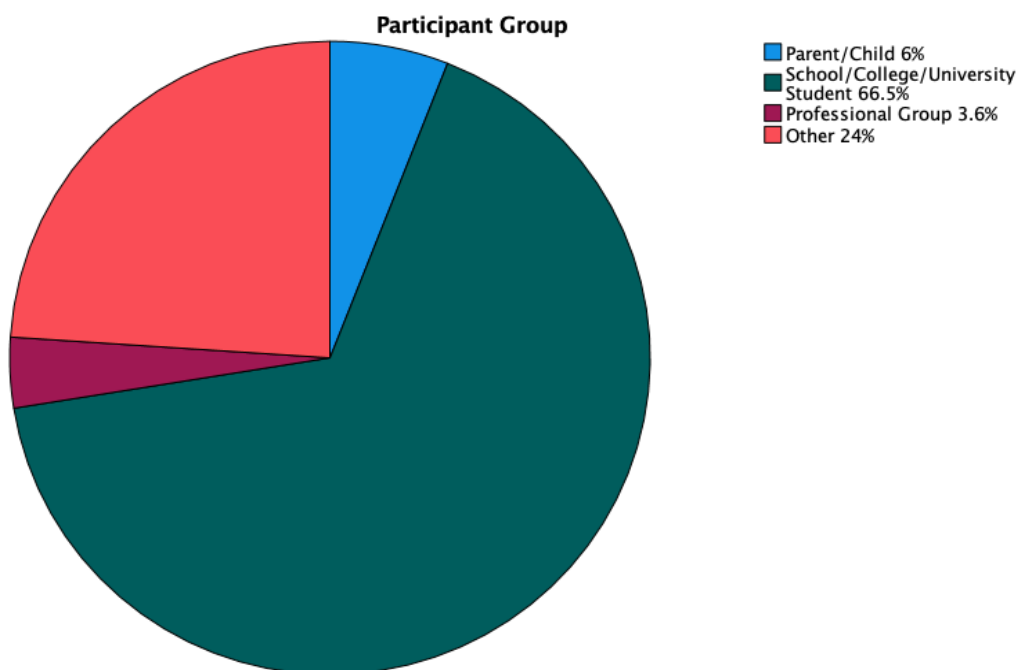


Figure 4.7: Groupings of participants



4.2.2 Objective 2: Key themes

Table 4.2: Descriptive statistics for objective 2

	Use of MPS	Wrongful Use Patterns	Influences of Use	Influences of Wrongful Use	Ways of Wrongful Use
N Valid	167	167	167	167	167
Mean	1.05	1.14	3.26	3.39	3.44
Median	1	1	2	2	4
Mode	1	1	1	1	4
Range	1	1	9	8	3
Minimum	1	1	1	1	1
Maximum	2	2	10	9	4

For objective two, this review worked to extract information on the key themes for MPS research. Of the articles, 94.6% ($n=158$) mentioned/discussed/explored the use of MPS. Slightly less, but as notable, 85.6% ($n=143$) of articles mentioned/discussed/explored the wrongful use of MPS. Articles often discussed both together.

Next, the review aimed to identify themes that were related to the use of MPS. In line with the literature review, academics were recorded to be the most mentioned/discussed/explored theme in associated with MPS use, at 46.1% ($n=77$). Prescriptions were the next highest recorded amount with 13.8% ($n=23$) of articles mentioning this. Socioeconomic/demographic factors 12% ($n=20$), attitudes and perceptions 7.2% ($n=12$), medical use 1.8% ($n=3$), recreational use 1.8% ($n=3$), family environment 0.6% ($n=1$) and access to medical care 0.6% ($n=1$) were all reported. 5.4% ($n=9$) were recorded as other and 10.8% ($n=18$) were not applicable.

Themes related to wrongful use were also recorded in this review. Similar to the themes of MPS use, academics were the highest amongst the articles, 46.7% ($n=78$). This was followed by attitudes and perceptions 12% ($n=20$), socioeconomic/demographic factors 8.4% ($n=14$) and prescriptions 6% ($n=10$). Only 3% ($n=5$) of articles mentioned additive behaviours in relation to MPS, 2.4% ($n=4$) mentioned recreational use and 0.6% ($n=1$) mentioned the family environment. 6.6% ($n=11$) were recorded as other and 14.4% ($n=24$) were not applicable.

The review examined whether any articles recorded different methods of MPS use and uncovered that 21% ($n=35$) of reports mentioned that it was used in conjunction with other substances. 4.2% ($n=7$) recorded that medically prescribed stimulants had been consumed in ways that it was not intended, and 1.2% ($n=2$) mentioned both of these themes. This did not apply to 73.7% ($n=123$) articles.

Figure 4.8: Number of articles that mention MPS use and MPS wrongful use

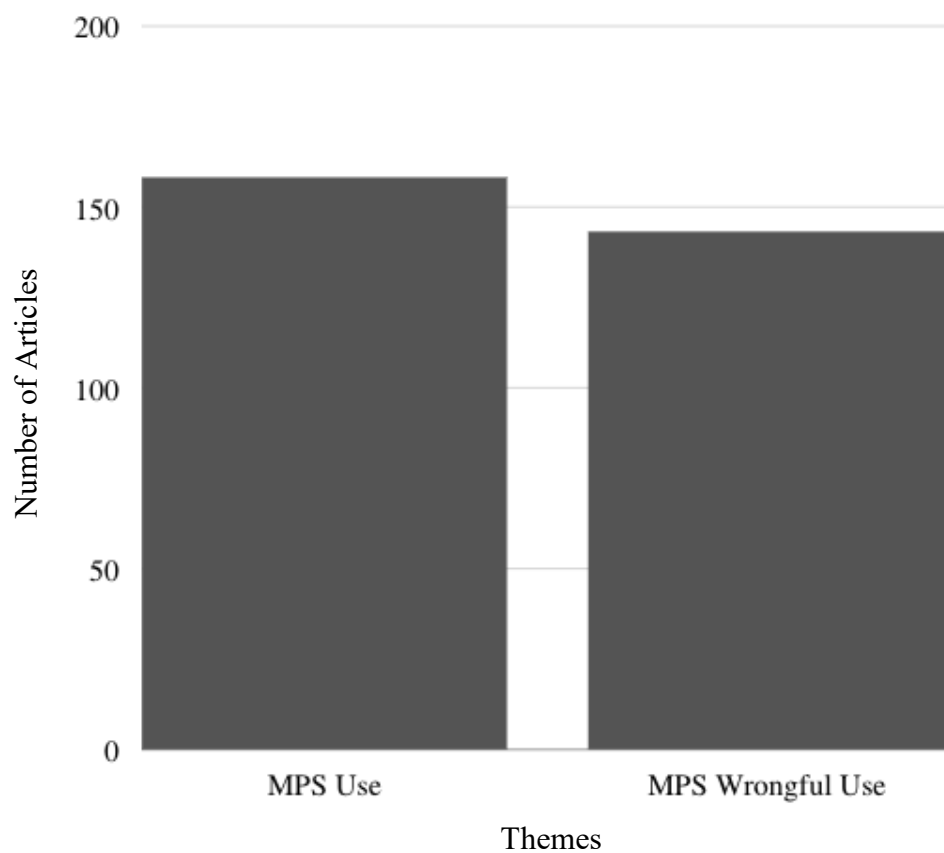


Figure 4.9: Themes identified to influence the use of MPS

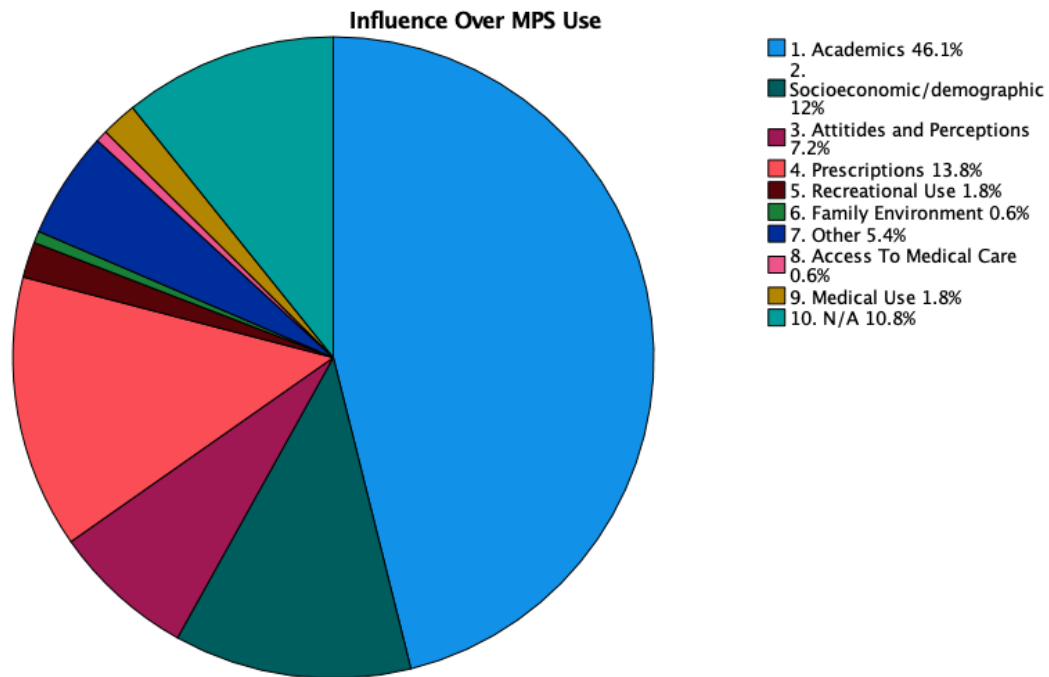


Figure 4.10: Themes identified to influence wrongful use of MPS

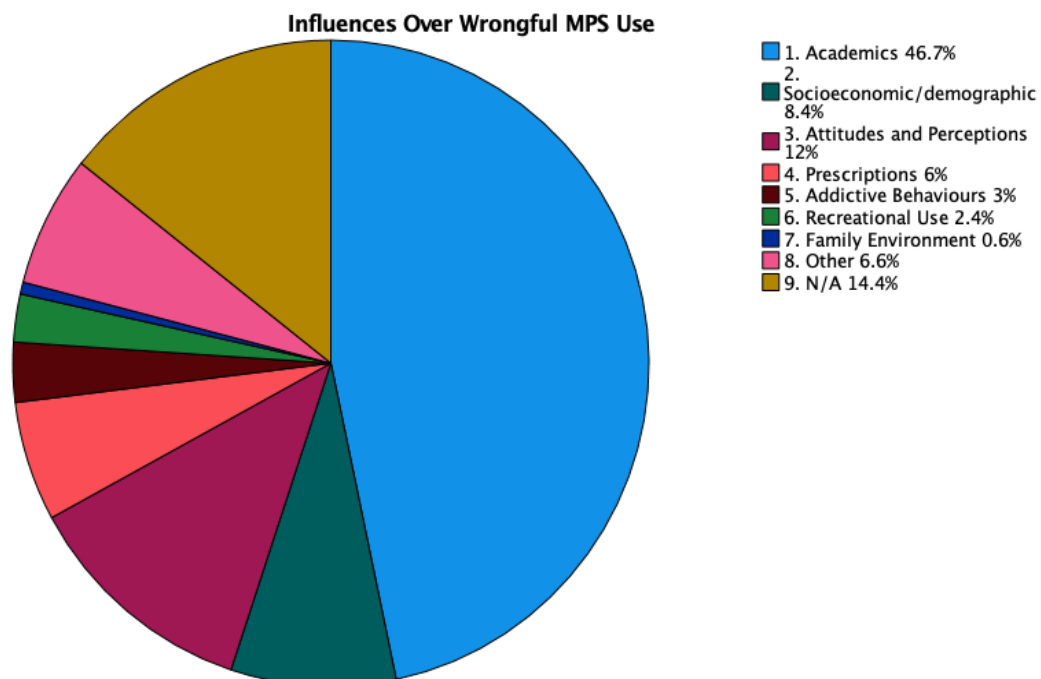
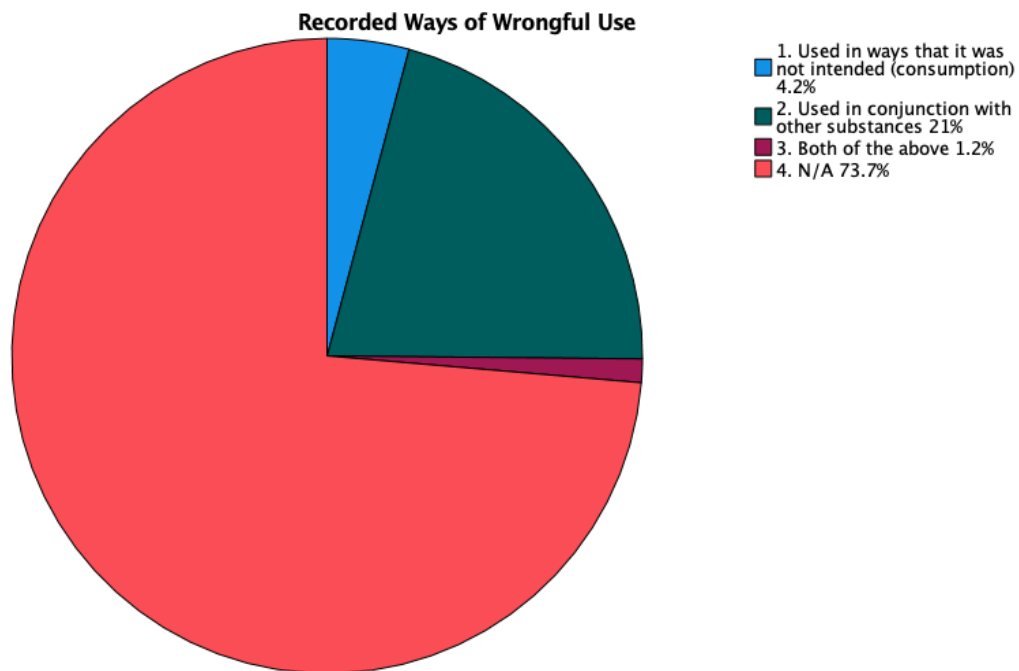


Figure 4.11: Number of articles that recorded ways of MPS wrongful use



4.2.3 Objective 3: Contemporary understanding

Table 4.3: Descriptive statistics for objective 3

	Location of Study	Does the study explore prescription patterns?	Mention socioeconomic/demographic factors?	Does the study note a presence of illegal sourcing?
N Valid	167	167	167	167
Mean	2.53	1.77	1.60	1.63
Median	2	2	2	2
Mode	2	2	1	2
Range	3	1	1	1
Minimum	1	1	1	1
Maximum	4	2	2	2

This review extracted data on the setting of the data collected in the articles. Tertiary Education was the most commonly reported setting, with 57.5% ($n=96$) of articles. A professional setting was used in 8.4% ($n=14$) articles and primary/middle/high school recorded 7.8% ($n=13$) of articles. 26.3% ($n=44$) were recorded as other.

Prescription patterns were mentioned/discussed/explored in 22.8% ($n=38$) of articles, socioeconomic/demographic's of MPS users were mentioned/discussed/explored in 39.5% ($n=66$) of articles and any form of illegal sourcing of MPS was mentioned/discussed/explored in 36.5% ($n=61$) of articles.

Figure 4.12: Location of data collection

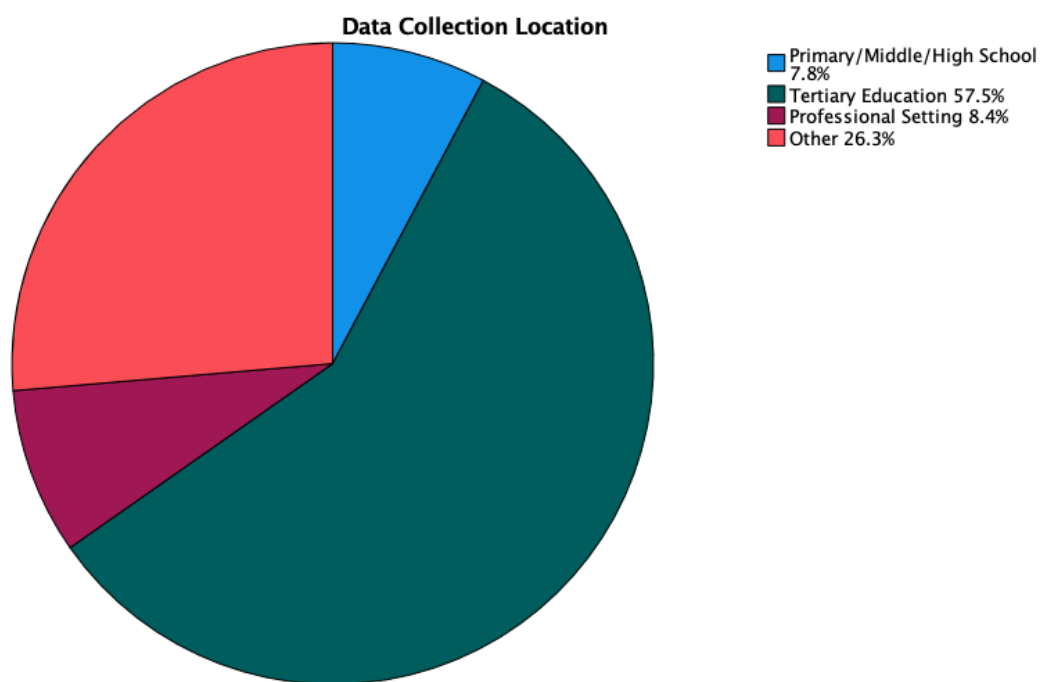
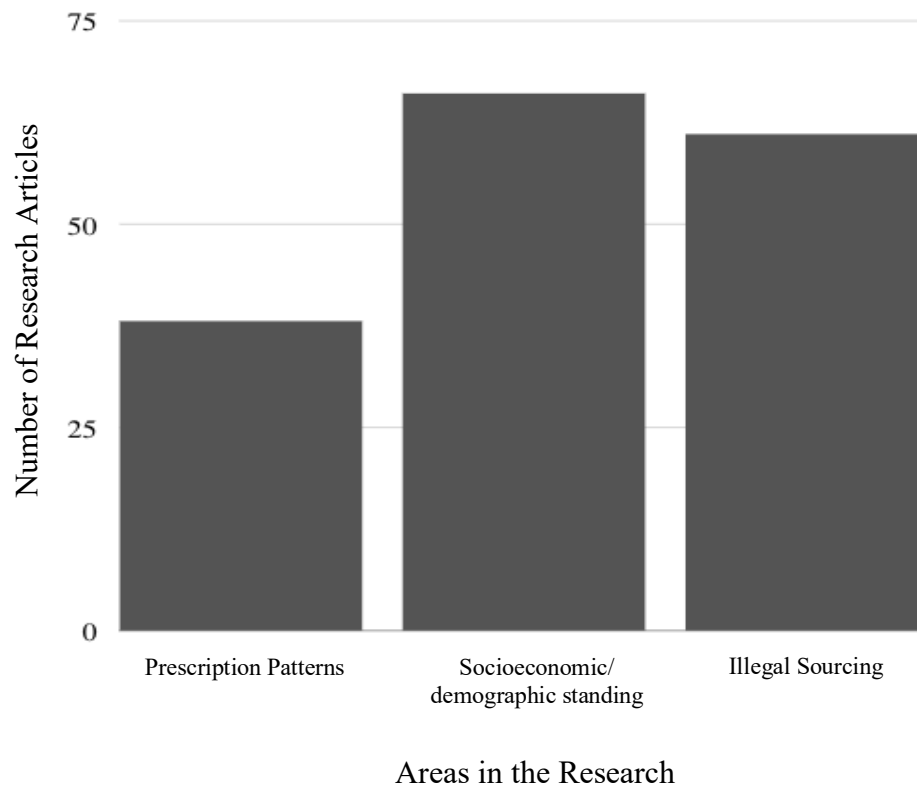


Figure 4.13: Research topics related to MPS discussed in the research



CHAPTER 5

DISCUSSION

5.1 Introduction

This review focused on published MPS research which explored any psychosocial aspect/s of the medical drug. Led by the study objectives, various characteristics were extracted from the articles to help map out the available literature on MPS and inform a contemporary understanding. These will be discussed below in relation to the existing research and Bronfenbrenner's Ecological System's Theory.

5.2 Objective 1: Study characteristics and trends

This study used published articles released between the period of 2005 and 2020. Over the fifteen-year time frame, the number of reports released steadily increased. There is a notable upward trend in MPS research, specifically MPS research that explores psychosocial elements of the medical drugs, suggesting a potential positive correlation between MPS prescriptions/usage rates and MPS research as, over the years, there has also been a steady increase in MPS prescriptions/usage (Scheffier et al., 2007). The increased prescriptions and use of MPS may mean more awareness surrounding it, making it more widely recognised and acknowledged. This is significant as more accessible research may help to close the gaps in health knowledge (Kebede et al., 2014), empowering people to make their own informed choices when it comes to their health.

Of the 167 studies used in this review, 107 emerged from the United States of America (USA). Furthermore, there was a massive disparity between the USA and other countries, with the following highest countries of origin being South Africa and Canada, with eight articles each. Also striking was that 89.9% of published research emerged from the first world/developed countries. Looking at the data, one may assume significantly lower MPS usage in countries outside the USA. However, research tells us that that is not the case (De Bruyn et al., 2019; Van Zyl et al., 2017). A pertinent question then emerges as to why there is such a skewed distribution of research. In 2003, a study sought to understand why ADHD (and MPS) is predominantly researched in the USA (Faraone et al., 2003). They acknowledged that with the USA dominating this research area, it has "led to the impression that ADHD is largely an American disorder and is much less prevalent elsewhere" (Faraone et al., 2003, p. 1). However,

they found that it was just as present across different countries/societies but was under-researched due to diagnosis confusion and misconceptions or concerns associated with MPS (Faraone et al., 2003). It has been hypothesised that ADHD is over-diagnosed in the United States of America and under-recognized in other countries (Renous et al., 2016). Although these studies were published in 2003 and 2016, the problem of underrepresentation in the research from other countries is still a concern today. While the USA has produced helpful research, it would be irresponsible to blindly assume that the implications would remain the same across different countries, societies, contexts etc., when using this research to gain insight into MPS or policy development.

The most common methods of data collection were questionnaires and surveys. These are generally considered valuable tools as researchers can assess large populations quickly, are time-effective, and have access to participants who may be geographically far away (Jones et al., 2013). However, there are potential risks, specifically recall accuracy inconsistencies and low response rates, which may affect the validity (Jones et al., 2013). Palamar and Le (2017) found that adolescents don't accurately self-report the wrongful use of MPS, and the frequency of MPS wrongful use is often underreported among various subpopulations. This may give us skewed data, and not an entirely accurate and all-encompassing report on these practices (Palamar & Le, 2017). It would be helpful to diversify the data collection methods so that a more accurate measurement can be obtained. Secondly, the most common analysis used in the studies was statistical analysis. While statistical analysis is a beneficial tool to understand patterns and trends, there is a gap in qualitative MPS research that aims to be more explorative and assist with understanding and defining.

The study samples were the final aspect of the research articles explored from objective one. Most studies had exclusively adult (18+) participants, and most of the study samples were students (school/college/university students). This is significant as it is not only adults who receive MPS prescriptions or use the medication. Furthermore, MPS is not exclusively intended for academics, so why are these participants and samples most common in MPS research? Crane and Broome (2017) may explain this; they ascertain that there is still a need for additional information on minors and their experiences during any research process to help inform correct ethical conduct and procedures (Crane & Broome, 2017). Working with children during research processes comes with challenges, and some researchers may shy away from this population specifically for this reason (Crane & Broome, 2017).

It could, however, also speak to the perception of MPS being synonymous with academics, whereby students would be the obvious choice when conducting a study. Student populations may be more accessible and present as a concentrated data pool to explore a phenomenon (Faraone et al., 2003). The significance of this finding lies in the areas that have not had a light shone on them as frequently, specifically professional groups and medical professionals. Singh (2004) emphasises how the attitudes of medical practitioners can influence a patient's perception and understanding of ADHD and MPS. Medical professionals have the power to impact their patients' decisions when it comes to treatment options, so investigating insights, attitudes, and perceptions from the source of where they could be coming from would contribute to the literature tremendously.

5.3 Objective 2: Key themes

When the literature review was conducted in the initial stages of this review, two predominant themes emerged: the use of MPS and different themes that were explored/investigated in relation to the use of MPS. These were then investigated in this review. While the use and wrongful use do, on occasion, overlap, they will be explored separately based on the review findings.

5.3.1 The use of medically prescribed stimulants

MPS use was a common, reoccurring theme amongst the studies included in this review. When discussing the use of MPS, these studies aimed to explore and understand what may affect medication use patterns. Much like the initial literature review suggested, academics were the most common recorded motivating factor for using MPS. When discussing academics, many studies noted that wakefulness, concentration, increased energy, and assistance with productivity were all driving factors for MPS use (King et al., 2020; De Bruyn et al., 2019). Although MPS does help with academic performance in those with ADHD through increased concentration and focus, this is not the only reason they are prescribed. So, why is this the most frequently visited theme for researchers?

Firstly, schools and classrooms are usually the first places children are suspected and flagged for having a behavioural disorder (Snider et al., 2003). Teachers play a crucial role by providing information on behaviours before a diagnosis is made, often helping manage a diagnosis in the classroom and reporting back to parents (Snider et al., 2003; Bolinger et al., 2020). Academic performance and classroom behaviour are often used as a benchmark to initiate the evaluation,

treatment, and tracking of the progress made when on the medication, explaining why they are so closely linked (Snider et al., 2003; Bolinger et al., 2020).

Secondly, it could reflect a society's emphasis on academics and academic achievement. Crede et al. (2015) say there is more pressure to achieve academically than ever before and investigated a relationship between academic achievement and life satisfaction (Crede et al., 2015). Educational settings have placed an emphasis on achievement, and it has become a part of the values and norms within these environments, thus prompting students to explore ways to help them cope and produce results (Kinman et al., 2017). While academics were the most recorded theme, it would be amiss not to mention the context of the studies. Most of the research was conducted on students or in an academic setting which could skew the data as academics are a significant aspect of a student's life. Thus, it can be assumed they would carry a substantial influence in these settings.

Medical prescriptions followed academics as one of the common themes discussed in the research relating to MPS use. One would need a prescription to get MPS legally, and there has been an increase in prescription rates (McCabe & West, 2013). What did stand out was that while this was a reoccurring theme in the studies, extensive data on prescription patterns and trends remain slim. The available data we have access to is mainly concentrated in the United States or first world/developing countries. As of 2017, there was no published data on the prevalence of ADHD in South Africa (Van Zyl et al., 2017). While there are available sales figures for medical drugs, in South Africa, there is no singular comprehensive database that allows MPS prescribing patterns to be explored over periods (Truter & Kotze, 2005). Longitudinal trends on MPS have not been updated, and in-depth studies into prescription trends have yet to be conducted (Renous et al., 2016). This remains true today, indicating a gap in the literature as longitudinal studies would be able to present a comprehensive understanding of long-term trends instead of short-term transformations.

Socioeconomic and demographic factors were also a theme that emerged from the data concerning MPS use. They can impact the frequency of use, ease of access, the likelihood of adherence and patterns of use (King et al., 2020; Efron et al., 2020; Haas et al., 2019). While some studies attempted to identify specific demographic factors linked to MPS use, the authors have not reached a consensus. With just how much these different factors could influence MPS use, further research could have implications for policy development, understanding and

addressing resource allocation and informing future funding decisions. Nevertheless, more research is needed in different contexts to create a comprehensive account.

Attitudes and perceptions were confirmed to be frequently discussed in MPS research. More specifically, it was identified as one of the common themes associated with MPS use. The literature has shown that these can influence use patterns, and specifically someone's adherence to the medication (Ghanizadeh, 2008; Jalilian et al., 2013; Sathaya et al., 2019). Attitudes and perceptions are thought to be developed partly from the knowledge individuals have about the medication (Singh, 2004), and one study found a low positive correlation between knowledge and attitudes regarding MPS use (Sathaya et al., 2019). Within the context of this review, this is relevant as it suggests how closely linked attitudes and perceptions are with MPS use; understanding what may impact them could be a valuable tool for medical professionals when addressing medication concerns. Furthermore, it calls for a closer look at what resources or systems are available to the public when investigating MPS. More research can be directed at specific bodies or professional groups to understand their attitude formation and training available on MPS.

5.3.2 The wrongful use of medically prescribed stimulants

Wrongful use was a key theme frequently referred to and explored in MPS literature. It must be noted that the literature used many different terms when referring to this, but for this review, wrongful use was used as an umbrella term and defined early in this study. Much like the themes associated with MPS use, academics were the most commonly occurring theme when discussing the wrongful use of MPS. However, within this context, they were being referred to as study tools used to facilitate learning by assisting with wakefulness and fighting fatigue, stress and pressure (King et al., 2020; De Bruyn et al., 2019; Patridge et al., 2020; Fond et al., 2016). Furthermore, a performance goal orientation motivates students to wrongfully use these medical drugs, as they are driven by achievement (Antshel et al., 2021). Although MPS is being wrongfully used to assist academic performance, there was no quantifiable data available to suggest this (Truter & Kotze, 2005) and in 2019, any data pertaining to this remains inconclusive (Kortekaas-Rijlaarsdam et al., 2019; Alrakaf et al., 2019).

If students seek means to cope with academic demands and pressure, how come they frequently turn to MPS? Students face various difficulties and challenges, and support services are

essential during this time (Ciobanu, 2013). In South Africa, accessing higher education and associated resources is difficult for many citizens (Malele, 2011). Although the National Student Financial Aid Scheme (NSFAS) was established to help students, the funding does come with added pressure. Students may lose the grant if their academic performance does not meet the requirements (Rossouw, 2018). This could shed light on two possibilities: at a tertiary level, there is inadequate systematic support offered to students so that they do not have to turn to medication, or there is a lack of awareness/knowledge of support services in place that they can turn to. It could also call for intervention at this level, focusing on the development of coping skills and more comprehensive policies around MPS use. It would be of value to mention that while academics were recorded as the most reoccurring theme in relation to MPS, students were the most common sample. Therefore, while this does not diminish the value of these findings, it must be acknowledged that academics are a prominent feature of these samples and settings, which could influence the data.

Attitudes and perceptions emerged as the second most recorded theme associated with the wrongful use of MPS. As the literature has mentioned, these hold a hefty influence over MPS use and, in this case, wrongful use (Nutley et al., 2020). Various factors have been associated with attitudes and perceptions, namely knowledge, social structures, and environments. Thus, it reinforces Bronfenbrenner's theory that everything exists within a context, so to fully understand a specific phenomenon, one must also account for its context (Bronfenbrenner, 1979; Bronfenbrenner, 1992). Students have been reported to perceive MPS as a tool to help during their studies, specifically in settings where values and norms place a big emphasis on achievement (Kinman et al., 2017). Wrongful users underestimate risks and overestimate advantages, meaning that their understanding of MPS governs their behaviour with it (Kinman et al., 2017). Using it correctly comes with great danger of adverse side effects; thus, campaigns to address these beliefs and provide accurate information are vital (Bavarian et al., 2017). With the frequency at which attitudes and perceptions are discussed in the literature, future research may direct their enquiries to various factors influencing these, and more in-depth qualitative investigations into overall attitude and perception themes where specific positive or negative attitudes can be explored.

Medical prescriptions were identified as a common theme in the literature relating to MPS and were repeatedly referenced. This was often explored with concern as it was noted that individuals with valid prescriptions were also engaging in the wrongful use of MPS, otherwise

known as a prescription diversion (Van Zyl et al., 2017; De Bruyn et al., 2019). Although prescription rates have been increasing, the data does not indicate if these ADHD diagnoses are appropriate or not (Renous et al., 2016). This is a concern as tracking possible over-diagnosis or misdiagnosis for ADHD and MPS treatment plans becomes incredibly difficult (Ford-Jones, 2015). With how often this is discussed in the literature, it may be assumed that this is a big concern for researchers as the effects of MPS may be harmful when not used correctly. Thus, it may be of value to investigate the processes that are used when issuing an MPS prescription, are individuals being given the information from their health care providers outlining the use and are there adequate steps are in place to inform individuals of the harm of misusing the medication, not to mention the illegality of sharing medications.

Various socio-economic and demographic factors were discussed with regard to MPS throughout the research. Differing from the discussion of this theme about the use of MPS, when referring to the wrongful use of MPS, a higher socioeconomic standing may facilitate more access to these medications through increased resources (Kind et al., 2020; Efron et al., 2020), potentially suggesting that accessing these medications and using them in ways differing from their medical purpose may largely be determined by someone's resources. This becomes even more alarming when using these medications to assist with academic performance when one does not medically require them, raising ethical concerns beyond the already severe health concerns. If access to these medications is linked to resource accessibility, further research is needed to determine how strong this link is and whether it applies across different contexts. Furthermore, beyond having increased resources, what other aspects of a person's socioeconomic standing play a role in influencing the wrongful use of MPS. Little is known about this particular theme in South Africa. With South Africa being a third-world country with such disparities between individuals' socio-economic standings, it would be valuable to see if these findings are replicated within the country's context or show differing results.

This review also extracted data on whether research articles reported on different ways medically prescribed stimulants are wrongfully used, noting that using it in conjunction with other substances was the most significant recorded theme among the articles with using it in ways that it wasn't intended having the second highest number of articles. Using these medical drugs in conjunction with other substances is a big concern for researchers, specifically with regard to alcohol (Egan et al., 2013). Using MPS in conjunction with other substances can result in severe adverse reactions; however, there is still limited information on the predictors

of this behaviour. This is a field where further research will be of immense value to help deepen understanding and track people who may be at high risk.

Overall, the wrongful use of MPS is a frequent and prevalent theme visited in the literature. Beyond the health concerns for those who are misusing it, there are concerns surrounding what may be motivating people to do so, from intrapersonal, interpersonal and environmental factors (Bavarian et al., 2017). In the context of this review, it has emphasised the substantial problem of MPS wrongful use and just how prevalent it is among various populations and settings. This calls for intervention in the form of policy review, policy formation and information distribution, as well as an increased investigation within South Africa, so there is available data to accurately measure and understand this health concern from within a South African setting where socioeconomic factors vary vastly from other countries.

5.4 Objective 3: Understanding how this information is used to inform a contemporary and future understanding of medically prescribed stimulants.

This review collected information on the setting from each study. As the findings from objective two showed, the most common sites were tertiary education, followed by professional settings (workplaces) and primary/middle and high schools. It reinforces the incredible lens that has been placed on academics throughout MPS research. What is worth mentioning is that workplaces can mimic education sites when looking at the features thought to impact MPS use: a high-pressure environment with considerable demands and pressure to perform (Sajid & Lab, 2021). However, significantly less research is emerging from this environment, strengthening the suggestion that MPS use is often understood as being synonymous with academics and students.

MPS prescription patterns were another area of intrigue for this review. Monitoring prescription patterns is tremendously helpful as it allows institutions or governing bodies to uncover trends while ensuring quality and affordable care is provided to patients (Blackenroth et al., 2017). Nevertheless, a minority of research articles explored any MPS prescription pattern. This type of information can add value to the medical industry by providing diagnostic patterns, frequency of use, adherence to medication, location patterns/trends and even insight into socio-economic and demographic MPS patterns. Socio-economic and demographic

patterns were mentioned in the studies slightly more than prescription patterns; however, they were only mentioned by less than half of the research articles included in this review.

Similarly, less than half of the studies mentioned any illegal sourcing of these medical drugs. Studies have indicated just how much of an influence availability has over the use of MPS, and in this case, specifically over the wrongful use (King et al., 2020; Benoit et al., 2020; De Bruyn et al., 2020; Van Zyl et al., 2017). Murphy et al. (2017) found that people who supply MPS illegally frame it as merely sharing it with people they know. In these cases, a distinction was made by participants between ‘dealing drugs’ and ‘sharing’ (Murphy et al., 2017). There were many arguments made in this study for distributing one MPS: reciprocity (trading it for something in return), social profit (to gain access into social circles), and advocating (helping other people) (Murphy et al., 2017). Although this research assists with formulating an understanding, it also calls for research of this nature from different contexts and settings. Furthermore, research into other avenues of MPS illegal distribution would be a welcomed contribution to the body of literature. Any additional research exclusively exploring the illegal sourcing of the medical drug would assist in providing a more comprehensive and complete understanding of this phenomenon and MPS as a whole. It would provide information on where to target interventions and where tighter restrictions can be implemented to ensure the safe use and distribution of MPS.

Objectives one and two were beneficial in providing an overview of MPS literature and how it is currently being researched. It has also allowed for insight into a current and future understanding of MPS; Bronfenbrenner's Ecological Systems Theory provides a helpful tool from which to do this. The central tenant of this theory is that things do not exist in isolation but rather in relation to other systems that all hold influence. The Ecological Systems Theory highlights the importance of five different but interrelated contexts on human development and behaviour; the microsystem (family/friends/classmates), mesosystem (interrelationships between other factors of the microsystem), exosystem (the broader social context), macrosystem (larger societal and cultural context) and the chronosystem (Bronfenbrenner, 1992). Cohen, Scribner & Farley (2000) have included factors such as accessibility, social structures, and media or educational messages to assist when applying this theory to health and drug-related topics.

Using this theory to understand MPS better highlights the importance of MPS' context and, more importantly, that meaning may vary from context to context. Although MPS is a medical drug, how humans interact with it and understand it is what gives it its importance in society. Starting by placing MPS at the center, the microsystem and mesosystem are people/places/institutions that regularly interact with MPS and each other. Because these interactions are usually immediate and consistent, they may shape understandings, attitudes, and general beliefs (Bronfenbrenner, 1979; Bronfenbrenner, 1992). Thus, a person's family, school, health care services and peers have significant power in shifting their understanding of MPS. This review has repeatedly demonstrated an association between MPS and academics throughout the available literature. School environments, teachers, and parents all play roles throughout the diagnosis stage, treatment initiation and management of medication among young students (Bolinger et al., 2020). Health care workers also pass on any relevant information and any biases they may have (Singh, 2004).

The exosystem and the macrosystem are things that one may encounter less frequently or less directly, but they still have a bearing on the individual. For example, someone's economic standing, or their parents, may influence whether they have consistent access to the medication or not (King et al., 2020; Benoit et al., 2020; Haas et al., 2019). At the macrosystem level, the culture in which one exists may influence their beliefs and understandings (Bronfenbrenner, 1992). At tertiary education sites, MPS are being called 'study drugs' and 'cognitive enhancers' (Partridge et al., 2013; Abelman, 2017), and there is a pervasive and widespread belief that MPS helps with academic performance. Therefore, different cultural ideas could lead to the presentation of MPS in different ways in a culture where academics and achievement are highly regarded; this could be viewed as an acceptable means to meet those expectations. For students who do not have access to support systems (adequate medical care, funding etc.), MPS may be a tool used to cope with various stresses, or it may be something they do not have access to even though they may medically require it. Therefore, the same medication can be experienced differently by those with different environmental factors. The media may be instrumental at these levels, but little is known about MPS and the media, presenting as a potential new area of enquiry.

The Ecological Systems Theory is an excellent tool as it emphasises how many different things go into influencing and shaping understandings and beliefs. Examining each additional environmental factor is essential to formulate a comprehensive, contemporary understanding

of MPS. This review has indicated that MPS is most frequently explored in research associated with academics and academic environments, indicating a high association. However, it has also shed light on many areas where there is little or no research available, such as workplace environments, schools, and medical professionals. Limited data is available from outside the USA or countries that are not developed. It cannot be assumed that this data would be replicated in other contexts or that MPS would carry the same meaning to those with different environmental factors influencing their beliefs and understandings.

South Africa is a third-world country, facing many unique challenges because of the past, with only 16.4% of people having a private medical aid scheme in 2018 (Szabo & Kaliski, 2018; Department of Health [DoH], 2019). It is significant to note that South Africa is one of the top three countries to output MPS research in this review; however, only a few articles were available regardless of this. Although the data produced from the USA cannot be blindly transferred to South Africa, it did highlight specific trends which need to be investigated further – specifically the wrongful use of MPS at tertiary education sites. If South Africa continues working on the NHI and rolls it out to the public, much more research into this area will be required to strengthen and build policies to protect the people of South Africa and share information about MPS.

5.5 Limitations and recommendations

This systematic review was restricted as it only included English publications. This may have impacted the results and limited the cross-cultural findings by excluding publications from countries where English may not be the primary language of academic journals. Furthermore, it only included articles the researcher had full access to. Thus, there is a possibility that not all MPS research articles were included even though an extensive search was conducted.

Recommendations:

1. Diversify the study settings and participants in future research to have a balanced representation and a more valid and reliable comparison.
2. To research interventions for education institutions and policy development for MPS in academic settings.

3. More research into the ethics surrounding MPS, specifically in the context of academics and as an ‘academic enhancer’.
4. Increase studies in developing countries and more extensive scale studies to better understand MPS within different contexts.
5. Research into various environments that may impact/influence MPS use and wrongful use.

CHAPTER 6

CONCLUSION

Medically prescribed stimulants have grown over the past couple of decades, not just in their use but also in how often they are being researched. Looking at the data, it can confidently be assumed that they have a significant presence in society and will continue to do so in the future. Existing research has provided information on this presence and continues to develop an understanding of MPS further. This systematic review aimed to provide a social perspective on MPS by examining existing research. It uncovered research trends, provided a consolidated overview of the available research, and shed light on significant gaps in the research to direct future investigation.

This review found there to be an abundance of available literature focusing on MPS, which gives a relatively in-depth understanding of how MPS is being discussed and understood. It noted the uneven distribution of MPS literature regarding which countries had the highest output of research and highlighted the need to conduct more research in different settings with different factors (developing countries etc). It also signified a call for more qualitative research where researchers can start to uncover the meaning-making processes and locate more in-depth data. This review documented a large amount of the available research focused on students in an academic setting, and much of the information garnered from the literature is in relation to either the use or the wrongful use of MPS, giving researchers an overview of the MPS interest areas and where further research can be directed. It highlighted different factors that may be influencing/contributing to the use and wrongful use of MPS, such as academics, attitudes, socioeconomic factors, and prescriptions.

All the information gathered from this review assisted with understanding how people in different settings/environments interact with medically prescribed stimulants. It provided a valuable overview of MPS research and areas of concern where more understanding is needed. Even more importantly, it reinforced that MPS cannot be understood in isolation but rather within the specific contexts in which it exists. More than ever, further research into different contexts and environments is needed, especially within South Africa.

Appendix

Ethical Clearance Form



28 March 2022

Miss Bo Staci Rode (214501079)
School Of Applied Human Sc
Howard College

Dear Miss Bo Staci Rode,

Original application number: 00013732

Project title: A Social Science Perspective on Literature Relating to Medically Prescribed Stimulants: A Systematic Review.

Exemption from Ethics Review

In response to your application received on 10 March 2022, your school has indicated that the protocol has been granted EXEMPTION FROM ETHICS REVIEW.

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE:

Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,



Prof Johannes John-Langba
Academic Leader Research
School Of Applied Human

UKZN Research Ethics Office
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Website: <http://research.ukzn.ac.za/Research-Ethics/>

Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

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References

- Abelman, D. (2017). Mitigating risks of student use of study drugs through understanding motivations for use and applying harm reduction theory: a literature review. *Harm Reduction Journal*.
- Aikins, R. (2019). "The White Version of Cheating" Ethical and social equity concerns of cognitive enhancing drug users in higher education. *Journal of Academic Ethics*, 111-130.
- Alrakaf, F., Binyousef, F., Altammami, A., Alharbi, S., Shadid, A., & Alrahili, N. (2019). Illicit stimulant use among medical students in Riyadh, Saudi Arabia. *Cureus*.
- Amir-Behghadami, M., & Janati, A. (2020). Population, intervention, comparison, outcomes and study (PICOS) design as a framework to formulate eligibility criteria in systematic reviews. *Emerg Med Journal*.
- Antholz, B. (2019). Methylphenidate and Crime Reduction. *International Journal of Social Science*, 33-55.
- Antshel, K., Parascandola, T., Taylor, L., & Faraone, S. (2021). Achievement goal orientation and stimulant misuse in college students. *Journal of American College Health*, 125-133.
- Armitage, C., & Christian, J. (2003). From Attitudes to Behaviour: Basic and Applied Research on the Theory of Planned Behaviour. *Current Psychology*, 187-195.
- Aromataris, E., & Munn, Z. (2017). *Joanna Briggs Institute Reviewer's Manual*. The Joanna Briggs Institute.
- Arria, A., Caldeira, K., O'Grady, K., Vincent, K., Johnson, E., & Wish, E. (2008). Nonmedical use of prescription stimulants among college students: associations with Attention-Deficit-Hyperactivity Disorder and Polydrug Use. 156-169.
- Arria, A., Caldeira, K., O'Grady, K., Vincent, K., Johnson, E., & Wish, E. (2008). Nonmedical use of prescription stimulants among college students: associations with attention-deficit-hyperactivity disorder and polydrug use. *Pharmacotherapy*, 156-169.
- American Psychological Association (APA). (2013). *Diagnostic and statistical manual of mental disorders (5th ed.)*.
- Bailey, E. (2022). Ritalin Vs. Adderall: An ADHD Medication Comparison. *Attitude: ADHD Medication & Treatment*.

- Bandura, A. (1977). Cognitive processes mediating behavioural change. *Journal of Personality and Social Behaviour*.
- Barringer, A., & Papp, L. (2021). Academic factors associated with college students' prescription stimulant misuse in daily life: An ecological analysis of multiple levels. *Journal of American College Health*.
- Bavarian, N., McMullen, J., Flay, B., Kodama, C., Martin, M., & Salts, R. (2017). A mixed-methods approach examining illicit prescription stimulant use: findings from a northern California university. *J Primary Prevent*, 363-383.
- Benson, K., Flory, K., Humphreys, K., & Lee, S. (2015). Misuse of stimulant medication among college students: a comprehensive review and meta-analysis. *Clin Child Fam Psychol Rev*, 50-76.
- Berger, I., Dor, T., Nevo, Y., & Goldzweig, G. (2008). Attitudes Towards Attention-Deficit Hyperactivity Disorder (ADHD) Treatment: Parents and Children's Perspectives. *Journal of Child Neurology*, 1036-1042.
- Beyer, C., Staunton, C., & Moodley, K. (2014). The implications of Methylphenidate use by healthy medical students and doctors in South Africa. *BMC Medical Ethics*.
- Blackenroth, D., Chase, H., Wei, Y., & Friedman, C. (2017). Monitoring prescribing patterns using regression and electronic health records. *BMC Medical Informatics and Decision Making*.
- Boaz, A., Ashby, D., & Young, K. (2002). Systematic reviews: what have they got to offer evidence based policy and practice. London, United Kindom: Systematic reviews: what have they got to offer evidence based policy and practice.
- Bogg, T., & Finn, P. (2009). An ecologically based model of alcohol-consumption decision making: evidence for the discriminative and predictive role of contextual reward and punishment information. *Journal of Stud Alcohol Drugs*, 446-457.
- Boland, A., Cherry, M., & Dickson, R. (2017). *Doing A Systematic Review: A Students Guide*. Los Angeles: SAGE Publications.
- Bolinger, S., Mucherah, W., & Markelz, A. (2020). Teacher knowledge of attention deficit/hyperactivity disorder and classroom management. *The Journal of Special Education*.
- Bossaer, J., Grey, J., Miller, S., Enck, G., Gaddipati, V. & Enck, E. (2013). The use and misuse of prescription stimulants as 'cognitive enhancers' by students at the academic health sciences centre. *Academic Medicine*, 967-971.

- Brandt, S., Taverna, E., & Hallock, R. (2014). A survey of nonmedical use of tranquilisers, stimulants and pain relievers among college students: Patterns of use among users and factors related to abstinence in non-users. *Drug and Alcohol Dependence*, 272-276.
- Brault, M., & Lacourse, E. (2012). Prevalence of prescribed attention-deficit hyperactivity disorder medications and diagnosis among Canadian preschoolers and school-age children: 1994-2007. *Can J Psychiatry*.
- Briars, L., & Todd, T. (2016). A review of pharmacological management of attention-deficit/hyperactivity disorder. *Journal of Pediatric Pharmacology*, 192-206.
- Bronfenbrenner, U. (1979). Contexts of child rearing: Problems and prospects. *American Psychologist*, 844-850.
- Bronfenbrenner, U. (1992). Ecological Systems Theory. In *Six Theories of Child Development: Revised Formulations and Current Issues* (pp. 187-249). Jessica Kingsley Publishers.
- Brownell, M., Mayer, T., & Chateau, D. (2006). The incidence of methylphenidate use by Canadian children: what is the impact of socioeconomic status and urban or rural residence? *Canadian Journal of Psychiatry*, 847-854.
- Bruggisser, M., Bodmer, M., & Liechti, M. (2011). Severe toxicity due to injected but not oral or nasal abuse of methylphenidate tablets. *The European Journal of Medical Sciences*.
- Cakic, V. (2009). Smart drugs for cognitive enhancement: ethical and pragmatic considerations in the era of cosmetic neurology. *Journal of Medical Ethics*, 611-615.
- Carroll, B., McLaughlin, T., & Blake, D. (2006). Patterns and knowledge of nonmedical use of stimulants among college students. *Arch Pediatr Adolesc Med*, 481-485.
- Chinneck, A., Thompson, K., Mahu, I., Davis-MacNevin, P., & Stewart, S. (2018). Personality and prescription drug use/misuse among first-year undergraduates. *Addictive Behaviours*, 122-130.
- Ciobanu, A. (2013). The role of student services in the improving of student experience in higher education. *LUMEN*.
- Coetzee, M., Kaminer, Y., & Morales, A. (2002). Megadose intranasal methylphenidate (ritalin) abuse in adult attention deficit hyperactivity disorder. *Substance Abuse*, 165-169.

- Cohen, D., Scribner, R., & Farley, T. (2000). A structural model of health behaviour: A pragmatic approach to explain and influence health behaviours at the popular level. *Preventive Medicine*, 146 - 154.
- Cole, V., & Hussong, A. (2020). Psychosocial functioning among college students who misuse stimulants versus other drugs. *Addictive Behaviours*.
- Conn, B., & Marks, A. (2015). An Ecological Approach to Understanding Adolescent Prescription Drug Misuse. *Journal of Adolescent Research*, 1-22.
- Connolly, J., Glessner, J., Elia, J., & Hakonarson, H. (2015). ADHD & Pharmacotherapy: past, present and future. *Ther Innov Regul Sci*, 632-642.
- Crane, S., & Broome, M. (2017). Understanding ethical issues of research participation from the perspective of participating children and adolescents: a systematic review. *Worldviews Evid Based Nurs*, 200-209.
- Crede, J., Wirthwein, L., McElvany, N., & Steinmayr, R. (2015). Adolescents' academic achievement and life satisfaction: the role of parents' education. *Frontiers in Psychology*.
- Crisp, B. (2015). Systematic Reviews: A social work perspective. *Australian Social Work*, 284-295.
- Crook, C., & Garratt, D. (2005). The positivist paradigm in contemporary social science research. In B. Somekh, & C. Lewin, *Research Methods in the Social Sciences* (pp. 207-214). London: SAGE Publications.
- Cunliffe, J., Decary-Hetu, D., & Pollak, T. (2019). Nonmedical prescription psychiatric drug use and the darknet: A cryptomarket analysis. *International Journal of Drug Policy*, 263-272.
- Cutler, K. (2014). Prescription Stimulants Are "A-Okay": Applying Neutralization Theory to College Students' Nonmedical Prescription Stimulant Use. *Journal of American College Health*, 478-486.
- Daniali, s., Nahavandi, A., Madjd, Z., Shahbazi, A., Niknazar, S., & Shahbazzadeh, D. (2013). Chronic ritalin administration during adulthood increases serotonin pool in the rat medial frontal cortex. *Iran Biomed Journal*, 134-139.
- Daughton, J., & Kratochvil, C. (2009). Review of ADHD pharmacotherapies: advantages, disadvantages, and clinical pearls. *Psychopharmacology Perspectives*, 240-249.

- De Bruyn, S., Wouters, E., Ponnet, K., & Van Hal, G. (2019). Popping smart pills in medical school: Are competition and stress associated with the misuse of prescription stimulants among students? *Substance Use & Misuse*, 1191-1202.
- DeCuir-Gunby, J., Marshall, P., & McCullouch, A. (2011). Developing and using a codebook for the analysis of interview data: an example from a professional development research project. *Field Methods*, 136-155.
- DeSantis, A., & Hane, A. (2010). "Adderall is Definitely Not a Drug": Justifications for the Illegal use of ADHD stimulants. *Substance Use & Misuse*, 31-46.
- Department of Health (DoH). (2019). Official *Guide to South Africa Health*. Department of Health. doi: https://www.gov.za/sites/default/files/gcis_document/201908/national-health-insurance-bill-b-11-2019.pdf
- Dreyer, J., Burger, J., Kotze, I., Van Dyk, S., & Cockeran, M. (2016). Students' perception of the perceived availability and diversion of methylphenidate in a South African tertiary academic institution. *Academy of Pharmaceutical Sciences*, 55-59.
- DuPont, R., Coleman, J., Bucher, R., & Wilford, B. (2008). Characteristics and motives of college students who engage in nonmedical use of methylphenidate. *The American Journal on Addictions*, 167-171.
- Efron, D., Mulraney, M., Sciberras, E., Hiscock, H., Hearps, S., & Coghill, D. (2020). Patterns of Long-term ADHD medication use in Australian children. *Achieve of Disease in Childhood*.
- Egan, K., Reboussin, B., Blocker, J., Wolfson, M., & Sutfin, E. (2013). Simultaneous use of non-medical ADHD prescription stimulants and alcohol among undergraduate students. *Drug and Alcohol Dependence*, 71-77.
- Epstein, J., & Loren, R. (2014). Changes in the definition of ADHD in DSM-5: Subtle but Important. *Neuropsychiatry (London)*, 455-458.
- Etikan, I., Musa, S., & Alkassim, R. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 1-4.
- Ettekal, A., & Mahoney, J. (2017). Ecological Systems Theory. In K. Peppler, *The SAGE Encyclopedia of Out-of-School Learning* (pp. 239-241). SAGE.
- Faraone, S. (2018). The pharmacology of amphetamine and methylphenidate: Relevance to the neurobiology of attention-deficit/hyperactivity disorder and other psychiatric comorbidities. *Neurosci Biobehav Rev*, 255-270.

- Faraone, S., Sergeant, J., Gillbert, C., & Biederman, J. (2003). The Worldwide Prevalence of ADHD: is it an American condition? *World Psychiatry*, 104 - 114.
- Fond, G., Riveline, J., Gavaret, M., & Franchi, J. (2016). (Mis)use of prescribed stimulants in the medical student community: motives and behaviours: a population-based cross-sectional study. *Medicine*.
- Ford, J., & Schroeder, R. (2008). Academic strain and non-medical use of prescription stimulants among college students. *Deviant Behavior*, 26-53.
- Ford-Jones, P. (2015). Misdiagnosis of attention deficit hyperactivity disorder: 'Normal Behaviour' and relative maturity. *Paediatrics & Child Health*, 200-202.
- Franke, A., Bagusat, C., Rust, S., Engal, A., & Lieb, K. (2014). Substances used and prevalence rates of pharmacological cognitive enhancement among healthy subjects. *Eur Arch Psychiatry Clin Neurosci*, 83-90.
- Ghanizadeh, A. (2008). Knowledge of pharmacists regarding Ritalin and ADHD and their attitude towards the use of Ritalin to treat ADHD. . *International Journal of Clinical Pharmacology*, 84-88.
- Haas, G., Momo, A., Dias, T., Ayodele, T., & Schwarzbald, M. (2019). Sociodemographic, psychiatric and Personality correlates of non-prescribed use of amphetamine medications for academic performance among medical students. . *Brazillian Journal of psychiatry*, 363-366.
- Haneem, F., Ali, R., Kama, N., & Basri, S. (2017). Descriptive analysis and text analysis in Systematic Literature Review: A review of master data management. *Research and Innovation in Information Systems*.
- Hanson, C., Burton, S., Giraud-Carrier, C., West, J., Barns, M., & Hanson, B. (2013). Tweaking and Tweeting: Exploring Twitter for Non-medical use of a psychostimulant drug (Adderall) among college students. . *Journal of Medical Internet Research*.
- Higgins, J., & Thomas, J. (2019). *Cochrane Handbook for Systematic Reviews of Interventions*. Oxford: The Cochrane Collaboration.
- Ilieva, I., & Farah, M. (2011). Enhancement stimulants: perceived motivational and cognitive advantages. *Frontiers in Neuroscience*, 1-6.
- Jalilian, F., Matin, B., Alavijeh, M., & Ataee, M. (2013). Prevalence and factor related to Ritalin abuse among Iranian medical college students: an application of the theory of planned behaviour. *Terapevticheskii Arkhiv*, 22-27.

- Javed, N., Ahmed, F., Saeed, S., Amir, R., Khan, H., & Iqbal, S. (2019). Prevalence of methylphenidate misuse in medical colleges in Pakistan: a cross-sectional study. *Cureus*.
- Jeffers, A., & Benotsch, E. (2014). Non-medical use of prescription stimulants for weightloss, disordered eating and body image. . *Eating behaviours*, 414-418.
- Jones, T., Baxter, M., & Khanduja, V. (2013). A quick guide to survey research. *Annals of The Royal College of Surgeons of England*, 5-7.
- Kebede, D., Zielinski, C., Mbondji, P., Piexoto, M., Kouvidila, W., & Lusamba-Dikassa, P. (2014). The way forward - narrowing the knowledge gap in sub-Saharan Africa to strengthen health systems. *Journal of The Royal Society of Medicine*, 10-12.
- Kerley, K., Copes, H., & Griffin, H. (2015). Middle-class motives for non-medical prescription stimulant use among college students. *Deviant Behavior*, 589-603.
- King, E., Benoit, W., Repa, L., & Garland, S. (2020). Prevalence and factors associated with non-medical prescription stimulant use to promote wakefulness in young adults. . *Journal of American College Health*.
- Kinman, B., Armstrong, K., & Hood, K. (2017). Perceptions of risks and benefits among nonprescription stimulant consumers, diverters and non-users. *Substance Use & Misuse*, 1256-1265.
- Korn, I., Hassan, K., Fainshtein, N., Yusov, N., & Davidovitch, N. (2018). Non-Medical Use of Prescription Stimulants for Treatment of Attention Disorders by University Students: Characteristics and Associations. . *Medical Science Monitor*, 378-3787.
- Kortekaas-Rijlaarsdam, A., Luman, M., Sonuga-Barke, E., & Oosterlaan, J. (2019). Does methylphenidate improve academic performance? A systematic review and meta-analysis. *European Child & Adolescent Psychiatry*, 155-164.
- Kriegler, S. (2014). A Social Constructivist Perspective on the Potential Relevance of Selected DSM-5 Disorders for South African Children and Youth. *Children and Society*.
- Krippendorff, K. (2004). *Content Analysis: An Introduction to its Methodology*. London: Sage Publications.
- Lakhan, S., & Kirchgessner, A. (2012). Prescription stimulants in individuals with and without attention deficit hyperactivity disorder: misuse, cognitive impact, and adverse effects. *Brain and Behaviour*, 661-677.
- Larson, M. (2006). Descriptive Statistics and Graphical Displays. *Circulation*, 76-81.

- Lohman, D., & Barrett, D. (2020). Scheduling medicines as a controlled substances: addressing normative and democratic gaps through human rights-based analysis. *BMC International Health and Human Rights*.
- Looby, A., & Earleywine, M. (2009). Prescription stimulant expectancies in recreational and medical users: results from a preliminary expectancy questionnaire. *Substance Use & Misuse*, 1578-1591.
- Lund, C., Peterson, I., Kleintjies, S., & Bhana, A. (2012). Mental Health Services in South Africa: Taking Stock. *African Journal of Psychiatry*, 402-405.
- Majumder, K. (2015). A young researcher's guide to a systematic review. *Editage Insights*, 2.
- Malele, I. (2011). *Access to higher education: challenges: higher education SA briefing*. Higher Education, Science and Innovation.
- Markowitz, J., Straughn, A., & Patrick, K. (2003). Advances in the pharmacotherapy of attention-deficit-hyperactivity disorder: focus on methylphenidate formulations. *Pharmacotherapy*, 1281-1299.
- Marshall, E. (2016). *The statistics tutor's quick guide to commonly used statistical tests*. Sheffield: Statstutor.
- McCabe, S., & West, B. (2013). Medical and Nonmedical Use of Prescription Stimulants: Results from a national multicohort study. *Journal of American Academic Child and Adolescent Psychiatry*, 1272-1280.
- Meerman, S., Batstra, L., Grietens, H., & Frances, A. (2017). ADHD: a critical update for educational professionals. *International Journal of Qualitative Studies on Health and Well-being*.
- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. (2009). The PRISMA Statement. *Preferred Reporting Items for Systematic Reviews and Meta-Analysis*.
- Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., . . . Group, P.-P. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic Reviews*.
- Moon, K., & Blackman, D. (2014). A guide to understanding social science research for natural scientists. *Conservation Biology*, 1167-1177.
- Munasur-Naidoo, A., & Truter, I. (2019). Cost of ADHD treatment using methylphenidate and atomoxetine in the South African private healthcare sector. . *Expert Rev Pharmacoecon Outcomes Res*, 677-687.

- Munn, Z., Tufanaru, C., & Aromataris, E. (2014). Data Extraction and Synthesis: The steps following study selection in a systematic review. *Systematic Reviews*, 49-54.
- Murphy, F., Murphy, S., Sales, P., & Lau, N. (2017). Examining social supply among nonmedical prescription stimulant users in the San Francisco Bay Area. *International Journal of Drug Policy*, 68-76.
- Ne'Eman-Haviv, V., & Bonny-Noach, H. (2019). Substances as self-treatment for cognitive test anxiety among undergraduate students. *Journal of Psychoactive Drugs*, 78-84.
- Neal, J. (2013). Nested or Networked? Future directions for ecological systems theory. *Social Development*, 722-737.
- Neuman, W. L. (2014). *Social Science Methods: Qualitative and Quantitative Approaches*. Edinburgh: Pearson Education Limited.
- Novak, S., Kroutill, L., Williams, R., & Van Brunt, D. (2007). The nonmedical use of prescription ADHD medications: results from a national Internet panel. *Substance Abuse Treatment Prevention and Policy*.
- Nutley, S., Mathews, C., & Striley, C. (2020). Disordered eating is associated with non-medical use of prescription stimulants among college students. *Drug and Alcohol Dependence*.
- Omosulu, R. (2013). The main features and constraints of social science's research methods. *International Journal of Development and Sustainability*, 1907-1918.
- Palamar, J., & Le, A. (2017). Discordant reporting of nonmedical amphetamine use among Adderall-using high school seniors in the US. *Drug Alcohol Dependence*, 181-212.
- Palinkas, L., Horwits, S., Green, C., Wisdom, J., Duan, N., & Hoagwood, K. (2015). Purposeful Sampling for Qualitative Data Collection and Analysis in Mixed Method Implementation Research. *ADM Policy Mental Health*, 533-544.
- Park, Y., Konge, L., & Artino, A. (2020). The positivism paradigm of research. *Journal of the Association of American Medical Colleges*, 690-694.
- Partridge, B., Bell, S., Lucke, J., & Hall, W. (2013). Australian university students attitudes towards the use of prescription stimulants as cognitive enhancers: perceived patterns of use, efficacy and safety. *Drug and Alcohol*, 295-302.
- Paulozzi, L., Strickler, G., Kreiner, P., & Koris, C. (2013). Controlled substance prescribing patterns - prescription behaviour surveillance systems, eight states, 2013. *Surveillance Summaries*.

- Petersen, M., Norgaard, L., & Traulsen, J. (2015). Pursuing Pleasures of Productivity: University Students' Use of Prescription Stimulants for Enhancement and the Moral Uncertainty of Making Work Fun. *Cult Med Psychiatry*, 665-679.
- Piper, B., Ogden, C., Simoyan, O., Chung, D., Caggiano, J., Nichols, S., & McCall, K. (2018). Trends in use of prescription stimulants in the United States and Territories, 2006 to 2016. *PLOS One*.
- Ponizovsky, A., Marom, E., & Fitoussi, I. (2014). Trends in attention-deficit hyperactivity disorder drugs consumption, Israel, 2005-2012. *Pharmacoepidemiol Drug Saf*.
- Prevention, C. f. (2021). *Attention-deficit/hyperactivity disorder (ADHD)*. Center for Disease Control and Prevention.
- Racine, E., & Forlini, C. (2010). Cognitive Enhancement, lifestyle choice or misuse of prescription drugs. *Neuroethics*, 1-4.
- Renous, C. S., Fergusson, E., & Suissa, S. (2016). Prescribing trends of attention-deficit/hyperactivity disorder (ADHD) medication in UK primary care, 1995-2015. *Br J Clin Pharmacol*, 858-868.
- Riddell, C., Jensen, C., & Carter, O. (2018). Cognitive Enhancement and coping in an Australian University student sample. *Journal of Cognitive Enhancement*, 63-69.
- Rosenkranz, M., O'Donnell, A., Verthein, U., H., Z., Addison, M., Liebrechts, N., . . . Kaner, E. M. (2019). Understanding pathways to stimulant use: a mixed-methods examination of the individual, social and cultural factors shaping illicit stimulant use across Europe (ATTUNE) study protocol. *BMJ Open*.
- Rossouw, F. (2018). Stressors and coping strategies among baccalaureate technologiae undergraduate nursing students at a western cape higher education institution.
- Sajid, A., & Lab, U. (2021). Work Environment Stress: Causes and Outcomes. *International Journal of Innovation, Creativity and Change*.
- Sathaya, G., Nagendra Rao, D., En, A., Gnan, J., & Mahalingam, H. (2019). Knowledge, attitude, self-esteem and use of pharmaceutical cognitive enhancers (PCE) among medical students: Cross sectional study. *Medine Journal*, 73-82.
- Scheffier, R., Hinshaw, S., Modrek, S., & Levine, P. (2007). The global market for ADHD medications. *Health Affairs*, 450-457.
- Singh, I. (2004). Doing their jobs: mothering with Ritalin in a culture of mother-blame. *Social Science & Medicine*, 1193-1205.

- Snider, V., Busch, T., & Arrowood, L. (2003). ADHD Teacher Knowledge of Stimulant Medication and ADHD. *Remedial and Special Education*, 46-56.
- Suri, H. (2020). Ethical Considerations of Conducting Systematic Reviews in Educational Research. In O. Zawacki-Richter, M. Kerres, S. Bedenlier, M. Bond, & K. Buntins, *Systematic Reviews in Educational Research* (pp. 41-54). Germany: Springer.
- Sussman, S., Pentz, M., Spruijt-Metz, D., & Miller, T. (2006). Misuse of 'study drugs': prevalence, consequences and implications for policy. *Substance Abuse Treatment Prevention, and Policy*.
- Svetlov, S., Kobeissy, F., & Gold, M. (2008). Performance enhancing, non-prescription use of Ritalin. *Journal of addictive Diseases*.
- Swedberg, R. (2018, April 4). One the Uses of Exploratory Research and Exploratory Studies in Social Science. Cornell University, United States.
- Sweeney, C., Sembower, M., Ertischek, M., Shiffman, S., & Schnoll, S. (2013). Nonmedical use of prescription ADHD stimulants and preexisting patterns of drug abuse. *Journal of Addictive Diseases*.
- Szabo, P., & Kaliski, Z. (2018). Mental health and the law: a South African Perspective. *BJPsych International Mental Law Profile Collection*.
- Teter, C., McCabe, S., Cranford, J., Boyd, C., & Guthrie, S. (2010). Prevalence and motives for illicit use of prescription stimulants in an undergraduate student sample. *Journal of American College Health*, 258-262.
- Thom, R. (2004). Mental Health Service Policy, Implementation and Research in South Africa-Are We Making Progress? *South African Journal of Psychiatry*, 32-37.
- Thornton, V., Dodd, C., & Weed, N. (2020). Assessment of prescription stimulant misuse among college students using the MMPI-2-RF. *Addictive Behaviors*.
- Torgerson, C. (2003). *Systematic Reviews*. London & New York City: Continuum International Publishing Group.
- Treceno, C., Arias, L., Sainz, M., Salado, I., Ortega, P., Velasco, V., . . . Carvajal, A. (2012). Trends in the consumption of attention deficit hyperactivity disorder medications in Castilla y Leon (Spain): changes in the consumption pattern following the introduction of extended release methylphenidate. *Pharmacoepidemiol Drug Saf*.

- Truter, I., & Kotze, T. (2005). Prescribing patterns of methylphenidate in a South African patient population who are members of a private medical aid. *Journal of Interdisciplinary Health Sciences*, 75-84.
- Van Zyl, P., Joubert, G., Fechter, L., Griesel, J., Nel, M., Honiball, A., . . . Dierdericks, M. (2017). Methylphenidate use among students living in junior on-campus residences of the University of the Free State. *South African Family Practice*, 122-127.
- Vergnes, J., Marchal-Sixou, C., Nabet, C., Maret, D., & Hamel, O. (2010). *Ethics in systematic reviews*. Toulouse: Journal of Medical Ethics.
- Walliman, N. (2011). *Research Methods The Basics*. London: Routledge.
- Wang, W., Luo, M., Xi, C., Lei, Y., Pan, S., Gao, X., . . . Lu, C. (2019). Cross-sectional study on influence of the family environment on the lifetime non-medical use of prescription drugs among Chinese adolescents in Guangdong: an analysis of sex differences. . *BMJ Open*.
- Wasserman, J., Fitzgerald, J., Sunny, M., Cole, M., Suminski, R., & Dougherty, J. (2014). Nonmedical use of stimulants among medical students. *The American Osteopathic Association*, 643-653.
- Weyandt, L., Oster, D., Marraccini, M., Gudmundsdottir, B., Munro, B., Rathkey, E., & McCallum, A. (2017). Prescription Stimulant Medication Misuse: Where are we and where do we go from here? *Exp Clin Psychopharmacol*, 400-414.
- White, B., Becker-Blease, K., & Grace-Bishop, K. (2006). Stimulant medication use, misuse and abuse in undergraduate and graduate student sample. *Journal of American College Health*, 261-268.
- Whitely, M., & Allsop, S. (2020). Look west for Australian evidence of the relationship between amphetamine-type stimulant prescribing and meth/amphetamine use. *Drug and Alcohol Review*.
- Wilens, T., & Spencer, T. (2010). Understanding Attention-Deficit/Hyperactivity Disorder from Childhood to Adulthood. *Postgrad Med*, 97-109.
- Woolsey, C., Barnes, L., Jacobson, B., Kennsinger, W., Barry, A., Beck, N., . . . Evans, M. (2014). Frequency of energy drink use predicts illicit prescription stimulant use. *Substance Abuse*.
- Young, A., Glover, N., & Havens, J. (2012). Nonmedical use of prescription medications among adolescents in the United States: a systematic review. *Journal of Adolescent Health*, 6-17.

