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Medication Monitoring in the Schools:

An Investigation of Current Practices of Florida School Psychologists

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
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Dedication

This manuscript is dedicated to the individuals who have provided me with encouragement and support not only in the creation of this work but also throughout all of my education. I would like to give a special thanks to both my parents who have helped provide values of working hard, instilling integrity in all endeavors, and following through even when it is difficult. I also would like to thank my family as a whole who has always put an emphasis on education and the pursuit of knowledge. To all my friends and extended family, I have been very blessed with your support throughout my life.

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Abstract

Prevalence rates of youth prescribed psychotropic medications have risen dramatically over the past decade. Many of these medications are prescribed to treat symptoms of a disorder that occur in the school setting. Some medications have negative side effects that can inhibit academic and social performance. School psychologists have been identified as professionals who are equipped to assist in monitoring both the beneficial and negative effects of medications for youth attending school. This study investigated the practices, training, types of disorders for which medication monitoring occurs, facilitators, and barriers to school psychologists engaging in medication monitoring in the schools. Survey data from 166 members of the Florida Association of School Psychologists were collected and analyzed. Seventy four percent of respondents endorsed medication monitoring as an appropriate role for school psychologists. Approximately half of the respondents in this study reported engaging in medication monitoring over the past school year. Over half the sample reported receiving training related to medication monitoring. Weak relationships were found among demographic and training variables and reported medication monitoring practices. Additionally, none of the interactions between demographic, professional background, and training variables was predictive of medication monitoring practices. Implications of these findings are discussed in relation to developing strategies to promote the medication monitoring practices of school psychologists.

Chapter One

Introduction

Statement of the Problem

Utilization rates of psychotropic medications, particularly in youth, have increased dramatically over the past decade. Zito (2003) reported a three-fold increase in the overall utilization rates of psychotropic medications in children and adolescents aged 4-19 years from 1987-1996. A 10-fold increase was observed for antidepressant medications for children and adolescents insured by Medicaid, and a five-fold increase was observed across children and adolescents insured by health maintenance organizations (HMOs [Zito, 2003]). Utilization rates of psychotropic medications prescribed to treat disorders such as Autism Spectrum Disorder, Asperger's syndrome, Obsessive Compulsive Disorder, and Conduct Disorder also have increased dramatically over the past decade (Abrams, Flood, & Phelps, 2006). Research targeting children receiving special education services found that 39% of these children are prescribed a psychotropic medication including stimulants, antipsychotics, antidepressants, and antihypertensive medications to inhibit externalizing behaviors (Mattison, 1999). Additionally, Mattison reported 17% of students receiving special education services were administered multiple medications.

Given these high utilization rates of psychotropic medications among school-aged youth, monitoring the effects of these medications is needed. Psychotropic medications are typically prescribed to treat both externalizing and internalizing symptoms of

emotional and behavioral disorders such as Attention-Deficit/Hyperactivity Disorder (ADHD), Oppositional Defiant Disorder, anxiety disorders, depressive disorders, and autism spectrum disorders (American Psychological Association [APA] Working Group on Psychoactive Medications for Children & Adolescents, 2006).

Many psychotropic medications have potentially serious side effects in youth. Specifically, the Food and Drug Administration (FDA) issued "black box" warnings on certain classes of medications prescribed to children and adolescents under 18 years of age, warning of serious potential side effects. The black box warning is the strongest warning available from the FDA. Side effects of some psychotropic medications may include suicidal ideation, acute seizures, cognitive/psychomotor impairment, and sudden increases or decreases in blood pressure resulting in acute episodes of hypotension or hypertension which can cause sudden fainting or headaches and blurred vision (APA Working Group, 2006; FDA, 2005).

Of additional concern is the fact that many psychotropic medications prescribed to youth are only approved by the FDA for use with adults; in other words, they are being used off-label or without documented efficacy in pediatric populations (Bush, 2006). The common practice in pediatrics of extrapolating adult doses of medications approved by the FDA to children is fraught with problems (Bush, 2006). For instance, drug absorption, metabolism, and secretion in children and adolescent's bodies can be markedly different than adults (Christensen, Helms, & Chesney, 1999). As a result, close monitoring of the effects (both beneficial and detrimental) of psychotropic medications is needed to ensure children and adolescents' response to medication does not impede academic and/or social-emotional functioning (Christensen et al., 1999).

Effects and Risks of Psychotropic Medications on Behavioral and Social Functioning

The APA Working Group (2006) offers the most up-to-date, comprehensive review of psychotropic medications and effects on childhood disorders. The disorders reviewed include: (a) Attention-Deficit/Hyperactivity Disorder (ADHD); (b) Oppositional Defiant Disorder (ODD); (c) Conduct Disorder; (CD); (d) Tourette and tic disorders; (e) Obsessive–Compulsive Disorder (OCD); (f) anxiety disorders; (h) depressive disorders; (i) bipolar disorder; (j) schizophrenia; and (k) autism spectrum disorder. The effects of some medications can be profound (e.g., permanent involuntary motor tics which resemble Parkinsonian symptoms known as extrapyramidal symptoms) while polypharmacy, the practice of combining different classes of medications to diminish side effects of other medications, can have potentially dangerous health risks as well as unpredictable effects on social and academic functioning (Christensen et al., 1999).

Combining multiple psychotropic medications to counteract side effects is commonplace (Christensen et al., 1999). For example, it is common for children taking stimulant medications to also be prescribed a medication off-label (e.g., Clonidine or Tenex) to counteract insomnia. However, many medications prescribed to counteract effects of stimulant medications can have significant and sudden side effects for which careful monitoring is required. For example, Clonidine, an anti-hypertensive medication commonly prescribed off-label to treat insomnia in children taking stimulants, can produce sudden drops in blood pressure otherwise known as hypotension (Christensen et al., 1999). Alternatively, if this medication is suddenly stopped (e.g., parent or school

personnel forget to administer the medication) a dangerous sudden rise in blood pressure (hypertension) may occur (Kratochvil, Lake, Pliszka, & Walkup, 2005). Many classes of medication have side effects (e.g., headaches, nausea, anxious symptoms, loss of academic skills due to medication side effects, and lethargy) that can negatively impact school functioning (APA Working Group, 2006). Further, different doses of medications can mitigate negative side effects significantly once a proper dosage is found. Lastly, there is a paucity of data related to appropriate dosages as well as long-term safety of medication prescribed to youth (APA Working Group, 2006).

Medication Monitoring in Schools

Public school personnel are playing an ever increasing role in pharmacological treatment of school-aged children. Non-medical school personnel (e.g., secretaries and instructional assistants) are required to dispense psychotropic medications including controlled medications with little or no supervision, particularly in rural areas of the country (DuPaul & Carlson, 2005). As a result, the probability of medication errors such as the inability to determine if a child took the medication, overdosing, and giving the incorrect medication to a student increases (DuPaul et al., 2005). Monitoring the effectiveness as well as negative side effects of medications is needed. The school psychologist has been identified as a professional, positioned in the school setting, who possesses unique training that is well-suited for medication monitoring. Specifically, school psychologists' knowledge and skills in consultation, problem solving, behavioral observations, intervention planning, and progress monitoring position them as ideal professionals within the education system to assist in the collection of data for the

purposes of progress monitoring the effects of medication (Grier & Bradley-Klug, in press; Power, DuPaul, Shapiro, & Kazak, 2003; Stoner, Carey, Ikeda, & Shinn, 1994).

A study conducted by Guerasko-Moore, DuPaul, and Power (2005) examined school psychologists' medication monitoring practices for children and adolescents being treated for symptoms related to ADHD. The researchers examined perceptions, training, practices, and perceived barriers to medication monitoring. Results indicated 54.5% of school psychologists reported engaging in medication monitoring and the majority reported this was an important professional role. Teacher and parent rating forms, interviews, direct observation, and review of work samples were perceived by school psychologists as the most effective, acceptable, and feasible monitoring methods. The majority of school psychologists (58.1%) reported not receiving formal training in medication monitoring. Additionally, receiving formal training (e.g., university-based class) on medication monitoring significantly increased the likelihood a school psychologist reported engaging in medication monitoring. The greatest facilitator of medication monitoring was teacher support. Barriers to medication monitoring were time and accessibility of physicians to collaborate. Although this study provides information regarding the medication practices of school psychologists related to youth with ADHD, additional research is needed to determine whether these findings extend to the monitoring of other medications frequently prescribed to school-age children and adolescents.

Facilitating and maintaining collaborative partnerships between school personnel and primary care providers (e.g., pediatricians) is another important aspect of medication monitoring (Grier & Bradley-Klug, in press). Haile-Mariam, Bradley-Johnson, and

Johnson (2002) found the majority of physicians (81%) were interested in more information from schools related to behavioral observations, academic performance, and intellectual functioning. Additionally, the majority of physicians reported the type of information they often receive (e.g., lengthy psychoeducational reports) is not useful due to time constraints of the physician. Wodrich and Landau (1999) recommend building a working relationship between primary care pediatrics and school psychologists, particularly for children with medical concerns. Developing concise methods of conveying information that respects both parties' time constraints is an important consideration when forging working alliances. School psychologists and pediatricians can develop working alliances for school-age children taking medications that may impact academic as well as social-emotional functioning.

Rationale for the Study

Current research indicates the utilization rates of psychotropic medications prescribed to school-age children is on the rise (Abrams, Flood, & Phelps, 2006; Zito, 2003). Many of the current psychotropic medications being used in pediatric populations have no randomized controlled trials demonstrating their efficacy in this population. As a result, many psychotropic medications are approved for use in adults but are prescribed off-label to children. In many cases, the side-effects and long-term impact on academic and social-emotional functioning in children have not been studied. Some effects are directly linked to academic performance (e.g., memory loss, loss of academic skills or cognitive/psychomotor impairment) which may go unnoticed by other school personnel without training in assessment and progress monitoring. Therefore, examining how

school personnel, specifically school psychologists, can assist in monitoring the effects of medications on youth during school hours is needed.

Purpose of the Study

This study sought to address gaps in the literature related to school psychologists' medication monitoring practices for the most commonly prescribed medications including stimulants, antipsychotics, Alpha 2 agonists, typical and atypical neuroleptics, selective seratonin reuptake inhibitors (SSRIs), tricyclics, and benzodiazepines. Although research has found over half of school psychologists surveyed reported engaging in medication monitoring as part of their practice (Gureasko-Moore, et al., 2005), research to date has not examined the medication monitoring practices of school psychologists beyond medications used to treat symptoms of ADHD. Current utilization rates suggest a significant number of youth in our schools are prescribed a variety of psychotropic medications to treat diverse symptoms of the most common disorders of youth (e.g., anxiety disorders, depressive disorders, ODD, autism spectrum disorders [Abrams, Flood, & Phelps, 2006; Mattison, 1999]).

Research Questions

1. Do school psychologists believe medication monitoring is a role in which they should be engaged?
2. What is the relationship between school psychologists beliefs regarding medication monitoring as part of their role and their likelihood of engaging in medication monitoring in practice?
3. What are the current medication monitoring practices of school psychologists?
    a) What types of data are collected when engaged in medication monitoring?

b) What is the frequency (e.g., daily, weekly, or monthly) that medication monitoring data are collected?

c) What is the frequency (e.g, daily, weekly, or monthly) that medication monitoring data are shared?

d) With whom is medication monitoring information shared (e.g., primary care provider, school nurse, teachers, parents)?

4. What types of training (pre-service vs. in-service) do school psychologists receive in the practice of medication monitoring?
5. What are the perceived barriers and facilitators to medication monitoring?
6. What is the direction and strength of the relationship between geographic location, degree level, training program philosophy, type of school served, types of training reported related to medication monitoring and frequency of medication monitoring by school psychologists?

Significance of the Study

This study built on existing literature that examined medication monitoring practices of school psychologists related to stimulant medications to treat symptoms of ADHD (Gureasko-Moore et al., 2005). Identification of medication monitoring practices currently employed, types of training school psychologists have received related to medication monitoring, and what methods for monitoring medications (e.g., behavioral observation, behavior rating scales, review of academic work) school psychologists feel are the most effective and acceptable in their practice were examined. This information will inform both pre-service and in-service practices related to medication monitoring. Additionally, identification of the facilitators and barriers to monitoring medications (e.g., time, training, and support from teachers) can be used to assist school psychologists

in implementing systems-wide efforts to more effectively engage in medication monitoring.

Chapter Two

Review of Related Literature

Overview

This chapter provides a review of the literature relevant to this study. The present study examined medication monitoring practices of school psychologists for students currently prescribed psychotropic medications. Specifically, a survey was utilized to examine current practice, training (pre-service and in-service), perceived effectiveness of specific procedures, and perceived barriers related to medication monitoring. A literature review was conducted to examine the current state of research on medication monitoring by school psychologists. This review of relevant literature is divided into seven primary areas, including: 1) prevalence rates of children and adolescents prescribed psychotropic medications; 2) risks of psychotropic medication use in children and adolescents; 3) effects of psychotropic medications on academic and social functioning; 4) role of the public school personnel in medication administration; 5) legal and ethical issues, 6) medication monitoring practices in public schools; and 7) role of the school psychologist in medication monitoring.

Prevalence of Children and Adolescents Prescribed Psychotropic Medications

Current research is equivocal regarding the utilization rates of psychotropic medications in youth populations. For the purposes of this literature review utilization rates are defined as the overall percentage of psychotropic medication prescribed for use

in a given population. Zuvekas, Vitiello, and Norquist (2006) examined trends in utilization rates of stimulant medications in children ages 0-18 years in the United States. Specifically, these researchers used the Medical Expenditure Panel Survey (MEPS), a nationally representative sample of U.S. households from the years 1997-2002. The MEPS is a household survey of health care use and costs conducted by the National Center on Health Statistics. The overall response rate for years 1997-2002 was 66.4%. Sample sizes for years 1997-2002 ranged from 7,235 to 11,713 randomly sampled households. Data on prescription drug use were collected directly from households responding to the survey. Results indicated the utilization rates of stimulant medication use among children and adolescents under 19 years of age was 2.7% in 1997 and 2.9% in 2002. The researchers indicate this is not a statistically significant change over the five year period. Use of stimulants was highest among 6-12 year olds at 4.8% in 2002 and lowest among preschool aged children (under 6 years old) at 0.3% in 2002. Additionally, the researchers found current use of stimulant medications was highest in males (4.0% in 2002) compared to 1.7% for females. Use of stimulant medications was also highest for Caucasian children (3.6%), while 2.2% for African American children and 1.4% for Hispanic children. Respondents who did not have insurance had lower stimulant utilization rates (0.9%) than those with publicly funded health insurance (i.e., Medicaid) (3.3%) or private health insurance (3.0%). Notably, the researchers also found variable utilization rates of stimulant medications based on region. Specifically, the Southeast region of the U.S. had utilization rates of 3.4% overall compared to the Western region of the U.S. at 2.2%. Significant increases in utilization rates in the Northeast region of the U.S., from 1.6% in 1997 to 2.7% in 2002 were reported.

Overall, this survey examined utilization rates of stimulant medications in children under 19 years of age across the U.S. The results indicated relatively stable utilization rates with some regional differences (i.e, greater prevalence in the Southeast). However, this study has limitations. Specifically, the study relied on participants' self-report to accurately recall information. It is possible that self-report bias could result in under or over-reporting of stimulant utilization.

Other researchers have examined utilization rates for a variety of psychotropic medications. Zito et al. (2003) conducted a study examining changes in the utilization rates of psychotropic medications for children and adolescents over a 10-year period. Specifically, these researchers used a population-based analysis of 900,000 children and adolescents enrolled in two U.S. healthcare systems. Medicaid data from two states and dispensing records from a large private health maintenance organization (HMO) were utilized. The results found at least six percent of children and adolescents being served by Medicaid and HMO insurance organizations had been prescribed a psychotropic medication across all geographic areas of the U.S. Zito et al. (2003) reported a three-fold increase in utilization rates of psychotropic medications in children and adolescents over the 10-year period of the study. Significant increases were found among specific drug classes as well. The largest increase in utilization rates across both HMO and Medicaid populations was dextroamphetamine (Adderall). This medication is typically used for the treatment of Attention-Deficity/Hyperactivity Disorder (ADHD), which accounted for a 7-fold increase among Medicaid populations and a 14-fold increase among the HMO population. The second largest increase in utilization rates was for antidepressant

medications. A 10-fold increase was observed across Medicaid populations while a 5-fold increase was observed across the HMO population.

Zito and colleagues (2003) hypothesized the dramatic increase in antidepressant use among children and adolescents were due to the overall increase in use of selective serotonin reuptake inhibitors (SSRIs) among adult populations. As prescriptions for SSRIs increased in adult populations, physicians began prescribing these medications at increasing rates to children and adolescents as well. Some classes of psychotropic medications were used with significantly greater prevalence among Medicaid populations than the HMO population. Neuroleptics, anticonvulsents used as mood stabilizers, and lithium were utilized at a much greater rate among the Medicaid populations. These medications are typically used to treat psychotic symptoms and to control violent externalizing behaviors (Weller, Rowan, Elia, & Weller, 1999). Specifically, as a group, these psychotropic medications were utilized at a rate in the Medicaid populations twice as frequently as in the HMO population. Age specific patterns across both the Medicaid populations and the HMO population were also investigated. The greatest changes for Medicaid populations with respect to psychotropic medication utilization occurred in the 10 to 14 year old group in 1997. Specifically, this group had the greatest overall utilization rate among all children and adolescents under 19 years of age. The researchers hypothesized this may be in part due to the longer duration of this population receiving stimulant medications and then receiving other psychotropic medications to treat other symptoms (e.g., violent externalizing behaviors). The 5-9 year old group was the previous Medicaid population with the highest utilization rate in 1987. With respect to the HMO group, in 1997, 15-19 year olds had the highest utilization rate of

psychotropic medications, replacing the 10-14 year old group which had the highest utilization rate in 1987 (Zito et al., 2003).

With respect to gender, Zito and colleagues (2003) found males were prescribed psychotropic medications at a rate twice that of females across the 10-year time period. Additionally, they found the male to female utilization rates were greater in the Medicaid populations than the HMO population. Boys were being prescribed antidepressants at a significantly greater rate than the previous decade and utilization rates for stimulant medications continued to be greater for boys than girls, although the disparity decreased over the ten-year period. Dopamine agonists (mainly Clonidine) rose from near non-use in the previous decade to marked increases across the time span of the study. Increased utilization rates of neuroleptics and lithium were noted.

With respect to race, data were only available for individuals in the Medicaid populations. Within this sample, there was no change in Caucasian and African American utilization ratios over the 10-year period. Specifically, the disparity between the two groups remained stable, particularly with respect to the use of antidepressants being utilized by the Caucasian sample at a far greater extent. Overall disparities in prescription of psychotropic medications related to race and other characteristics were consistent with data from the National Ambulatory Medical Care Study (NAMCS) which will be described below in detail (Goodwin, Gould, Blanco, & Olfson, 2001).

Goodwin et al. (2001) examined data from a nationally representative study (NAMCS) of 166,256 office visits to physicians (i.e., pediatricians, psychiatrists, child and adolescent psychiatrists, and general practitioners) for children and adolescents 19 years old and under. The researchers examined utilization rates of psychotropic

medications. The results indicated psychotropic medications were prescribed to children and adolescents 19 years of age and younger 2.2% of the total office visits. For office visits in which a psychotropic medication was prescribed, stimulant medications were the most frequent (54%) while antidepressants were second most frequently prescribed followed by (30%); anxiolytics (7.2%); antipsychotics (including anticonvulsants; 7.2%); and mood stabilizers (12.7%). The significant majority of psychotropic medications were prescribed by general practitioners (e.g., family physicians) and pediatricians (85.4%) compared with specialists (e.g., child and adolescent psychiatrists).

Consistent with Zito et al. (2003), male children and adolescents were more likely to be prescribed a psychotropic medication, particularly stimulants. With respect to race, Caucasian children and adolescents were prescribed a psychotropic medication at a greater rate than children and adolescents of other races with the exception of stimulants.

Additionally, significant differences were noted among payment source (i.e., HMO vs. Medicaid). Specifically, if a child or adolescent used Medicaid as their insurance, they were more likely to be prescribed certain classes of psychotropic medications such as antipsychotics, anxiolytics, and mood stabilizers. Several hypotheses for this phenomenon were presented. Specifically, children and adolescents who utilize Medicaid are likely to be from low socioeconomic status (SES) households. Research has linked low SES with an increased risk for mental illness (Buck, 1997).

Frazier and colleagues (2011) examined the prevalence and correlates of psychotropic medication use in adolescents with a diagnosis of autism spectrum disorder (ASD) who also were diagnosed with Attention Deficit/Hyperactivity Disorder (ADHD) as well as youth only diagnosed with ADHD or ASD. Data from the National

Longitudinal Transition Study, a 10 year prospective study with data collected from 2000 to 2009, were examined. The study included a nationally representative sample (*n* = 11,000) of adolescents ages 13-17 who received special education services. Youth who were diagnosed with both ASD and co-occurring ADHD had the highest (58%) rates of psychotropic medication use while youth with only ADHD had a 49% usage rate. Youth with only an ASD diagnosis had the lowest usage rate in the study of 34%. Strengths of this study include the large nationally representative sample and the fact that data are relatively current. Weaknesses in this study include the reliance on parent self-report data and the restricted age range of participants. As such, this study does not offer data relevant to children below the age of 13 years.

More recently, Pringle and colleagues (2012) examined data from the Survey of Pathways to Diagnosis and Services which is a nationally representative survey of school-aged children with special health care needs aged 6-17 who have been diagnosed with autism spectrum disorder, intellectual disability, or a developmental delay. The researchers re-contacted, via telephone, parents of children who participated in the original Survey of Pathways to Diagnosis and Services study in 2009 which examined factors related to how families access care, received a diagnosis, and the frequency and types of treatments and interventions accessed for their children. Eighty-seven percent of the participants in the original study agreed to participate in the follow-up phone interview. Pringle et al. (2012) found over one-half of all school-aged children diagnosed with autism spectrum disorders (ASD) are prescribed at least one psychotropic medication and almost one-third of school aged children with ASD use stimulant

medications. Additionally, one-quarter of children with ASD take anti-anxiety or mood stabilizing medications and one-fifth are prescribed antidepressant medications.

The strengths of this study included how recently it was conducted, the large nationally representative sample size from which the results were drawn and the relatively high (87%) rate of families who agreed to be re-interviewed about what medications their children are currently taking. Additionally, the study employed an age range (6 to 17 years) of child participants that closely matches the school age population.

Other researchers have found large numbers of children receiving special education services for emotional and behavior disorders are being prescribed psychotropic medications. Mattison (1999) conducted a study in which three year usage of psychotropic medications among elementary school students in the Midwestern U.S. who were receiving special education services under the category of serious emotional disturbance was investigated. A total of 89 students ages 7-18 years participated in this study. Using parent report data, 39% of the total sample of 89 students were reported to be taking a psychotropic medication at the beginning of the three-year data collection. Specifically, 26% were being prescribed stimulant medication while the remaining students were being administered antipsychotics, antidepressants, and the antihypertensive medication Clonidine as an off-label medication. Additionally, the researchers found 17% of students were being administered multiple medications. A portion of the students in this study were administered various medications at different points throughout the study. Specifically, 24% received a psychotropic medication consistently across the entire three-year span of the study. This study is the only one of its kind at the time of writing to specifically examine the prevalence of psychotropic

medication usage in students receiving special education services under the diagnostic label of serious emotional disturbance.

Overall, the studies presented relating to psychotropic utilization rates indicate school-age children are prescribed psychotropic medications at a rate that has risen dramatically over the past decade. While Zuvekas et al. (2006) found stimulant medications remained relatively stable, other researchers examining a broader scope of psychotropic medication utilization rates in children found significant increases in other classes of psychotropics (e.g., antidepressants, neuroleptics, and lithium). Further, children with co-morbid diagnoses were found to have the highest utilization rates (Frazier et al., 2011). Children in emotional and behavior disorder special education classes utilize psychotropic medications at significantly greater rates than the overall U.S. population when comparing utilization rates across studies.

The aforementioned studies are limited by the lapse in time between data collection and publication. Additionally, the study by Mattison (1999) used a small sample size which limits generalization of the results to the entire U.S. population. This was not a limitation in the other studies reviewed as the researchers utilized larger and more representative samples. Overall, the studies yield important information on the current utilization rates across the U.S. with respect to psychotropic medication use in children and adolescents.

Risks of Psychotropic Medication Use in Children and Adolescents

With the reported increase in use of psychotropic medications, there is a related concern as to the short-and long-term side effects of these medications on children and adolescents. The amount of evidence on the short-and long-term effects of medications

to treat various childhood disorders has been lacking. This had lead to the FDA issuing "black box" warnings on certain classes of medications used in children and adolescents under 18 years of age warning of serious potential side effects (e.g., suicidal ideation; Food and Drug Administration, 2005).

Bush (2006) articulates the real and potential risks of widespread off-label prescribing of psychotropic medications to children. Off-label prescribing refers to the use of medications outside of the Food and Drug Administration guidelines for use. Specifically, a medication may be approved for use for a certain condition but is prescribed off-label to treat another condition based upon a clinician's judgment. For example, Clonidine is an anti-hypertensive agent originally approved to treat high blood pressure but is frequently prescribed to treat symptoms of ADHD in children. Bush (2006) discusses the paucity of clinical trials involving children and the widespread off-label prescribing of medications which have never been studied in children. Bush gives several plausible hypotheses for the lack of clinical trials involving children. Specifically, as pharmaceutical companies are for-profit businesses, clinical trials which may not lead to significant future profits may be de-emphasized while other clinical trials may be given priority (e.g., adult clinical trials). Children are typically prescribed medications for shorter durations than adults leading to less of the medication being needed and therefore, less profit.

Christensen, Helms, and Chesney (1999) discuss the concerns related to extrapolating childrens' doses of medications from recommended adult doses. These authors present the problems with this practice as children and adolescents' bodies are different than adults and therefore may metabolize the medication in a different manner.

Drug absorption, metabolism, and secretion are different in childrens' maturing bodies than in an adult. However, pediatricians and other specialists are left with using professional judgment when prescribing an approved drug for unapproved purposes (off-label use). Therefore, as children and adolescents are being prescribed psychotropic medications for which no specific clinical trials demonstrating their efficacy for this age group occurs widely, close monitoring of medication response is vital. Given the widespread use of psychotropic medications in children and the paucity of clinical trials with this population along with the significant differences in children and adolescents' biological development, close monitoring of medication benefits and side effects is needed. Additionally, considering researchers have found many of the reasons children are prescribed a psychotropic medication is to treat a symptom of a disorder that manifests itself in the school environment, monitoring in this setting is crucial (Connor & Barkley, 2006; Mattison, 1999). The next section of this literature review will document the most prevalent childhood mental and behavioral disorders, the most commonly prescribed medications, and the potential side-effects of pharmacological treatments on academic and social functioning.

Effects of Psychotropic Medications on Academic, Behavioral, and Social Functioning

The most up-to-date comprehensive review of psychotropic medications and effects on academic and social functioning was completed by the American Psychological Association (APA) Working Group on Psychoactive Medications for Children and Adolescents (2006). This report includes examinations of risk-benefit ratios of pharmacological treatments for the most common childhood disorders treated with

psychotropic medications. The APA Working Group report comprehensively reviewed extant literature in selected peer-reviewed journals as well as Food and Drug Administration (FDA) safety and efficacy data. Additionally, psychosocial, psychotropic, and combined treatments (i.e., psychosocial and psychotropic treatments) were reviewed for evidence of efficacy. The disorders relevant to this study due to their prevalence in child and adolescent populations reviewed by the Working Group include: (a) Attention-Deficit/Hyperactivity Disorder (ADHD); (b) Oppositional Defiant Disorder (ODD); (c) Conduct Disorder; (CD); (d) Tourette and tic disorders; (e) Obsessive–Compulsive Disorder (OCD); (f) anxiety disorders; (h) depressive disorders; (i) bipolar disorder; (j) schizophrenia; and (k) autism spectrum disorder. The information gleaned from the APA Working Group's review of each aforementioned disorder will focus on the effects on academic and social functioning for the purposes of this literature review. Table 1. examines in detail both the beneficial and deleterious effects of psychotropic medications on academic and social functioning. The purpose of providing this information is to inform the reader of the prevalence of each aforementioned disorder, the types of psychotropic medications commonly used to treat each disorder and the side effects each medication may have in children and adolescents.

Table 1

Psychotropic Medications by Disorder: Evidence of Efficacy and Side Effects

Disorder/ Prevalence Rates	**Most Common Psychotropic Medications Utilized to Treat Disorder:**	**Evidence of Efficacy in Children and Adolescents**	**Common Side Effects**
Attention-Deficit/ Hyperactivity Disorder (ADHD) Prevalence Rates in Children: 5%	**Stimulants:** Methlyphenidate, a central nervous system stimulant **Nonstimulants:** Straterra Amoxetine (norepinephrine reuptake inhibitor) Clonidine (antihypertensive)	**Stimulant medications:** Well documented (e.g., MTA Cooperative Group, 1999) **Nonstimulants:** Less evidence of efficacy **Polypharmacological Treatments:** Little empirical evidence of efficacy, regularly used to counteract side-effects (e.g., insomnia from stimulants) and treat co-morbid disorders (e.g., oppositional defiant disorder)	**Stimulant Medication Side Effects:** Decreased appetite, nausea, chronic headaches sleep difficulties, growth problems (Connor & Barkley, 2006) anxious behaviors, **Nonstimulant Side Effects:** Chronic stomachaches, appetite suppression, Food and Drug Administration (FDA) "black box" warning of suicidal ideation in children under 18 years of age (U.S. FDA, 2005) Risk of liver toxicity for amoxetine **Positive Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Increased attention to task with appropriate doses ▪ Decreased impulsivity behaviors **Negative Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Reduced academic engagement due to medication side effects (e.g., headaches, nausea, anxious symptoms) ▪ Behavioral variability related to short half-life of medication ▪ Lethargy in the school setting associated with insomnia from stimulant medications

Oppositional Defiant Disorder (ODD) **Conduct Disorder (CD)** ODD Rates in Children: 2-16% CD Prevalence Rates in Children: 1-10%	**Stimulants:** Methylphenidate **Nonstimulants:** Atomoxetine Clonidine **Antipsychotic medications:** Halperidol, Risperidone Lithium	**Stimulant medications:** Well documented **Nonstimulants:** Less evidence of efficacy **Antipsychotic medications:** Off-label use only	**Stimulant Medication Side Effects:** Decreased appetite, sleep difficulties, growth problems (Connor & Barkley, 2006) anxious behaviors **Nonstimulant Side Effects:** Chronic stomachaches, appetite suppression, Food and Drug Administration (FDA) "black box" warning of suicidal ideation in children under 18 years of age (U.S. FDA, 2005), drowsiness decreasing focus and attention leading to reduced academic performance) **Antipsychotic Medication Side Effects:** Extrapyrimidal symptoms (permanent) Headaches, drowsiness, nausea Memory loss, decreased cognitive functioning Motor tremors **Positive Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Decreased externalizing symptoms ▪ Possibly may increase efficacy of behavioral interventions **Negative Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Reduced academic engagement due to medication side effects (e.g., headaches, nausea, anxious symptoms) ▪ Behavioral variability related to short half-life of medication ▪ Lethargy in the school setting associated with insomnia from stimulant medications ▪ Memory loss as a side effect of lithium, cognition difficulties ▪ Decreased fine motor skills (resulting from motor tremors)

Tic Disorders (Including Tourettes Syndrome) Prevalence Rates in Children and Adolescents: 2%	**<u>Alpha 2 agonists</u>** Clonidine Guanfacine **<u>Typical Neuroleptics/Antipsychotics</u>** Halperidol Pimozide **<u>Atypical Neuroleptics</u>** Risperidone Ziprazidone Atmoxetine	Randomized clinical trial data available, however extremely small sample sizes were employed Long-term effects unknown on all classes of medication in children and adolescents	**<u>Alpha 2 agonists</u>** Sedation, dry mouth, headaches, irritability, dysphoria, postural hypotension, Guanfacine is associated with less risk of sedation **<u>Typical Neuroleptics</u>** Sedation, cognitive dulling, akathisia, extrapyrimidal symptoms (EPS), risk of tardive dyskinesia, dysphoria **<u>Atypical Neuroleptics</u>** Sedation, weight gain, EPS, galactorrhea, dysphoria, increased risk of hepatoxicity, diabetes mellitus **Positive Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Decreased externalizing symptoms ▪ Increases social/emotional functioning by decreasing symptoms ▪ Possibly may increase efficacy of psychosocial interventions **Negative Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Loss of academic skills due to medication side effects (e.g., cognitive dulling) ▪ Reduced academic engagement due to medication side effects (e.g., sedation, headaches, dysphoria, cognitive dulling, lethargy) ▪ Decreased fine motor skills (resulting from motor tremors) ▪ Increased risk of suicidal ideation resulting in decreased school functioning (both academic engagement and social functioning) associated with atmoxetine

Obsessive Compulsive Disorder (OCD) Prevalence Rates in Children and Adolescents: 0.5-2.0%	**<u>Selective Seratonin Reuptake Inhibitors (SSRIs)</u>** Prozac Paxil Zoloft Celexa **<u>Clomipramine</u>**	Some evidence of efficacy, small sample sizes Long-term effects unknown	**<u>SSRIs</u>** Nausea, disinhibition, loss of appetite or weight gain, sedation, tremors, potential suicidal ideation (FDA warning) ***Must be closely monitored to ensure child or adolescent is regularly taking medication, otherwise serious withdrawal symptoms can occur** **<u>Clomipramine</u>** Potential cardiotoxicity in children and adolescents (used very infrequently), sedation, fainting, seizures, tremors, weight gain **Positive Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Decreased symptoms of disorder ▪ Increases social/emotional functioning by decreasing symptoms ▪ Possibly may increase efficacy of psychosocial interventions **Negative Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Reduced academic engagement due to medication side effects (e.g., headaches, nausea, sedation) ▪ Disinhibition associated with impulsive behaviors ▪ Psychosocial difficulties associated with weight gain among peers ▪ Increased risk of suicidal ideation resulting in decreased school functioning (both academic engagement and social functioning)

Disorder/ Prevalence Rates	**Most Common Psychotropic Medications Utilized to Treat Disorder:**	**Evidence of Efficacy in Children and Adolescents**	**Common Side Effects**
Anxiety Disorders (Generalized anxiety disorders, social anxiety disorders, separation anxiety disorders) Prevalence Rates in Children and Adolescents: 12-20%	**<u>Selective Seratonin Reuptake Inhibitors (SSRIs)</u>** Prozac Paxil Zoloft Celexa **<u>Benzodiazapines</u>** Found to be ineffective for children, rarely used in adolescents due to habit-forming dangers	Some evidence of efficacy, small sample sizes Long-term effects unknown	**<u>SSRIs</u>** Nausea, disinhibition, loss of appetite or weight gain, sedation, tremors, potential suicidal ideation (FDA warning) ***Must be closely monitored to ensure child or adolescent is regularly taking medication, otherwise serious withdrawal symptoms can occur** **Positive Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Decrease of negative symptoms of disorder ▪ Increase social interaction ▪ Possibly increase effects of psychosocial interventions **Negative Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Reduced academic engagement due to medication side effects (e.g., headaches, nausea, sedation) ▪ Disinhibition associated with impulsive behaviors ▪ Psychosocial difficulties associated with weight gain among peers ▪ Increased risk of suicidal ideation resulting in decreased school functioning (both academic engagement and social functioning)

Depressive Disorders Prevalence Rates in Children and Adolescents: Up to 20% at some point during childhood through adolescence	**<u>Selective Seratonin Reuptake Inhibitors (SSRIs)</u>** Prozac Paxil Zoloft Celexa **<u>Tricyclics</u>**	Some evidence of efficacy, small sample sizes, more efficacy in adolescent populations Long-term effects unknown No efficacy data in school-age populations	**<u>SSRIs</u>** Nausea, disinhibition, loss of appetite or weight gain, sedation, tremors, potential suicidal ideation (FDA warning) ***Must be closely monitored to ensure child or adolescent is regularly taking medication, otherwise serious withdrawal symptoms can occur** **<u>Tricyclics</u>** Nausea, cognitive retention difficulties, enuresis (daytime and night) blurred vision **Positive Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Decrease of negative symptoms of disorder ▪ Increase social interaction ▪ Possibly increase effects of psychosocial interventions **Negative Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Reduced academic engagement due to medication side effects (e.g., headaches, nausea, sedation) ▪ Disinhibition associated with impulsive behaviors ▪ Psychosocial difficulties associated with weight gain among peers ▪ Increased risk of suicidal ideation resulting in decreased school functioning (both academic engagement and social functioning)
Bipolar Disorder Prevalence Rates in Children and Adolescents: 1%	**<u>Lithium</u>** **<u>Valporate</u>** **<u>Risperidone</u>**	Paucity or randomized controlled trials, National Institutes of Mental Health is sponsoring medium-size study comparing efficacy of lithium, valporate, and risperidone in children	**<u>Lithium</u>** Difficulty with memory (e.g., word retrieval) working memory deficits, cognitive dulling, weight gain, increased risk for Type II diabetes, lipid level elevation, transaminase elevation

		ages 8-14 with bipolar disorder Long-term effects unknown	**<u>Valporate</u>** Change in appetite; constipation; diarrhea; dizziness; drowsiness; hair loss; headache; indigestion; nausea; stomach pain; trouble sleeping; vomiting; weight changes **<u>Risperidone</u>** Extrapyramidal effects (sudden, often jerky, involuntary motions of the head, neck, arms, body, or eyes), dizziness, hyperactivity, tiredness, abdominal pain, fatigue, fever and nausea. Orthostatic hypotension during the early phase of treatment (drop in their blood pressure when rising from a lying position and may become dizzy or even lose consciousness) **Positive Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Decrease or elimination of negative symptoms of disorder ▪ Increase social interaction **Negative Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Reduced academic engagement due to medication side effects (e.g., headaches, nausea, sedation) ▪ Disinhibition associated with impulsive behaviors ▪ Psychosocial difficulties associated with weight gain among peers ▪ Increased risk of suicidal ideation resulting in decreased school functioning (both academic engagement and social functioning) ▪ Memory loss as a side effect of lithium, cognition difficulties

Childhood-Onset Schizophrenia Prevalence Rates in Children and Adolescents: 0.5% (1% onset before age nine, 9% before age 15)	**<u>Typical Neuroleptics/Antipsychotics</u>** Halperidol Pimozide Risperidone Olanzapine	Paucity of data in pediatric populations Long-term effects unknown	**<u>Typical Neuroleptics</u>** Extrapyramidal effects (sudden, often jerky, involuntary motions of the head, neck, arms, body, or eyes), dizziness, hyperactivity, tiredness, abdominal pain, fatigue, fever and nausea. Orthostatic hypotension during the early phase of treatment (drop in their blood pressure when rising from a lying position and may become dizzy or even lose consciousness) Type II diabetes, difficulty with word retrieval, working memory deficits, cognitive dulling **Positive Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Decrease or elimination of negative symptoms of disorder ▪ Increase social interaction **Negative Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Reduced academic engagement due to medication side effects (e.g., headaches, nausea, sedation) ▪ Disinhibition associated with impulsive behaviors ▪ Psychosocial difficulties associated with weight gain among peers ▪ Increased risk of suicidal ideation resulting in decreased school functioning (both academic engagement and social functioning) ▪ Memory loss as a side effect of lithium, cognition difficulties ▪ Effects of orthostatic hypotension (may cause dizziness, loss of consciousness) in early phases of treatment

Disorder/ Prevalence Rates	**Most Common Psychotropic Medications Utilized to Treat Disorder:**	**Evidence of Efficacy in Children and Adolescents**	**Common Side Effects**
Autism Spectrum Disorder (ASD) Prevalence Rates in Children and Adolescents: 1 in 150 children and adolescents	**33-47% of children with ASD are prescribed a psychotropic medication*** **SSRIs** Prozac Paxil Zoloft Celexa **Alpha 2 agonists** Clonidine Guanfacine **Atypical Neuroleptics** Risperidone Ziprazidone Amoxetine **Stimulants:** Methlyphenidate, a central nervous system stimulant **Less Common:** Lithium Divalproex Sodium	**Limited randomized controlled trials utilizing small sample sizes**	**SSRIs** Nausea, disinhibition, loss of appetite or weight gain, sedation, tremors, potential suicidal ideation (FDA warning) ***Must be closely monitored to ensure child or adolescent is regularly taking medication, otherwise serious withdrawal symptoms can occur** **Alpha 2 agonists** Sedation, dry mouth, headaches, irritability, dysphoria, postural hypotension, Guanfacine is associated with less risk of sedation **Atypical Neuroleptics** Sedation, weight gain, EPS, galactorrhea, dysphoria, increased risk of hepatoxicity, diabetes mellitus **Stimulant Medication Side Effects:** Decreased appetite, chronic headaches sleep difficulties, growth problems (Connor & Barkley, 2006) anxious behaviors **Lithium** Difficulty with memory (e.g., word retrieval) working memory deficits, cognitive dulling, weight gain, increased risk for Type II diabetes, lipid level elevation, transaminase elevation **Positive Effects on School Performance (Academic and Psychosocial Functioning):**

			▪ Decreased externalizing symptoms ▪ Increases social/emotional functioning by decreasing symptoms ▪ Possibly may increase efficacy of psychosocial interventions **Negative Effects on School Performance (Academic and Psychosocial Functioning):** ▪ Reduced academic engagement due to medication side effects (e.g., headaches, nausea, sedation) ▪ Disinhibition associated with impulsive behaviors ▪ Psychosocial difficulties associated with weight gain among peers ▪ Lethargy in the school setting associated with insomnia from stimulant medications ▪ Increased risk of suicidal ideation resulting in decreased school functioning (both academic engagement and social functioning) ▪ Memory loss as a side effect of lithium, cognition difficulties ▪ Effects of orthostatic hypotension (may cause dizziness, loss of consciousness) in early phases of treatment

Adapted from: APA Working Group on Psychoactive Medications for Children and Adolescents, (2006)
*(Aman, Lam, & Collier-Crespin, 2003; Aman, Lam, & Van Bourgondien, 2005; Witwer & Lecavalier, 2006).

Taken together, the prevalence rates and variety of medications prescribed to school-aged children has increased substantially over the past decade. While the use of psychotropic medications in school-aged populations has resulted in positive treatment gains for many, there is a paucity of evidence on the effects, particularly long-term effects of such pharmacological treatments on children. Randomized studies are currently being conducted to evaluate short and long-term effects of pharmacological treatment. However, many children and adolescents have already or currently are prescribed medications for which there is little to no scientific evidence of their effects. The effects on school performance are even less studied, even as public school personnel are asked to play a larger role in the treatment of children with mental health and behavioral disorders.

Legal and Ethical Issues in Medication Utilization in Public Schools

Researchers report that public school personnel are playing an ever increasing role in pharmacological treatment of school-aged children. Specifically, school personnel are increasingly being asked to dispense medications including controlled medications to students during the school day. DuPaul and Carlson (2005) discuss the emerging trend of non-medical school personnel (e.g., secretaries and instructional assistants) being asked to dispense psychotropic medications including controlled medications with little or no supervision. School nursing services are limited in many school systems, particularly in rural areas. As a result, other non-medical school personnel are asked to perform these functions which increases the probability of medication administration errors (e.g., lack of follow-up to ensure child took his or her medication, overdosing, giving stimulants away to other students; DuPaul et al., 2005).

The involvement of school personnel in the utilization and administration of psychotropic medications is controversial. For example, school personnel are frequently the first to recommend treatment including pharmacological agents to treat the symptoms of ADHD even before a formal medical diagnosis (dosReis, 2003). While school personnel can play a pivotal role in monitoring treatment efficacy as well as side effects (DuPaul & Carlson, 2005), both at the federal and state level, legislation has been enacted to limit the role of school personnel involvement in the recommendation or requirement that a child take a psychotropic medication as a condition of participation in any school activity (academic, athletic, or social). Specifically, the reauthorization of IDEA (2004) includes provisions for each state to develop policies and practices prohibiting public school personnel from recommending parents seek prescriptions for controlled substances such as stimulants as a condition for their children to attend school. Additionally, the Child Medication Safety Act requires states receiving federal education funds to develop specific policies and procedures related to prohibiting school districts from requiring a child take a psychotropic medication as a condition of attending school.

As a result, 23 states have enacted legislation prohibiting school employees from recommending psychotropic medication to parents to treat any disorder. This includes the State of Florida (National Conference of State Legislatures, 2004). In the State of Florida Senate Bill 1090, signed into law in 2005, prohibits school personnel (including school psychologists) from coercing parents to have their child prescribed a psychotropic medication. In addition, the Bill creates safeguards giving parents the right to refuse a request by school personnel to conduct a psychological evaluation on their child. The bill also clarifies school personnel's ability to share information related to emotional and

behavioral functioning with parents to allow for information sharing but specifically excludes any coercive practices related to pressuring parents to obtain psychotropic medications for their child as a condition of attending school (National Conference of State Legislatures, 2004).

While this is obviously a well-intentioned mandate, it also can have negative collateral consequences. For instance, some of the most efficacious treatments for certain disorders (e.g., ADHD) include the use of stimulant medications which fall into the category of psychotropic medications. A school psychologist who is well-grounded in advocating evidence-based treatments may feel prohibited from recommending that parents speak to their physician about an evidence-based treatment for their child out of fear of liability.

As previously discussed, this can have negative consequences for certain school employees who are typically charged with evaluating and making recommendations that are based on scientific research (e.g., school psychologists). Given this legislation and constraints on school employees (including school psychologists), the next section will examine the extant research on medication monitoring practices in public schools.

Medication Monitoring Practices in Public Schools

Guerasko-Moore, DuPaul, and Power (2005) conducted a survey that examined medication monitoring practices of school psychologists related to the treatment of ADHD. The survey assessed four areas related to medication monitoring by school psychologists specific to children with ADHD. The areas assessed included (a) the self reported use of procedures for monitoring the effects of medications on the symptoms of ADHD; (b) training related to medication monitoring; (c) perceptions of effectiveness,

acceptance, and feasibility of medication monitoring practices; and (d) perceptions of barriers and facilitators related to medication monitoring by school psychologists. The researchers obtained a survey return rate of 64.7% with a total of 437 surveys included in analyses. The demographic data obtained through this survey were aligned with NASP membership demographics for the year of the study with respect to age, gender, and ethnicity.

Guerasko-Moore et al. (2005) found that 54.5% of survey participants reported they engaged in medication monitoring as part of their work as a school psychologist. Additionally, survey participants who engaged in medication monitoring reported monitoring an average of 1-5 students diagnosed with ADHD per year. Survey participants also indicated a relatively strong agreement (3.84 out of 5 on a Likert scale) with the statement "monitoring the effects of medication for students with ADHD is a role school psychologists should play." These findings indicate that while medication monitoring is a role that may not be officially required in many school psychologists' job duties, it is one many reported perceiving as important and necessary. With respect to actual practices, the majority of school psychologists who reported engaging in medication monitoring for students with ADHD used teacher rating forms, direct behavioral observations, and teacher interviews.

Perceptions of effectiveness, acceptance, and feasibility of medication monitoring practices in addition to actual practices were also assessed. Guerasko-Moore et al. (2005) found direct observation, teacher rating forms, and teacher interview were rated as the most effective, feasible, and had the highest acceptance for monitoring medications of students with ADHD. Less effective, feasible, and acceptable practices were parent

rating forms, parent interview, student interviews, student grades, student self-report rating, and curriculum based measurement and assessment practices (CBM/CBA). Previous research has found one of the lowest rated methods in the current study, CBM/CBA, has significant efficacy when utilized properly (Stoner, Carey, Ikeda, & Shinn, 1994).

Training in medication monitoring was also assessed in this study. In line with other studies (i.e., Carlson & Demaray, 2001) Gureasko-Moore et al. (2005) found fewer individuals indicated they received formal training in medication monitoring (42% of study participants) than those who indicated they did not receive formal training (58%). The most common methods for training were graduate coursework (14.3%) and professional workshops (18.1%). Examining the differences between the amount of time spent engaged in medication monitoring activities and trained versus untrained school psychologists, those with training in medication monitoring reported significantly more time engaging in this practice for students with ADHD.

Perceptions of barriers and facilitators related to medication monitoring by school psychologists were rated on a Likert scale ranging from one (significant barrier) to five (significant facilitator) in engaging in medication monitoring. The researchers found time was the most significant barrier with accessibility and perceptions of school psychologists' role in medication monitoring by physicians being less significant barriers. In terms of facilitators, the highest rating was teacher support while administrative support and amount of training were perceived to be the weakest facilitators related to medication monitoring.

The results of this study indicate the majority of school psychologists believe medication monitoring is an appropriate professional role. Over half of all respondents indicated they are currently involved in medication monitoring for students with ADHD to some degree. The representative sample from which this study was drawn, as well as the relatively high return rate, enhances the generalizability of the results of this study to school psychologists who are members of the National Association of School Psychologists (NASP).

This study has several limitations. Specifically, this study employed self-report data that are not cross referenced. The results of this study cannot take into account the misreading of a question or misrepresentation of answers as the survey was anonymous. Also, this study utilized only the NASP database. While the NASP database allows for random selection of a representative sample of NASP members, it does not encompass all school psychologists currently working in the U.S. Additionally, the researchers noted that not all NASP members update their demographic information to indicate if they work in a school or another setting and may have filled out the survey regardless. This study also found some level of discrepancy between overall NASP demographics and study demographics related to training and years of experience. Lastly, this study examined medication monitoring limited to students taking medication for ADHD. As this literature review delineates, a multitude of medications are being taken by children with ADHD and a number of other disorders.

Collaboration between School Personnel and Medical Providers

Extant research on collaboration between pediatricians and school personnel indicates overall, pediatricians would like more information regarding medication effects from school personnel. Haile-Mariam , Bradley, and Johnson (2002) conducted a survey of pediatricians assessing the type and format of information needed from schools to assist in the treatment of ADHD. The researchers obtained a 66% return rate totaling 332 returned surveys. Forty five percent of the respondents worked in a group medical practice and 59% were in practice over 15 years. Information related to medication monitoring gleaned from this study indicates pediatricians want more information from school personnel. Specifically, regarding information related to medication monitoring and treatment effects, 81% of pediatricians indicated they wanted information from school personnel such as direct observation of student behavior. Additionally, 45% of surveyed pediatricians indicated they would like information on medication side effects. Only 9% of pediatricians reported school personnel providing this information.

Collaboration between school personnel and medical providers is the first step in effective medication monitoring (Wodrich et al., 1999). Collaboration between medical providers and school personnel enhances the level and continuity of care for children. Researchers have identified the school psychologist as a professional uniquely suited for collaboration with medical providers such as physicians to enhance the outcomes for children prescribed psychotropic medications (Power et al., 1995; Power, DuPaul, Shapiro & Parrish, 1998; Wodrich et al., 1999). The next section of this literature review will discuss the unique skills of the school psychologist and how they relate to medication monitoring.

Role of the School Psychologist

Several researchers have advocated for school psychologists' involvement in the ever increasing numbers of children being prescribed psychotropic medications who are also attending school. Specifically, DuPaul and Carlson (2005) advocated for increased school psychologist involvement in helping physicians and families make more effective decisions regarding the dosage, clinical effects, and side effects of various psychotropic medications. School psychologists' are in a unique and well-suited position to assist in medication monitoring considering the following skills many school psychologists possesses: (a) training in data-based decision making; (b) training in systematic problem-solving examining all factors from an ecological perspective such as the environment, specifically the child, the curriculum, and family influences; (c) ability to progress monitor using methods sensitive to small changes in performance; and (d) the ability to observe children and adolescents in the school environment which typically is significantly different from office-based settings or other community settings (DuPaul & Carlson, 2005). The aforementioned skills school psychologists' possess enable them to engage in medication monitoring as well as collaboration with the prescribing physician and the school nurse who may have responsibility to oversee administration of medications. Collaboration between the school nurse and school psychologist can harness both professional's knowledge and skills. The school nurse is trained in administration of medication, common side effects, and adverse reactions while the school psychologist brings knowledge of assessment of behavior (the variable medication is most often used to affect) as well as collaboration skills to bring together multiple professionals from different disciplines.

School psychologists possess numerous strengths related to medication monitoring. Specifically, school psychologists are in a unique position to evaluate the medication effects within the natural environment (i.e., school environment). School psychologists have specific training utilizing broad and narrow band rating scales, direct observation of behavior using narrative recording methods as well as standardized behavior rating methods. For example, the Behavior Observation System in Schools (BOSS; Shapiro, 2010) has been found to be efficacious to evaluate medication efficacy (Power, DuPaul, Shapiro, & Kazak, 2003). Also, review of permanent products such as the accuracy and completion of assignments are available to school psychologists and have been shown to be sensitive to medication effects (Power et al., 2003). Additionally, the use of curriculum based measurement (CBM) has been shown to be an efficacious method of determining the response-to-medication for certain disorders such as ADHD (Stoner, Carey, Ikeda, & Shinn, 1994). CBM has been found to be sensitive to changes in dosages of methylphenidate to treat symptoms of ADHD (Stoner et al., 1994). School psychologists may also assist in determining optimal dosage (DuPaul & Carlson, 2005). Psychotropic medications interact differently with each child and dose-response effects can vary widely for children. As a result, determining optimal dosages is essential to obtain the greatest medication efficacy (DuPaul et al., 2005). School psychologists are in the unique position to utilize the aforementioned techniques (e.g., CBM and direct behavior observations in the school environment) to assist in finding an optimal medication dosage for a child.

The school psychologist can assist in designing and implementing a medication trial in collaboration with the child's physician (DuPaul & Carlson, 2005). A medication

trial will be a temporary trial of a pre-specified dose of a psychotropic medication which may or may not be known to those evaluating its effects. An open trial is one where all parties know the dosage and type of medication. Blinded trials call for only certain individuals (not involved in evaluating the medication's efficacy) to know the dosage and type. The overall goal is to identify the most appropriate dosage with the least side effects and maximum benefit for the child. Collaboration between the school psychologist and other school personnel such as the school nurse with the child's physician is an important aspect of a well designed medication trial (DuPaul & Carlson).

Children currently receiving a psychotropic medication may need continual progress monitoring to best assess overall efficacy (DuPaul & Carlson, 2005). Progress monitoring in the school environment can prove valuable to a treatment team as seeing a child in an office setting may be not indicative of actual functioning within the school environment (Pelham et al., 2000). The level of behaviors occurring in the natural setting can provide valuable information to the treatment team, particularly when the information is provided by an individual with specific training in assessing and observing behavior such as the school psychologist (DuPaul et al., 2005).

Finding an optimal dosage (least side effects and maximum beneficial effects) for children receiving a psychotropic medication is critical to balance to cost and risks of the medication (e.g., side effects) to the benefits (e.g., improved functioning). For example, children with ADHD may react differently to the same medication and dose even when considering gender, age, and height (DuPaul et al., 2005). The MTA Cooperative Group (1999) which conducted the most comprehensive evaluation of effects of treatments for ADHD to-date, found for children with ADHD, dose-response varied considerably across

children. This was found while holding constant other factors such as gender, age, and weight. The results of a follow-up study by the MTA Cooperative Group (2009) recommend a highly individualized medication monitoring plan due to wide ranging dose-responses among children (Molina, et al., 2009).

DuPaul et al. (2005) discussed possible ways for school psychologists to assist in determining optimal dosage. Specifically, the treatment team comprised of the physician, parent, teacher, and school psychologist determine keystone behaviors which will serve as outcome data. Keystone behaviors are behaviors which if affected will also have collateral effects on other areas of functioning. For example, the researchers list possible keystone behaviors such as accuracy of completed assignments along with reductions in disruptive behavior in the classroom. After the team has agreed upon keystone behaviors to monitor, the school psychologist can assist in collecting assessment data to help determine the lowest efficacious dosage.

Wodrich and Landau (1999) also advocate for an increased role of the school psychologist in collaboration between medical and school entities including monitoring of medications. Specifically, the authors state that school psychologists are in a unique position to assist in contributing to effective outcomes for children with medical conditions who may be prescribed a psychotropic medication. Wodrich et al. (1999) recommend strategic partnerships between school psychologists and local pediatricians for a variety of reasons. One of the most compelling reasons the authors cite is the school psychologist's access to children in the natural environment. DuPaul et al. (2005) also state access to the natural environment as well as school psychologists' possessing the requisite knowledge and skills to effectively monitor medications make this school

professional uniquely suited for this practice. Wodrich et al. (1999) recommend building a working relationship between primary care pediatrics and school psychologists, particularly for children with involved medical concerns. The authors also recommend school psychologists and pediatricians forge working alliances for school-age children taking medications that may impact academic as well as social-emotional functioning.

Sulkowski, Jordan, and Nguyen (2009) also advocate for increasing collaboration between physicians prescribing psychotropic medications and school psychologists. The authors present numerous strategies aimed at decreasing barriers and increasing opportunities for collaboration. Specifically, Sulkowski et al. describe using guidelines set for by the American Academy of Child and Adolescent Psychiatry (2004) to support collaborative efforts and avoid role confusion. The authors advocate for school psychologists to assist the prescribing physician in better understanding school systems and becoming more informed about the school environment and specific adaptations that can be made (e.g., lower task demands, assign a peer helper). Also, the authors advocate for school psychologists taking leadership roles in their school systems by creating district-wide consultation roles with local pediatricians and other physicians (e.g., child and adolescent psychiatrists). Additionally, Sulkowski et al. advocate forging alliances with physicians to promote district-wide services such as providing pharmacological consultations and in-service trainings on psychotropic medication management. By utilizing a district-wide approach, resources of the consulting physician and the school psychologist can be more efficiently utilized.

Given these recommendations on forging collaborative partnerships, research has found physicians are open and willing to collaborate with school personnel; particularly

school psychologists on issues related to medications children are receiving (Ax, Bradley-Klug, & Scott, 2003; Barnett, Duncan, & O'Connors, 1999). However, in general, physicians were unsure of how to collaborate (e.g., who to contact within the school system; Ax et al., 2003). Other researchers have found physicians attempted to collaborate first with the school nurse and classroom teacher while 40% reported attempting to collaborate with the school psychologist (Bradley-Klug, Sundman, Nadeau, Cunningham, & Ogg, 2010). The extant research on this topic is limited by only the aforementioned studies as well as small to medium sample sizes reported. Therefore, the information gleaned from each study cannot be generalized across all physicians.

Although medication monitoring is a practice school psychologists may be equipped to assist in and medical providers indicate they would like this information, there are ethical considerations that must be taken into account. Specifically, legislation previously mentioned may prohibit a school psychologist from recommending an efficacious treatment for a child because that treatment may involve the use of a psychotropic medication. For example, Carlson, Thaler, and Hirsch (2005) discuss an example where a research-supported efficacious treatment for ADHD involves a multi-modal approach that can include the use of a stimulant medication which falls under the class of psychotropic medications. A school psychologist may feel hesitant to discuss with parents all approaches due to fear of liability or noncompliance with educational law. Carlson and colleagues (2005) propose ethical considerations school psychologists should take into consideration when engaging in medication monitoring. Carlson and colleagues advocate utilization of a problem-solving model to take into consideration all variables and possible outcomes as an important step for school psychologists who

engage in medication monitoring. A problem-solving approach leads to a balance between acting in the best interests of the child, utilizing evidence-based treatment approaches, and following district/state policies related to medications.

Research examining school psychologists' knowledge and training related to psychopharmacology and medication monitoring is lacking. However, research indicates school psychologists are routinely involved in consultation (e.g., member of school-based problem-solving team, involved in evaluations for special education services) where medications are being utilized. School psychologists may also be suited to collaborate with the child, his or her parents, and the prescribing physician to implement a behavioral plan to increase adherence to medication regimens if this is a problem for a child or adolescent. Research has found adherence to medication regimens occurs due to a myriad of factors such as intolerable side effects and misunderstanding of the need to regularly take medication (Bussing, Koro-Ljungberg, & Gary, 2005; Gau, Chen, & Chow, 2008).

Carlson, Demaray, and Hunter-Oehmke (2006) conducted a survey examining school psychologists caseloads in which students were receiving medications, types of training related to pharmacology, and consultative efforts monitoring medications. A national sample of 320 school psychologists who were members of NASP was utilized in the analyses. A 37% return rate was reported. Demographic data obtained in the survey indicated the sample was consistent with NASP membership with respect to gender, ethnicity, type of degree, and years of experience. The findings indicated 63% of school psychologists were involved in medication evaluation trials in the past year. Also, in nearly a quarter of cases school psychologists were involved, the children were receiving

psychotropic medication as part of an intervention. Additional findings included the majority of school psychologists have not had formal university training in child psychopharmacology (81%) and the primary method school psychologists acquired background knowledge in child psychopharmacology was through professional workshops (88%), and independent reading (96%). The depth and comprehensiveness of the workshop training was not delineated in the survey. Approximately 62% of school psychologists reported working with physicians and parents to evaluate medication trials for children, but collaborative monitoring was infrequent. Additionally, these instances were limited to treatment of ADHD.

The strengths of this study include being the only known survey to assess medication monitoring and child psychopharmacology among school psychologists. The researchers highlighted important information, particularly with respect to the number of cases on which school psychologists are consulting that include medication monitoring. Limitations of this study include a relatively small return rate (34%), potentially lessening the degree to which one can make confident conclusions about the overall prevalence of medication monitoring practices and overall conclusions based on the survey. Additionally, while simple and straightforward to read, the survey could have gleaned more information from respondents that would be valuable. For instance, 63% of respondents indicated they collaborate with physicians, but no information was provided about what practices were used when evaluating pharmacological interventions. Nevertheless, this survey is the only examination of both school psychologists' knowledge and training in child psychopharmacology and medication monitoring practices.

Conclusions

Current research indicates the utilization rates of psychotropic medications prescribed to school-age children has remained relatively stable to treat some disorders (i.e., ADHD) while the utilization rates of psychotropic medications used to treat other disorders (e.g., depression, autism, Aspergers syndrome, and ODD/CD) have increased dramatically over the past decade (Abrams, Flood, & Phelps, 2006). Many of the current psychotropic medications being used in pediatric populations have no randomized controlled trials demonstrating their efficacy in this population. As a result, the vast majority of psychotropic medications are approved for use in adults but are prescribed off-label to children. Thus in many cases, the side-effects and long-term effects on academic and social-emotional functioning in children have not been studied and can vary dramatically between children due to different rates medications are metabolized. Many of the medications being utilized in pediatric populations have both positive and negative possible effects on school performance. Some effects are directly linked to academic performance (e.g., memory loss, cognitive dulling) which may go unnoticed by other school personnel without training in assessment and progress monitoring.

Children spend a majority of their waking hours in the school environment. The psychotropic medications are in many cases prescribed to treat problem behaviors that are occurring in the school environment as school personnel has been found to be one of the first to suggest the need for medication dosReis et al. (2003). School psychologists are in a unique position to assist in medication monitoring due to specialized training in progress monitoring, assessment of behavior, collaboration and consultation skills, and training in systematic problem-solving.

There are significant gaps in the literature regarding the practices and prevalence of medication monitoring beyond students taking medication for ADHD. Additionally, no research to date has examined the acceptability and feasibility of monitoring medications beyond those for ADHD. Prevalence rates suggest significant amounts of children and adolescents may be coming to school taking psychotropic medications for other disorders (e.g., challenging behavior, anxiety and/or depressive symptoms). Additionally, research has not yet examined the degree to which school personnel are informed about a child who is taking a psychotropic medication so that an individual can assist in monitoring its effects in the school environment. Given the variety of psychotropic medications children are currently receiving, the lack of efficacy studies of the use of psychotropic medications in children examining short-term and long-term effects, potential serious side-effects (e.g., suicidal ideation) more research is needed. This is particularly important as more children and adolescents are prescribed psychotropic medications for which a paucity of efficacy research is available. Side effects, interaction effects from multiple medications being utilized (polypharmacy) can cause acute reactions that may at best impede academic performance and at worst cause serious side effects (e.g., extra pyramidal symptoms, suicidal behavior). The current study addresses these gaps in the literature.

Chapter Three

Method

Introduction

This chapter describes the methods used to collect data for the study. The following facets of the study will be described in this order: (a) participants; (b) respondent information, (c) demographic information; (d) materials used in the study, and (e) procedures.

Participants

Participants for this study consisted of a sample of practicing school psychologists from the 2010-2011 Florida Association of School Psychologists (FASP) membership directory. Currently, there are approximately 500 members listed as active in the directory. School psychologists who are not currently working in public schools or who are not currently working in a practitioner capacity (e.g., retired or not working in a school setting) were removed from the sample resulting in a total sample of 273 potential respondents.

Survey studies have examined school psychologists' diagnostic practices and beliefs related to medication monitoring and/or knowledge of child psychopharmacology. The researchers conducting these studies have obtained a usable response rate ranging from 37% (Carlson, Demeray, & Hunter, 2006) to 64.7% (Guereasko-Moore, DuPaul, & Power, 2005). Given the wide variation in response rates across similar studies the goal

for this study was to obtain a usable response rate of at least 50% with a minimum response rate of 35%. As a result, surveys were mailed to the entire sample listed as currently working in a school setting. A 50% return rate would then yield 136 returned surveys. In order to arrive at this specific number of surveys, a power analysis was conducted utilizing Cohen's (1988) statistical formula. A minimum return rate of 35% yielding 96 surveys would result in adequate power (> .80).

Respondent Information

The number of respondents for this study and percentage of the total sample are presented in Table 2. A total of 166 of the 273 potential respondents replied to either the first or second mailing, resulting in a return rate of 61%. A total of 26 respondents checked a box at the beginning of the survey indicating they did not currently work in a school and returned the blank questionnaire.

The response rate for the first mailing was significantly higher than the rate for the second mailing. Specifically, 134 out of 273 respondents returned the questionnaire after the first mailing. The researcher utilized specific numeric codes on the outside of each return envelope in order to determine if the respondent was mailing back the questionnaire from the first or second mailing. This represented a 49% response rate for the first mailing. For participants sent a second questionnaire, 32 out of 139 initial non-responders returned a questionnaire. This represented a 23% response rate for the second mailing.

A total sample of 166 questionnaires and 140 useable surveys (i.e., participants indicating they did not work in a school were excluded from analyses) was considered within the acceptable range for the analyses in order to answer each research question.

The power achieved for this sample was calculated to be adequate (> .80**)** based on Cohen's (1988) statistical formula. Additionally, when comparing response rates for the current study to previous research the overall response rate is within the range of other empirical studies.

Table 2

Respondent Data

Item	*n*	*% of Total Sample*
Total questionnaires sent-1st mailing	273	100%
Total questionnaires returned-1st mailing	134	49%
Total questionnaires sent -2nd mailing	139	51%
Total questionnaires returned-2nd mailing	32	23%
Total of respondents not eligible	26	9.5%
Total number of non-responders	107	39%
Total useable questionnaires	140	51%
Total returned surveys (including ineligible)	166	61%

Demographic Information

Demographic information was collected from all respondents in addition to questions regarding types of degrees held outside the field of school psychology, years practicing, student to school psychologist ratio, and percentage of time working with various K-12 grade levels including time spent in non-student activities (e.g., district office). A summary of demographic information collected is presented in Table 3. The majority of the sample was female (84.3%). The ethnicity of the sample was largely White, not of Hispanic origin (81.4%). The sample closely represents the demographic information collected by the National Association of School Psychologists (NASP; 2010) with some noteworthy exceptions. Specifically, in the study sample 81.5% of respondents

indicated holding a specialist or master's +30 degree whereas in the NASP sample this value was 45.76%. Additionally, in the study sample the reported school psychologist to student ratios are significantly higher. Respondents indicated 38.9% had a school psychologist to student ratio of 1: >3,000 compared to only 4% in the NASP sample.

Given that the sample was selected from members of the Florida Association of School Psychologists, the entire sample reported practicing in the State of Florida. The vast majority of respondents reported working full-time (95%) while 0.7% reported part-time employment, 2.1% reported employment as a contractual/independent consultant, and 2.1% did not respond to this question. Regarding degree level, the majority of respondents (81.5%) reported holding a specialist or master's +30 degree in school psychology while 14.3% reported holding a doctorate. A lesser percentage reported holding a master's degree only (4.3%). A question was included in the survey regarding graduate degrees held in fields outside school psychology. Approximately 14% of respondents listed degrees held in clinical psychology, counseling psychology, special education, educational leadership, and other fields such as information technology. All respondents reported holding master's degrees in other fields with the exception of one respondent reporting a doctorate in educational leadership.

Examining the years of experience of respondents revealed most respondents had greater than six years of experience practicing as a school psychologist. Specifically, 89.3% of respondents had more than 10 years experience practicing as a school psychologist while only 10.7% reported less than five years in practice. The school psychologist to student ratio varied greatly across respondents. The lowest school psychologist to student ratio reported was 1:450 while the highest was 1:8,500. The

mean school psychologist to student ratio was 1:2,092. Respondents were asked to indicate their primary geographic setting in which they work (i.e., urban, suburban, or rural). Respondents indicated 25% working in an urban, 49.3% in suburban, and 25.7% in rural locations. Regarding the population of students served, responses varied. The most frequent work setting was elementary school (56.5%), followed by middle school (17.5%), and high school (15.3%). Some respondents reported working in a Pre-K setting (8.5%) for some portion of their time while others reported working in a non-student allocation such as being assigned to the district office (2.2%) for part of their time. One respondent indicated working full-time in a non-student allocation. As a result, the data from that respondent were excluded in analyses due to no direct student contact being reported. The demographic characteristics of the sample compared to the information provided by NASP are displayed in Table 3.

Table 3

Comparison of School Psychologists' Demographic Categories of Current Study to NASP Membership (2010)

Demographic Information	Current Study *n = 140*	NASP (2010) *n = 1272*
Gender		
Male	15.7%	21.9
Female	84.3%	78.1
Ethnicity		
Black/African American	8.6%	3%
Asian American/Pacific Islander	1.4%	1.3%
Native American/Alaskan Native	0%	.6%
White/Caucasian	81.4%	90.7%
Hispanic/Latino	8.6%	3.4%

Other	0%	1%
Highest Degree in School Psychology		
Bachelor's	0%	0%
Master's	4.3%	25.06%
Master's +30/Specialist	81.5%	45.76%
Doctorate	14.3%	24.17%
Years Practicing as a School Psychologist		
0-5 years	10.7%	30.3%
6-10 years	20%	15.9%
11-15 years	31.4%	14.3%
16+ years	37.9%	27.6%
School Psychologist to Student Ratio		
<1000:1	22.1%	43.6%
<1500:1	23.7%	67.9%
>2000:1	15.3%	14.4%
>3000:1	38.9%	4.0%
Primary Work Location		
Urban	25%	25.6%
Suburban	49.3%	43.4%
Rural	25.7%	24.0%

Materials

A cover letter, included with the survey, presented the purpose of the study, estimated time to complete the survey, provided the principal investigator's (PI) contact information, and an explanation of the incentives for completion of the survey were included with the survey (Appendix A). Specifically, in order to increase the response rate, each respondent received a U.S. currency one dollar bill enclosed in the survey as an incentive to return a completed survey. Previous research demonstrates that offering an upfront incentive for completing a survey increases the useable response rate (Dillman, Smyth, & Christian, 2009; Erwin & Wheelright, 2002; Tuten, Galesic, & Bosnjak, 2004).

The survey (see Appendix C) included a section requesting demographic information along with Likert-type rating scales. Participants were asked to provide demographic data including their gender, ethnicity, job status (i.e., full-time, part-time, contractual), highest degree in school psychology, highest degree earned not in school psychology, number of years practicing as a school psychologist, type of schools served, student to school psychologist ratio, and percentage of time working with students at different grade levels. Following the demographic section, the survey was divided into five primary areas of school psychologists' practices related to medication monitoring and beliefs of effectiveness, efficacy, and feasibility of methods used to monitor medications. Specifically, the survey assessed (a) the self-reported training related to medication monitoring, (b) the types of disorders students are diagnosed with for which school psychologists are monitoring medications, (c) the procedures utilized to monitor the effects of medications, (d) the effectiveness, acceptability, and feasibility of medication monitoring procedures, and (e) facilitators and barriers to monitoring medications in schools.

Participants were asked a variety of "yes/no", Likert type and frequency of use questions to gather data. Participants were asked whether they have been involved in monitoring the effects of medications for a student with whom they work. If the participants answered "yes", they were directed to continue answering several in-depth questions assessing the types of disorders for which the school psychologist was monitoring medications, and the procedures utilized to monitor medications. All participants were asked to indicate their perceptions related to the degree to which various methods of monitoring medications are effective, acceptable, and feasible in the

school setting. All participants were asked to indicate their perceptions related to the degree to which various variables are facilitators and barriers to monitoring medications in school settings. The estimated time to complete the survey was between 15-20 minutes.

Procedures

The first step in conducting this study was to develop the survey itself. The investigator reviewed the extant literature related to this topic to determine gaps in the current literature and areas in need of further research. Specifically, as stated in the literature review, one known study has examined school psychologists' current practices related to medication monitoring (Guerasko-Moore & DuPaul, 2005). However, that study was limited to examining medication monitoring practices related to Attention- Deficit/Hyperactivity Disorder (ADHD) and medications prescribed to treat the symptoms of ADHD. In developing the current survey, the researcher examined surveys utilized in previous studies on this topic. The researcher built on previous research and expanded the scope of medication monitoring practices to all psychotropic medications that are prescribed to school-age children and adolescents. The final survey consisted of 22 questions, divided into four sections. Each section utilized fill in the blank, multiple choice, and Likert-type question formats to gather data. The first section contains 11 questions related to gender, age, ethnicity, professional background, state in which the psychologist is currently employed, employment setting, employment type (i.e., part or full-time, contractual), types of students with whom the school psychologist works (i.e., grade levels), and the school psychologist to student ratio. Additionally, at the beginning of the survey, respondents who did not work in schools at all were asked to

check a box indicating this and return the survey in the postage-paid envelope. The second section consisted of questions related to previous training in medication monitoring, philosophy of graduate training program, frequency of medication monitoring, and types of medications monitored. To ensure clarity, operational definitions were given for overall philosophy of graduate training programs broken down into four categories. Each category ranged from extremely traditional (e.g., primary focus is on psychoeducational assessment for eligibility in special education programs) to extremely non-traditional (e.g., primary focus is on linking assessment to intervention and little focus on psychoeducational assessment solely for eligibility in special education programs). The third section consisted of questions related to the types of methods utilized to monitor medications. To collect data on the frequency and number of students a school psychologist monitors per year, respondents selected from numeric ranges. To collect data on the types of medications school psychologists are monitoring, a comprehensive list of psychotropic drug categories was presented. The fourth section consisted of questions assessing specific procedures school psychologists use to collect medication monitoring data as well as with whom and the frequency in which the information is shared. Additionally this section assessed perceived facilitators and barriers to engaging in medication monitoring.

Numerous drafts of the survey were reviewed by an expert panel consisting of school psychology faculty members with expertise in pediatric school psychology, graduate students with experience in conducting surveys, and a faculty member with expertise in measurement and survey development. Based upon the feedback from this panel, revisions were made to the survey with respect to clarity of the questions and

response options, as well as overall organization of the survey contents. Specifically, a number of changes were made to the survey itself based on recommendations from the panel. The length of the survey was shorted from 26 to 22 questions and the format of questions was changed from forced choice response type questions to an open-ended item for question 22 that asked respondents about facilitators to medication monitoring. The reason for this was to counterbalance question 21 which asked about barriers to medication monitoring and respondents were asked to select from a list which they felt were barriers. It was hypothesized by the panel and researcher that extant research has identified barriers school psychologists face in practice but a paucity of data exists on what facets facilitate medication monitoring. Operational definitions were given at key points in the survey to help ensure participants understood how medication monitoring is being defined in this study to ensure accurate results. In section 1 (background information), a question (item 6) was added based on a recommendation from a panel member to ask participants about their highest graduate degree earned that was not in school psychology. This question was added based on information gathered during the previous NASP membership survey which also added that question to ascertain what other degrees school psychologists possess. The cover letters were also modified in several ways to help ensure clarity and to increase the potential response rate by shortening the letter(s). Specifically, the panel recommended a more clear definition of medication monitoring in the first paragraph of both the initial and follow-up letters as well as attempting to keep the letter to one page in length.

The next step in the survey development process was to conduct a pilot study of the cover letter and survey with 26 practicing school psychologists to gather additional

feedback on survey organization and clarity. In addition, seven of those practicing school psychologists were randomly selected to be contacted by phone and interviewed about the clarity of questions on the survey. They also were asked how they would answer each question to ascertain whether the questions would glean the anticipated information. The researcher spent approximately 20 to 30 minutes with each participant going through the survey and asking them how they would answer questions. Overall, the answers school psychologists gave were consistent with the data the researcher desired to collect. In addition, participants in the pilot study were asked to record the total number of minutes required to complete the survey. Participants estimated the total time to complete the survey was between 15-20 minutes. Feedback obtained from participants in the pilot study was used to finalize the survey and cover letter. A number of specific changes were made to both the survey and cover letters based on feedback from the panel of practicing school psychologists. Specifically, three of the seven school psychologists being interviewed by phone consistently appeared to misunderstand one item. In item 21, which queries respondents regarding barriers to medication monitoring, participants appeared confused by the meaning of "lack of community support". As a result, the researcher added "e.g., collaborative relationships with mental/physical health providers in the community" based on feedback from members of the panel. In item 10 which asks "primary location of current work site (please choose one)" several members of the panel recommended bolding and placing in italics the word "one" so that respondents would only check a single box. Members of the panel of practicing school psychologists also had various formatting recommendations including bolding and increasing the font size

of directions to skip items (i.e., item 12) if the question did not pertain to them (e.g., respondent has no medication monitoring training).

Approval to conduct the study was obtained from the University of South Florida (USF) Institutional Review Board (IRB) prior to commencement of data collection. This assisted in ensuring that all possible and necessary precautions were taken to protect human research participants. Once approval was obtained from the USF IRB, approval from the Florida Association of School Psychologists (FASP) was obtained. A separate application detailing the scope and nature of the proposed study, research questions, and risks versus benefits to participants was provided to FASP. Upon approval from FASP, the researcher obtained the FASP membership directory of practicing school psychologists via an electronic database of mailing addresses for each participant. Two separate mailings were conducted to ensure the highest return rate possible. Specifically, all selected participants were included in an initial mailing that included a cover letter (Appendix A), survey (Appendix C), U.S. currency dollar bill (for an incentive), and a self-addressed postage-paid envelope. A unique code number was utilized on the front of each survey in order to determine if a participant needed to be mailed a second survey for non-response to the first one. After the first mailing, participants who had not responded within one month of the initial mailing were mailed a second survey as well as a follow-up cover letter (Appendix B) encouraging them to return their completed survey.

A database was created using Microsoft Excel in order to enter data as surveys were received. The primary researcher set up the database and developed specific codes for entering each item from the survey. Specifically, each item on the survey was coded with a specific number to indicate the respondent's answer to a question. The data were

then entered by the primary researcher. Once all data had been entered, every tenth survey was checked for errors with a member of the research team. If an error was found, the survey entered prior to and after the randomly selected survey was also checked for errors. All errors were recorded in a separate error log in order to report the results. If an incomplete survey was received, the researcher examined the survey and determined if it should be entered into the database. The researcher utilized the following criteria in order to make the determination whether or not to enter the incomplete survey data: (a) if the demographic data were incomplete the survey was excluded from the database as many of the analyses required the combination of answers to questions in sections II-IV as well as demographic data, (b) if the demographic data were complete and portions of sections II-IV were incomplete, the primary researcher made a determination whether to enter the incomplete survey into the database based on the amount of information missing. Specifically, the researcher used his judgment whether the survey would provide additional information in the data set or if too much information was missing to contribute to the overall study. This occurred in one instance. The respondent left multiple areas of the survey blank including questions related to training in medication monitoring as well as their perceptions of barriers and facilitators. As a result, due to the necessity of the missing information in order to carry out analyses, that respondent's survey was not included in the data set.

Chapter Four

Results

This chapter begins with a discussion of how the survey data were entered into the database and the precautions taken to ensure the integrity of these data. Each research question is then presented along with the specific analyses conducted to address the questions.

Treatment of the Data

All data were initially entered into a Microsoft Excel spreadsheet during the Fall of 2011 by the researcher. Data were then checked by another member of the research team for data entry errors. Specifically, data were analyzed using the Statistical Package for the Social Sciences (SPSS) Version 19 (SPSS Inc., 2010) for values falling outside expected ranges following data entry. If a value was found to be outside the expected range, the survey was checked and the correct response entered into the dataset. Next, the researcher and a member of the research team reviewed every tenth survey manually to check for data entry errors. If an error was found the surveys before and after were also checked for data entry errors. At the conclusion of the process 24% of the surveys were reviewed for data entry errors. Data entry errors were calculated to have occurred on 0.5% of the surveys checked. The small amounts of errors found were then manually corrected in the Excel spreadsheet. SPSS was used to conduct analyses in order to address each research question.

Research Question 1: Do school psychologists believe medication monitoring is a role in which they should be engaged?

For the purpose of this study, the survey instrument defined medication monitoring as follows: "Medication monitoring is defined as including the following activities (not an exhaustive list): Consultation with classroom teacher(s) and paraprofessionals, utilization of behavior rating scales, behavior observations, review of work samples or curriculum-based assessments". This definition was provided in bold face type to respondents on the second page of the survey prior to being asked questions related to medication monitoring. To address this research question, the frequencies of responses to question 14 on the survey instrument were examined. Specifically, question 14 asked "Please indicate your opinion to this statement: Monitoring the effects of psychotropic medications for students with emotional and behavior disorders (e.g., ADHD, depression, anxiety) and other disorders is a role in which school psychologists should be involved". Respondents could select any one of the following responses to this question: "Strongly Disagree", "Disagree", Neither Agree nor Disagree", "Agree", and "Strongly Agree". Descriptive statistics are presented in Table 4 and the percentages respondents endorsed by category (e.g., Strongly Disagree, Strongly Agree) are presented in Table 5. Overall, the majority of respondents (74.3%) indicated they "Agree" or "Strongly Agree" that medication monitoring is an appropriate role for school psychologists.

Table 4

Descriptive Statistics of School Psychologists' Beliefs Related to Medication Monitoring (n =140)

	n	*M*	*95% CI*	*SD*	*Sk*	*Ku*	*Range*
Medication Monitoring Agreement	140	3.93	3.79-4.07	0.85	-0.78	0.95	1-5

Note. The scale of the medication monitoring agreement variable is as follows: 1=Strongly Disagree, 2= Disagree, 3= Neither Agree nor Disagree, 4= Agree, 5= Strongly Agree.

Table 5

Response to Role of School Psychologists in Medication Monitoring (n =140)

Rating	*n*	*Percent*
Strongly Agree	35	25%
Agree	69	49.3%
Neither Agree or Disagree	29	20.7%
Disagree	5	3.6%
Strongly Disagree	2	1.4%

Research Question 2: What is the relationship between school psychologists' beliefs regarding medication monitoring as part of their role and their likelihood of engaging in medication monitoring in practice?

In order to analyze data pertaining to this question, respondents' answers to survey questions 14 and 16 were examined. Specifically, respondents were asked in question 14 to indicate their opinion to the following statement: "Monitoring the effects of psychotropic medications for students with emotional and behavior disorders (e.g., ADHD, depression, anxiety) and other disorders is a role in which school psychologists should be involved". A Likert type scale ranging from "Strongly Disagree" to "Strongly

Agree" was utilized. For survey question 16, respondents were asked the following: "How frequently do you monitor the effects (beneficial or negative) of a psychotropic medication for students with whom you work?" Response choices for this question were "Annually, "Quarterly (i.e., fall, winter, spring)", "Once per month", "Once per week", "Daily", "2-5 times per day", and "5+ times per day". Participants were also directed to review the operational definition of medication monitoring provided at the beginning of the survey in order to answer this question.

In order to address this research question a Spearman rank order correlation coefficient was calculated for data collected in questions 14 and 16 on the survey. The data collected from question 14 based on a five-point Likert scale was utilized in the analysis. Specifically, all respondents' data were used (i.e., respondents who chose "Strongly Disagree", "Disagree", Neither Agree nor Disagree", "Agree", and "Strongly Agree"). Also, the data collected from item 16 was also utilized (i.e., "Annually, "Quarterly (i.e., fall, winter, spring)", "Once per month", "Once per week", "Daily", "2-5 times per day", and "5+ times per day") in the analysis. Due to the nature of the variables, (i.e., ordinal data) the Spearman method was chosen to carry out the analyses. The results are presented in Table 6. Overall, there is a relatively weak relationship between respondents' beliefs related to medication monitoring and frequency of medication monitoring. This not surprising as many respondents reported believing that medication monitoring is a role they agree with, yet had not engaged in.

Table 6

Spearman's Rho Correlation between Beliefs in Medication Monitoring and Actual Reported Practices (n = 77)

Variables	1.	2.
1. Medication monitoring beliefs	–	
2. Frequency of medication monitoring practices	0.24*	–
M	2.91	
SD	1.02	

Note. The scale of the variable "Medication monitoring beliefs" was assessed using the following: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree. The scale for the variable "Frequency of medication monitoring practices" was assessed using the following: 1=Annually, 2= Quarterly, 3= Once per month, 4=Once per week, 5 = Daily, 6= 2-5 times per day, 7 = 5+ times per day.
*$p < .05$.

In order to further analyze data pertaining to this research question, respondents' answers to survey questions 14 and 15 were also examined. In question 14, respondents were asked to indicate using a five-point Likert scale, their opinion on whether medication monitoring is a role in which school psychologists should be involved. For survey question 15, respondents were asked to indicate "yes" or "no" to the following question: "Have you been involved in monitoring the effects (beneficial or negative) of a psychotropic medication in any manner for a student with whom you work?" Respondents were also directed to review the definition of medication monitoring in the beginning of the survey before answering question 15.

An independent samples t-test was conducted to compare group means for respondents who reported being involved in medication monitoring practices (Item #15) and their beliefs regarding medication monitoring (Item # 14). The results are presented in Table 7. There was a significant difference between respondents who endorsed "yes"

(M = 4.11, SD = 0.85) versus "no" (M = 3.61, SD =0.77) for whether they engage in medication monitoring in their agreement that medication monitoring is a role in which school psychologists should be involved, t (137) = -3.48, $p < .001$. Levene's test was not significant, therefore equal variances are assumed.

Overall, there is a relatively weak relationship between school psychologists' beliefs regarding medication monitoring and their actual reported practice. However, when comparing group means between school psychologists who reported engaging in medication monitoring versus those who did not, a statistically significant difference was found.

Table 7
Independent Samples t-test Examining Beliefs Regarding Medication Monitoring and Reported Involvement in Medication Monitoring (n = 137)

	Yes	No			
Medication Monitoring Involvement	*M (SD)*	*M (SD)*	*t*	*df*	*Sig (2-tailed)*
Agreement with Medication Monitoring	4.11	3.61	-3.48	137	.001
	0.85	0.77			

Note. The scale of the variable "Medication monitoring involvement" was assessed by respondents indicating either "Yes" or "No". The scale of the variable "Medication monitoring beliefs" was assessed using the following: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree.
*$p < .05$.

Research Question 3: What are the current medication monitoring practices of school psychologists? (a) What types of data are collected when engaged in medication monitoring? (b)What is the frequency (e.g., daily, weekly, or monthly) that medication monitoring data are collected? (c) What is the frequency (e.g, daily, weekly, or monthly) that medication monitoring data are shared? (d) With whom is

medication monitoring information shared (e.g., primary care provider, parents, school-based intervention team, teachers)?

Question 3a: What types of data are collected when engaged in medication monitoring?

Responses from item 20 were examined to address this research question. This item asked respondents to indicate which procedures they used to monitor medications as well as how often each procedure was used. The categories included behavior rating scales, direct behavior observations, child and teacher interviews, work samples, curriculum based assessments, and grades. A response category of "Other" was included with item 20 so respondents could list types of data collected that were not included on the survey. Respondents who listed a category under "Other" (n = 18) did not report a frequency with which they utilized the particular method. As a result, N/A is reported. Table 8 presents the percentages of respondents who reported using each method of data collection. Of note, the categories in Table 8 are not mutually exclusive. Respondents were able to report the use of more than one method in the practice of medication monitoring. Overall, respondents reported utilizing a multitude of methods in medication monitoring rather than relying on a single method. Methods endorsed by 50% or more of the respondents included direct behavior observations, teacher rating forms, child interviews, and teacher interviews.

Question 3b: What is the frequency (e.g., daily, weekly, or monthly) that medication monitoring data are collected?

Data from survey question 20 were used to analyze the results for this question (see Table 8). The majority of respondents reported utilizing each method one time per month or less overall but did report using a variety of methods (e.g., teacher interviews, child interviews, review of work samples). Some (21%) of respondents reported utilizing teacher interviews every other week (e.g., bi-weekly) while approximately 15% reported using direct behavior observations on a bi-weekly basis and 14% on a weekly basis. A very small percentage (less than 2%) reported using direct behavior observations and curriculum-based assessment procedures on a daily basis. Some respondents utilized the "Other" category reporting a variety of medication monitoring methods used to collect data. Specifically, consultations with the school nurse, daily behavior reports from teachers, response to counseling sessions, and statewide data from standardized tests were reported. Overall the number of respondents using the "Other" category was lower than those who utilized the provided categories (i.e., < 20).

Table 8

Frequency of Medication Monitoring Practices (n = 77)

Medication Monitoring Method	*n*	Percentage	<1 time month	1x month	Approx 1x every 2 weeks	1x week	Daily	N/A or 0 times
Teacher rating forms	71	50.7%	54..9%	22.5%	12.7%	1.4%	0%	8.5%
Direct behavior observations	74	52.9%	24.3%	44.6%	14.9%	13.5%	1.4%	1.4%
Parent rating forms	69	49.3%	62.3%	17.4%	8.7%	1.4%	0%	10.1%
Parent interviews	69	49.3%	52.2%	30.4%	7.2%	1.4%	0%	8.7%
Child self-report rating scales	69	49.3%	53.6%	14.5%	4.3%	4.3%	0%	23.2%
Child interview	70	50%	42.9%	25.7%	11.4%	8.6%	0%	11.4%
Teacher interview	73	52.1%	20.5%	45.2%	20.5%	9.6%	0%	4.1%
Permanent products	66	47.1%	31.8%	25.8%	10.6%	6.1%	0%	25.8%
Curriculum based assessment	66	47.1%	33.3%	16.7%	10.6%	6.1%	1.5%	31.8%
Grades	69	49.3%	50.7%	26.1%	10.1%	1.4%	0%	11.6%
Other								
Consultation with school nurse	4	3.0%	N/A	N/A	N/A	N/A	N/A	N/A
Discipline records	3	2.0%	N/A	N/A	N/A	N/A	N/A	N/A
Statewide reading assessment	2	1.4%	N/A	N/A	N/A	N/A	N/A	N/A
Response to counseling	1	.07%	N/A	N/A	N/A	N/A	N/A	N/A
Daily behavior reports from teacher	8	6.0%	N/A	N/A	N/A	N/A	N/A	N/A

Note. The scale for the variables with the exception of the category "Other" was assessed using the following: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree. The scale for the category "Other" was free response and the *n* along with the percentage of respondents who endorsed each are presented.

Question 3c: What is the frequency (e.g., daily, weekly, or monthly) that medication monitoring data are shared?

To address this research question, responses from item 19 which asked "when you engage in medication monitoring, in general with whom and how often do you share the information?" were examined. The categories included ("< 1 time per month", "1 time per month", "Approximately 1 time every two weeks (i.e., bi-weekly)", 1 time a week", "Daily", and "N/A or zero times". Table 9 presents the frequencies displayed as percentages that respondents reported in sharing medication monitoring information as well as with what entity it was shared. The majority of school psychologists reported sharing medication monitoring information with parents, teachers, prescribing physicians, and the school-based intervention team typically one time per month or less. However, some school psychologists reported sharing of information on a more frequent basis. Specifically, when sharing information with parents, nine percent of school psychologists reported sharing information bi-weekly and seven percent reported sharing information weekly. When sharing information with teachers, 15 percent reported sharing information weekly as well as bi-weekly, and three percent reported daily sharing of information. When sharing information with the prescribing physician, one percent reported bi-weekly sharing of information and no respondents reported weekly or daily sharing information. When sharing information with the school-based intervention team, 18 percent reported sharing information bi-weekly, five percent weekly, and one percent daily. Respondents who utilized the "Other" category did not list the frequency in which they share information, only the entity with which they share the information. The next

section will discuss which entities respondents report sharing information with in more detail.

Question 3d: With whom are medication monitoring data shared?

In order to address this research question responses from item 19 were examined. The potential categories included Parents, Teachers, Prescribing Physicians, School-based intervention teams, and a category for "Other". Table 9 presents the results. Overall, respondents indicated sharing information with Parents, Teachers, Prescribing Physicians, and the School-based intervention team relatively equally (range is 52.1%-54.2%). Regarding responses to the "Other" category, 9% of respondents indicated they share medication monitoring information with a child's therapist, 3% reported sharing information with the school nurse and one respondent (0.02%) indicated they shared information with an outside agency.

Table 9

Frequency of Sharing Medication Monitoring Information and with Whom it is Shared (n = 77)

Sharing of Information	*n*	Percentage	<1 time month	1x month	Approx 1x every 2 weeks	1x week	Daily	N/A or 0 times
Parents	76	54.2%	40.8%	40.8%	9.2%	6.6%	0%	2.6%
Teacher	75	53.5%	30.7%	37.3%	14.7%	14.7%	2.7%	0%
Prescribing Physician	73	52.1%	39.7%	12.3%	1.4%	0 %	0%	46.6%
School-based Intervention Team	74	52.8%	25.7%	41.9%	17.6%	5.4%	1.4%	8.1%
Other								
Outside care agency	3	0.02%	N/A	N/A	N/A	N/A	N/A	N/A
Mental health/therapists	13	9%	N/A	N/A	N/A	N/A	N/A	N/A
Nurse (school)	4	3%	N/A	N/A	N/A	N/A	N/A	N/A

Research Question 4: What types of training (pre-service vs. in-service) do school psychologists receive in the practice of medication monitoring?

To address this research question, responses from survey item 12 were examined which asked "Have you received training at any time in the past on monitoring the effects of psychotropic medications in students?" Respondents had the option of answering either "yes" or "no" to this question. If respondents indicated "yes", they were then directed to indicate what types of medication monitoring training they have received from a list of potential types of trainings. Overall, 63.3% (n = 88) of respondents reported receiving some training related to medication in the past. The results are presented in Table 10.

Table 10

Percentage of Respondents with Training in Medication Monitoring (n = 140)

Medication Monitoring Training	*n*	Percent.	95% Confidence Interval
Yes	88	63.3%	57.18-69.42%
No	51	36.7%	26.14-47.26%

Table 11 illustrates the descriptive statistics regarding the types of medication monitoring training (e.g., in-service, reading of scholarly journals, and graduate courses containing a component on medication monitoring) respondents reported receiving at any point in the past. The majority of respondents reported receiving a variety of types of training. The amount of training reported by respondents varied considerably. Specifically, the means and standard deviations for each training category from highest to lowest are as follows: Personal reading of scholarly journal articles in hours (M =17.43, SD = 22.74), Personal reading of textbooks in hours (M = 14.32, SD = 17.25), In-service training (M = 3.73, SD = 4.08), attending professional conferences (M =3.41, SD = 3.63), online training (M = 1.93, SD = 3.03), and graduate courses containing a component on the topic of medication monitoring (M = 1.65, SD = 2.03). Overall, respondents reported the greatest amount of training in personal reading of scholarly articles and textbooks. However, the scale for those two variables was in hours while the other types of training were measured in number of trainings or graduate courses. Therefore, comparisons must be made carefully.

Table 11

Descriptive Statistics of Types of Medication Monitoring Training (n =77)

	n	*M*	*SD*	*Sk*	*Ku*	*Range*
In-service training	75	3.73	4.08	2.41	6.42	0-20
Online training	59	1.93	3.03	1.59	1.56	0-12
Professional conferences	71	3.41	3.63	2.90	10.93	0-20
Graduate courses	66	1.65	2.03	2.08	3.41	0-8
Personal reading of scholarly journals (hours)	72	17.43	22.74	2.40	5.85	0-100
Personal reading of textbooks (hours)	71	14.32	17.25	2.40	7.92	0-100
Other Consultation with physicians	4	N/A	N/A	N/A	N/A	N/A

Note. The scale for each of the variables is as follows: In-service training, online training, professional conferences, graduate coursework, personal reading of scholarly journals and textbooks, and "other" were continuous variables measured by the number of trainings, conferences, courses, and hours spent reading reported.

Research Question 5: What are the perceived barriers and facilitators to medication monitoring?

Responses from item 21 (barriers) and item 22 (facilitators) were used to answer this research question. Item 21 required respondents to answer the following question: "To what extent do you agree or disagree that each of the following factors is a barrier to school psychologists monitoring psychotropic medications students are taking?" Respondents were provided with a list of 11 factors, including one that allowed them to

write in an “Other” option, and were asked to indicate the extent to which they agreed or disagreed to the factor on a 5-point Likert scale ranging from “Strongly Agree” to “Strongly Disagree”. The means and standard deviations represent respondents as a group reporting their opinion on the degree to which they agreed or disagreed that each factor is a barrier. “Strongly Disagree” would be represented as a 1 while “Strongly Agree” is at the highest end of the scale at 5. The results of respondents’ ratings are presented in Table 12. Three factors were rated by respondents as the largest barriers to medication monitoring compared to the remaining eight. Lack of time was reported to be the largest barrier (M = 3.60, SD = 1.13, n = 137). Lack of community support was listed as second (M = 3.42, SD = 1.07, n = 137), and insufficient knowledge regarding how to monitor medications was third (M = 3.10, SD = 1.19, n = 137). The remaining eight factors were rated fairly evenly on whether they were viewed as a barrier. Specifically, means for each were below 3.0 indicating respondents were neutral regarding whether these factors served as barriers to medication monitoring.

Some respondents listed their own barriers to medication monitoring under the category for “Other”. Although the number of respondents using the “Other” category is low (n = 37), responses included perceptions that primary care pediatricians prescribe the greatest amount of psychotropic medications and have little training in monitoring, situations where the student’s behavior improves and the need to actively monitor decreases, and an overall unawareness of the school psychologist’s skill set related to medication monitoring.

Survey item 22 utilized an open ended response format for respondents to list factors they felt were facilitators to medication monitoring. A post-hoc thematic analysis

based on recommendations from Lofland and Lofland (1995) was completed regarding respondents' reports of facilitators to medication monitoring. Specifically, each response was carefully examined by the researcher and categories were developed. A total of 10 categories were created based on respondents' reported perceptions of facilitators. These categories sufficiently represent the perceptions of respondents with respect to facilitators to medication monitoring based on recommendations from Lofland et al. (1995). Not all respondents listed facilitators. Specifically, out of the total sample of 140 completed surveys, 109 included information related to facilitators. This represents approximately 78% of respondents who answered the question related to facilitators to medication monitoring. These results are presented in Table 13.

Regarding facilitators, respondents most frequently reported ongoing professional training (26%) as an important facilitator to medication monitoring. This category could include in-service training, professional conferences, online training, and supervision from colleagues. The second most frequently listed facilitator was communication and collaboration with the prescribing physician (21%). This category included the degree to which the school psychologist and prescribing physician were able to communicate effectively. The third most frequently listed category was including medication monitoring activities on a student's Individualized Education Plan (IEP). Specifically, 16.5% of respondents reported inclusion of specific tasks related to medication monitoring as a facilitator. However, none of the respondents indicated whether this is a practice that is currently occurring in their schools, or simply a recommendation that including medication monitoring on a student's IEP would facilitate the process of collecting this type of data. Other facilitators listed were less frequently cited by

respondents (< 6.5%) but did cover a fairly broad range of facilitators such as having access to existing tools to make medication monitoring easier, less students on caseload, and increased role flexibility.

Table 12

Perceptions of Barriers to Medication Monitoring (n = 140)

Factor	*n*	*M* *SD*	*Sk* *Ku*	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Lack of time	137	3.60 1.14	-.67 -.43	5.1%	16.2%	13.2%	44.1%	21.3%
Insufficient knowledge	137	3.10 1.19	-.25 -1.09	10.3%	26.5%	14.7%	39.7%	8.8%
Lack of resources	136	2.74 1.02	0.08 -1.09	9.6%	38.2%	22.1%	28.7%	1.5%
Lack of teacher support	137	2.23 .902	0.69 0.39	19.1%	50%	21.3%	8.1%	1.5%
Lack of support of other colleagues	137	2.31 .920	0.62 0.09	16.8%	48.9%	22.6%	10.2%	1.5%
Lack of parent support	137	2.65 1.02	0.21 -.66	12.4%	35.8%	29.2%	19.7%	2.9%
Lack of administrative support	137	2.58 .998	0.21 -.75	13.1%	38.7%	27%	19.7%	1.5%
Lack of support from school psychologists' supervisor	137	2.41 1.07	0.56 -.25	20.4%	38.7%	24.8%	11.7%	4.4%
Teacher availability	137	2.91 1.07	0.08 -.888	8%	32.8%	25.5%	27.7%	5.8%
Lack of community support	137	3.42 1.07	-.39 -.71	3.6%	20.4%	20.4%	41.6%	13.9%
Other								
Pediatricians prescribe	5	4%	N/A	N/A	N/A	N/A	N/A	N/A

most psychotropic medications, little training in monitoring								
Student's behavior improves, active monitoring decreases	11	8%	N/A	N/A	N/A	N/A	N/A	N/A
Belief monitoring is completed informally with no school psychologist input	2	1.5%	N/A	N/A	N/A	N/A	N/A	N/A
Unawareness of school psychologist skill set	13	9.42%	N/A	N/A	N/A	N/A	N/A	N/A
School is unaware of student taking medication	6	4.34%	N/A	N/A	N/A	N/A	N/A	N/A

Note. The scale for the variables with the exception of the category "Other" was assessed using the following: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree nor Disagree, 4=Agree, 5=Strongly Agree. The scale for the category "Other" was free response and the *n* along with the percentage of respondents who endorsed each are presented.

Table 13

Perceptions of Facilitators to Medication Monitoring (*n* = 109)

Facilitator	*n*	*Percent*
Ongoing professional training	29	26.6%
Communication between school psychologist and prescribing physician	23	21.1%
Collaboration between, school psychologist, teacher and parents	16	6.0%
Graduate training	1	0.9%
More role flexibility	2	0.8%
Less students on caseload	7	6.4%
Easy to use method to monitor (e.g., checklists)	7	4.6%
Including on IEPs as progress monitoring requirement	18	16.5%
Time	5	4.6%
Increased community support for medication monitoring	1	0.9%

Note. The scale for the variables related to facilitators of medication monitoring was assessed using an open-ended question "Given the listing of potential barriers in the previous question, please list what you feel may be a facilitator to school psychologists monitoring psychotropic medications". The items were coded into 10 categories and the *n* along with percentage of respondents endorsing a facilitator in each category are presented.

Research Question 6: What is the direction and strength of the relationship between geographic location, degree level, training program philosophy, type of school served, types of training related to medication monitoring, and the frequency of medication monitoring by school psychologists?

Responses from survey items 10 (geographic location), 5 (degree level), 13 (training program philosophy), 11 (type of school served), and 12 (types of training related to medication monitoring) in relation to item 16 (frequency of medication monitoring) were examined in order to answer this research question. Spearman rank

order correlation coefficients were calculated for all variables related to this research question. The Spearman method was chosen due to the nature of the variables of interest which included ordinal data. Prior to conducting Spearman rank order correlation coefficients, preliminary analyses were performed to ensure there were no violations of the assumptions of normality, linearity, and homoscedascticity. Specifically, a scatter plot was generated to examine the data for outliers that fell outside of expected ranges (i.e., exceeding three standard deviations) based on recommendations from Talbachnick and Fidell (2007). The results are presented in Table 14. Overall, small to moderate significant positive correlations were observed for respondents who reported practicing in a rural school setting (r_s = 0.39) and for those who received in-service training (r_s = 0.38) while a moderate negative correlation was observed for the variable non-student allocation (r_s = -.43). Other correlations for geographic location, types of school served, and types of training were small to moderate but did not demonstrate a statistically significant relationship with frequency of medication monitoring. In summary, the results of the analyses indicate small to moderate relationships between some demographic and training variables. However, the majority of intercorrelations were not significant when using Cohen's (1988) guidelines.

Table 14

Intercorrelations between Demographic Variables and Medication Monitoring Practices

Variable	Frequency of Medication Monitoring	*n*
	Spearman's Rho	*Sig. (2-tailed)*
Geographic location		
Urban	-.94	77 0.42
Suburban	0.12	77 0.29
Rural	0.39	77 0.03*
Type of school (grade level)		
Pre-K	0.14	77 0.46
K-5	-.265	77 0.16
6-8	-.04	77 0.83
9-12	0.21	77 0.27
Non-student allocation	-.43	77 0.02*
In-service training	0.38	58 0.04*
Online training	-.001	45 0.99
Professional conferences	0.34	53 0.07
Graduate courses	0.06	48 0.77
Personal Reading Scholarly Articles	0.27	56 0.16
Personal Reading Textbooks	0.25	56 0.19

* Correlation is significant at the $p = 0.05$ level (2-tailed).

Note. The scale for each of the variables is as follows: School setting was measured by geographic location delineated as 1= urban, 2= suburban, 3= rural. Degree level: 1= Master's, 2 = Masters +30, 3= Specialist, 4= Doctorate. Program philosophy was measured on a 5-point Likert scale delineated as 1= primarily assessment focused, 2=somewhat assessment focused, 3= balanced between assessment and intervention focus, 4= somewhat intervention focused, 5= primarily intervention focused. Grade level was measured in percentages of time spent in each setting reported including a category for non-student allocation in which no direct student contact occurs. In-service training, online training, professional conferences, and graduate coursework were continuous variables measured by the number of trainings, conferences, and courses reported. Medication monitoring frequency was measured on a scale of 1=annually, 2=quarterly, 3=once per month, 4= once per week, 5= daily, 6=two to five times per day, 7= five or more times per day. The sample sizes range from a minimum of 59 cases to a maximum of 140

Additional Information

This section examines two further areas of interest in addition to the original research questions. Predictive analyses examined how well degree level, training program philosophy, geographic location, types of training reported related to medication monitoring predict the frequency of medication monitoring by school psychologists. Additionally, the types of disorders school psychologists reported monitoring medications for were examined.

How well does degree level, training program philosophy, geographic location, types of training reported related to medication monitoring predict the frequency of medication monitoring by school psychologists?

To determine which variables were most predictive of the frequency of medication monitoring by school psychologists, a simultaneous multiple regression analysis was utilized. Specifically, respondents' answers to items 5 (highest degree earned), 10 (geographic location), 12 (types of training reported), 13 (philosophy of training program), and 16 (frequency of medication monitoring) were examined. Some survey items from each aforementioned variable were not included in the model if less than 50 respondents completed the items (e.g., number of professional conferences and online trainings attended). Respondents' answers to item 10 were re-coded into dummy variables due to their categorical nature in order to be entered into the regression model. Prior to conducting the multiple regression analysis, preliminary analyses were conducted to ascertain whether any violations of the assumptions of normality, linearity, multicollinearity, and homoscedascticity occurred. First, the data were examined for the presence of multicollinearity. When variables are highly correlated in a multiple

regression analysis it becomes difficult to identify the unique contribution of each variable in predicting the dependent variable (i.e., frequency of medication monitoring) because the variables which are highly correlated are predicting the same variance in the dependent variable. The values examined to determine if multicollinearity exists in the model were tolerance and variance inflation factor (VIF). Tolerance is an indicator how much variability of an independent variable is not explained by the other variables. Tabachnick and Fidell (2007) recommend using a value of less than .10 as a guideline. Specifically, if a value is very small (<.10) this indicates the multiple correlations with other variables is very high. The VIF is interpreted as the inverse of tolerance and Tabachnick et al. (2007) recommend values above 10 are a cause for concern. Two independent variables exceeded these guidelines (personal reading of scholarly texts and personal reading of textbooks and other sources). Due to the sensitivity of regression analyses to violations of the assumption of multicollinearity, these variables were combined in the model due to the very similar nature of each variable (i.e., personal reading of scholarly journals and textbooks). Next, the data were examined for violations of the assumptions related to normality, linearity, and homoscedascticity. Utilizing the probability plots generated by SPSS and the regression standardized residual plot the data were examined for violations to the aforementioned assumptions. The data fell in a linear pattern suggesting no major deviations from normality. Additionally, the scatterplot generated by SPSS was examined. Specifically, the standardized residuals were visually examined and appeared to follow a rectangular pattern that did not deviate past 3.3 or -3.3 standard deviations from the mean. This pattern is desired as it suggests no violations of the assumptions needed to utilize a multiple regression analysis (Tabachnick et al.,

2007). The Mahalanobis distance was also examined to check for outliers. The critical chi-square value based on the degrees of freedom was calculated to be 24.32 using an alpha level of .001. Additionally, the value for Cook's Distance was examined to determine the degree to which the data identified as an outlier were having an undue influence on the overall model. Tabachnick et al. (2007) recommend values that exceed 1 are potentially exhibiting undue influence on the overall regression model and should be removed from the dataset. As a result, three data points fell significantly outside of this value and were subsequently removed from the dataset. The results of the analysis are presented in Table 15. An alpha level of .05 was used to determine statistical significance. The regression analysis, predicting frequency of medication monitoring from seven predictor variables, was not statistically significant, F (6, 44) = 0.86, p = .98, R^2 = .11

Table 15

Simultaneous Regression Analysis for Demographic Variables and Training Predicting Medication Monitoring Practices (n = 51)

Variable	*B*	*SE B*	*β*	*t*	*p*
Constant	2.11	0.66		3.17	0.03
Degree level	0.08	0.20	0.06	0.39	0.69
Program philosophy	0.22	0.15	0.25	1.49	0.14
School setting					
Urban [Rural = reference]	-.01	0.41	-.01	-0.01	0.99
Suburban [Rural = reference]	-.10	0.36	-.05	-.27	.78
In-service training	0.02	0.04	0.09	0.60	0.55
Personal Reading	0.02	0.04	0.07	0.46	0.64
R^2			0.11		
F			0.86		

$p < .05$

Note: For the School Setting variable, Rural is denoted as the reference category. The scale for each of the variables is as follows: Degree level: 1= Master's, 2 = Masters +30, 3= Specialist, 4= Doctorate. Program philosophy was measured on a 5-point Likert scale delineated as 1= primarily assessment focused, 2=somewhat assessment focused, 3= balanced between assessment and intervention focus, 4= somewhat intervention focused, 5= primarily intervention focused. School setting was measured by geographic location delineated as 1= urban, 2= suburban, 3= rural. In-service training, and personal reading, were continuous variables measured by the number of trainings, conferences, hours spent reading, and courses reported.

For what types of disorders do school psychologists monitor medications?

Participant responses from survey item 18 asking "In the last year, approximately how many students have you monitored the effects of psychotropic medications for each of the following disorders?" were examined. The response categories included Attention-Deficit/Hyperactivity Disorder, Oppositional Defiant Disorder, Depressive Disorders, Anxiety Disorders, Autism Spectrum Disorders, Asperger's Disorder, Bipolar Disorder,

Tourettes Syndrome and/or Tic Disorders, Thought Disorders (e.g., schizophrenia), Multiple Disorders (e.g., intellectual disability and disruptive behavior disorder), and a category for "Other Disorders" in which respondents were asked to write in the name of the disorder. Respondents were asked to indicate the number of students for whom medication monitoring data were collected in the last year using a scale of: "0", "1-2", "3-5", "6-8", and "9+". The results are presented in Table 16. Overall, the majority of respondents reported monitoring medications for a variety of disorders. It is important to note the results in the table below are not mutually exclusive. Specifically, respondents were able to report monitoring medications for a variety of disorders. The disorder with the highest reported incidence of medication monitoring was Attention-Deficit/Hyperactivity Disorder (M =1.80, SD = 0.96, n = 75) while the lowest was Thought Disorders (M = 0.27, SD = 0.660, n = 44). When examining the specific percentages in Table 14 for each disorder which school psychologists reported monitoring medications, most reported doing so for less than six students in the past school year. Additionally, a small number of school psychologists utilized the category "Other Disorders" and reported monitoring medications for seizure disorders and Obsessive Compulsive Disorder. However, they did not indicate what frequency or the number of students for whom they monitored medications.

Table 16

Disorders for which School Psychologists Report Monitoring Medication in the Past Year (n =77)

Disorder	*n*	*M* *SD*	*Sk* *Ku*	Number of Students 0	1-2	3-5	6-8	9+
Attention-Deficit/Hyperactivity	75	1.80	0.98	1.3%	44.0%	37.3%	8%	9.3%
Disorder (ADHD)		0.96	0.35					
Oppositional Defiant Disorder,	50	1.26	0.86	32%	34%	18%	8%	8%
Conduct Disorder or other		1.22	-.074					
externalizing disorder								
Depressive Disorders	46	0.93	1.06	43.5%	32.6%	13%	8.7%	2.2%
		1.06	0.46					
Anxiety Disorders	48	0.81	1.09	37.5%	50%	6.3%	6.3%	0%
		0.82	1.29					
Autism Spectrum Disorders	55	0.93	1.35	43.6%	34.5%	12.7%	3.6%	5.5%
		1.10	1.45					
Asperger's Disorder	46	0.67	1.92	56.5%	30.4%	6.5%	2.2%	4.3%
		1.01	3.77					
Bipolar Disorder	51	0.80	1.54	41.2%	47.1%	3.9%	5.9%	2.0%
		1.01	2.77					
Tourettes Syndrome and/or Tic	42	0.31	1.68	73.8%	21.4%	4.8%	0%	0%
Disorders		.563	2.02					
Thought Disorders	44	0.27	2.69	81.8%	11.4%	4.5%	2.3%	0%
		.660	7.31					
Multiple Disorders	43	0.53	2.12	74.4%	9.3%	9.3%	2.3%	4.7%
		1.07	3.85					
Other Disorders								
Seizure Disorders	2	1.5%	N/A	N/A	N/A	N/A	N/A	N/A
Obsessive Compulsive Disorder	4	3%	N/A	N/A	N/A	N/A	N/A	N/A

Note. The scale for the variables with the exception of the category "Other" was assessed using the following: 0= no students, 1-2=one-two students, 3-5=three to five students, 6-8=six to eight students, 9+=nine or more students. The scale for the category "Other" was free response and the N along with the percentage of respondents who endorsed each are presented.

Summary of Results

In summary, the results of this study found the majority of school psychologists believe medication monitoring is an appropriate role (74.3%); however, intercorrelations between school psychologists' beliefs regarding medication monitoring and the frequency of actual reported practice was low ($r_s = 0.24$). School psychologists who reported they engaged in medication monitoring in any amount held more favorable views of this practice being an important role for school psychologists than those who did not report engaging in medication monitoring at all. School psychologists reported using a variety of methods to monitor medications (e.g., behavior rating scales, teacher interviews, direct behavior observations) and utilized each method on average once per month. However, some respondents (< 2%) did report engaging in medication monitoring as frequently as once per day. With respect to receiving training related to medication monitoring when broadly defined, over half the sample reported receiving training at some time in the past (63.3%). The types of training included in-service trainings, graduate coursework, and personal reading of scholarly articles. School psychologists reported a number of barriers as well as facilitators to engaging in medication monitoring. The most frequently reported barriers were lack of time and community support (e.g., lack of interest from physicians) as well as insufficient knowledge to engage in medication monitoring. The facilitators most frequently reported were availability of ongoing professional training, communication and collaboration between the school psychologist and prescribing physician, and inclusion of medication monitoring activities on a student's IEP.

When examining the direction and strength of the relationship between various demographic variables (e.g., degree level) and engagement in medication monitoring, weak correlations were observed. This was also found when examining the relationship between types of training reported in medication monitoring and frequency of engaging in the practice. School psychologists did report engaging in medication monitoring for a variety of disorders. The most frequent disorder was Attention Deficit/Hyperactivity Disorder while the least frequent was Thought Disorders. When examining how well demographic variables and types of training related to medication monitoring and actually predict engagement in the practice, the results were not significant. Specifically, the percentage of variance in medication monitoring accounted for by the demographic and training variables was not significantly different than zero.

Chapter Five

Discussion

Summary of the Study

The purpose of this study was to provide a comprehensive examination of the current practices of school psychologists related to medication monitoring for the most commonly prescribed psychotropic medications used with children and adolescents. Specifically, this study examined the beliefs and practices of school psychologists related to medication monitoring, such as the types and frequency of data collected, with whom data are shared, and the types of training received related to medication monitoring. Finally, this study examined the perceived facilitators and barriers to medication monitoring in public schools by school psychologists.

This chapter will summarize the study results and discuss these findings with respect to the extant literature. In addition, this chapter will discuss the implications of the results for school psychologists, identify limitations of the study, and provide directions for future research.

Research questions 1 and 2: Beliefs related to medication monitoring and frequency of self-reported medication monitoring practices.

The purpose of these research questions was to determine the beliefs school psychologists hold related to medication monitoring as part of their overall professional activities as well as the relationship between those beliefs and actual medication

monitoring practices. Findings from this study indicate the majority of respondents (74.3%) "Agree" or "Strongly Agree" (M = 3.93, SD = 0.85) that medication monitoring is an appropriate role for school psychologists.

The following definition for medication monitoring was used in the survey: "Medication monitoring is defined as including the following activities (not an exhaustive list); consultation with classroom teacher(s) and paraprofessionals, utilization of behavior rating scales, behavior observations, review of work samples or curriculum-based assessments". These findings are similar to extant research on this topic. Specifically, Guereasko-Moore, DuPaul, and Power (2005) found the majority of respondents to their survey also reported being in agreement that medication monitoring is a practice in which school psychologists should be engaged. These findings indicate that over time, the beliefs regarding medication monitoring among school psychologists have remained relatively stable. However, it is important to note the samples were drawn from different populations. Specifically, Guereasko-Moore et al. (2005) drew from a national sample of 700 school psychologists who were members of the National Association of School Psychologists (NASP) while the current study was based upon a sample of 273 school psychologists who were members of the Florida Association of School Psychologists (FASP).

School psychologists who reported "Agree" or "Strongly Agree" indicating their endorsement of medication monitoring as a role in which they should be engaged reported differing levels of practice. Specifically, school psychologists were asked to rate the frequency in which they engage in medication monitoring for the previous school year. However, when examining group differences among school psychologists who

reported “yes” to the question asking if they have monitored medications at all over the past school year and their beliefs regarding medication monitoring, statistically significant results were obtained. Specifically, school psychologists who reported they do engage in medication monitoring also reported perceiving this to be a needed role more than those who did not report engaging (i.e., answered “no”) in medication monitoring. Overall, the strength of the relationship between school psychologists’ beliefs regarding medication monitoring and their actual reported practice was relatively weak. However, school psychologists who reported engaging in medication monitoring also reported more favorable beliefs regarding the practice than those who did not.

Several plausible hypotheses can be generated from these results. Specifically, many school psychologists may agree that medication monitoring is an appropriate professional role; however, they may not have time to engage in this practice. Extant research found numerous barriers exist that prevent school psychologists from engaging in roles outside traditional activities such as psychoeducational testing and assessment for special education services (DuPaul & Carlson, 2005; Sulkowski, Jordan, & Nguyen, 2009). Additionally, school psychologists may agree medication monitoring is an activity in which they should be engaged, but not have suitable training or tools to carry out the practice. In the current study, school psychologists were asked to report barriers to medication monitoring as well as facilitators. Many school psychologists reported lack of time, insufficient training, and community support as reasons for not engaging in medication monitoring. Previous research also reported similar findings. Specifically, Carlson, Demaray, and Hunter-Oehmke (2006) conducted a survey examining multiple facets of school psychologist’s practices related to medication monitoring. Not having

sufficient training to engage in medication monitoring was found to be a significant barrier as was having high caseloads which likely would result in insufficient time to conduct these practices. The barriers and facilitators to medication monitoring will be discussed in further detail later in this chapter.

Research Question 3: Current Medication Monitoring Practices of School Psychologists.

This research question examined four facets of medication monitoring. Specifically, it examined (a) the types of data collected when engaged in medication monitoring, (b) the frequency of data collection, (c) the frequency with which data are shared, and (d) with whom medication monitoring data are shared.

Findings indicate school psychologists utilize various types of data when engaged in medication monitoring. Teacher rating forms, direct behavior observations, and interviews were the preferred methods of medication monitoring data collection. In the current study, respondents reported selecting methods of data collection that are sensitive to small changes in performance over time compared to less sensitive measures (e.g., grades and annual state-wide standardized tests). Methods that allow for ongoing progress monitoring such as behavior rating scales used in conjunction with direct behavior observations were likely preferred due to their objectivity when used as a multi-modal method of data collection. This speaks to the unique training school psychologists possess which enables them to be well suited for the practice of medication monitoring. Other researchers have advocated for school psychologists to engage in medication monitoring to a greater extent due to their unique training (DuPaul & Carlson, 2005). Specifically, these authors purport that many school psychologists are well-suited to

assist in medication monitoring considering the following skills in their repertoire: (a) training in data-based decision making; (b) training in systematic problem-solving examining factors from an ecological perspective; (c) ability to progress monitor using methods sensitive to small changes in performance; and (d) the ability to observe children and adolescents in the school environment which typically is significantly different from office-based settings or other community settings. Furthermore, previous research has found the behaviors children and adolescents exhibit in non-school settings may be dramatically different from the levels of behaviors exhibited in the classroom (Pelham et al., 2000). Methods school psychologists used to collaborate will be discussed in further detail later in this chapter.

Along with possessing unique training, school psychologists have at their disposal a number of structured and standardized tools to use that are efficacious in the practice of medication monitoring. For example, the use of structured direct behavior observation tools such as the Behavior Observation System for Students (BOSS; Shapiro, 2010) provides concrete data to evaluate academic engagement and off-task behaviors that may be impacted by various dosage levels of psychotropic medications. In fact, research supports the use of the BOSS for evaluating the effects of medications on students with Attention-Deficit/Hyperactivity Disorder (ADHD). Specifically, Power, DuPaul, Shapiro, and Kazak (2003) found this tool was efficacious in helping to determine the impact of stimulant medications being used to treat the symptoms of ADHD.

In the current study, approximately half of the entire sample reported using some method of data collection to engage in medication monitoring. This indicates school psychologists are engaging in medication monitoring; however, the frequency in which

they are monitoring the effects of medications is limited. Specifically, less than 1% of respondents reported collecting medication monitoring data on a daily basis. It may not be possible for many school psychologists to collect data daily given time and resource constraints. Although it is recommended that during titration of a stimulant medication careful monitoring occur to achieve the best dose-response relationship (DuPaul & Carlson, 2005), this may not be feasible for most practicing school psychologists. It should be noted that this study did not differentiate between whether the school psychologist or a delegate collected these data. Specifically, a paraprofessional, school counselor, or classroom teacher may have collected data related to a student's response to medication and potentially shared it with the school psychologist. Additionally, this study found a higher than average school psychologist to student ratio. This study found 38.9% of the sample reported a school psychologist to student ratio of 1: >3,000. When comparing this ratio to the most recent data from the National Association of School Psychologists membership survey, only 4% of school psychologists nationally reported having a ratio of 1: > 3,000 (Curtis et al., 2010). As a result, due to their overall caseloads it is possible school psychologists in the current study may have other members of the school assist in collecting data related to medication monitoring. Future research should explore this aspect of medication monitoring more in-depth.

The majority (i.e., 68%) of school psychologists reported using each of the potential medication monitoring methods once per month or less. It is plausible that school psychologists collect data regarding a child's response to medication at regularly scheduled times that occur once per month such as before a school-based intervention team meeting. School psychologists reported direct behavior observations, child

interviews, and teacher interviews as the most frequent methods to be used once per week. Previous research found similar data collection methods to be viewed by school psychologists as the most effective and feasible in the school setting (Guerasko-Moore, et al., 2005). However, this study was limited to utilizing these data collection methods for students with ADHD. The current study examined the use of the aforementioned data collection methods for a wide variety of disorders. Future research should explore how school psychologists integrate multiple sources of information when sharing data with others (e.g., school-based intervention team, teacher, or prescribing physician).

The results varied with what entities school psychologists are sharing medication monitoring information and the frequency with which they are engaging in this practice. Specifically, the majority (66%) of school psychologists who reported collected these data indicated that they share the data with others one time per month or less. Approximately 15% of school psychologists reported sharing medication monitoring information weekly with teachers. Also, 17.6% of school psychologists reported sharing medication monitoring information bi-weekly at school-based intervention team meetings. Lastly, a small percentage of school psychologists reported daily sharing of information with the teacher (2.7%) and school based-intervention team (1.4%). With respect to the prescribing physician, school psychologists, on average, reported sharing information approximately one time per month or less (52%). This is consistent with previous research. Specifically, Carlson, Demaray, and Hunter-Oehmke (2006) found in a study examining school psychologists' caseloads in which students were receiving medications that 62% of school psychologists reported working with physicians to

evaluate medication trials for children but the collaborative monitoring was infrequent (e.g., < 1 time per month).

When examining the frequency in which medication monitoring information is shared, it is hypothesized that medication monitoring data are shared with teachers and other staff at regularly scheduled meetings in which a discussion of the identified child is already taking place. Sharing of information with prescribing physicians occurs less frequently due to barriers in communication and collaboration. Extant research has found physicians are unsure with whom to communicate or how to forge alliances with the educators including school psychologists (Bradley-Klug et al., 2010). Additionally, Bradley-Klug et al. (2010) found physicians reported first attempting to collaborate with the school nurse and classroom teacher, rather than the school psychologist. Future research should examine more specific methods school psychologists and physicians would find effective and feasible to communicate on a more frequent basis.

Research Question 4: Types of Training School Psychologists Receive in the Practice of Medication Monitoring.

Sixty-three percent of respondents reported receiving training related to medication in the past. In-service training, professional conferences, and personal reading of scholarly articles were reported to be the most frequent avenues through which school psychologists received this training. In comparison, Carlson and colleagues (2006) examined school psychologists' practices related to medication monitoring and found the majority of school psychologists have not had formal university training in child psychopharmacology (81%). The primary method school psychologists acquired background knowledge in child psychopharmacology was through professional

workshops (88%) and independent reading (96%). In contrast to the Carlson et al. study, 45% of respondents in the current study indicated they had some type of training related to medication monitoring as a component of a graduate course. Carlson et al. (2006) examined this aspect of training and found only 19% of respondents reported graduate coursework containing a component that includes topics related to medication monitoring. As will be discussed later in this chapter, the elapsed time between studies, increased attention towards psychotropic medications being taken by children, and evolving school psychology training programs may contribute to the differences in findings.

With respect to personal reading of scholarly articles as well as other sources of information (e.g., textbooks), a wide range was reported from 0-100 hours of time spent reading on the topic. A number of hypotheses are offered to explain these findings. School psychologists are required to participate in a variety of trainings and in-service presentations each year in most districts. Additionally, school psychologists who hold a Nationally Certified School Psychologist (NCSP) credential are required to obtain National Association of School Psychologists (NASP) approved continuing education units (CEUs) every three years. It is possible that school psychologists who hold the NCSP seek training in medication monitoring through the resources offered by NASP. Future research examining this hypothesis would need to draw upon a stratified national sample.

This study found a higher percentage of school psychologists reporting training in medication monitoring than previous research. Specifically, Guerasko-Moore et al. (2005) found 41.9% of school psychologists reported receiving training in medication

monitoring compared to 63.3% in the current study. It is hypothesized because this current study was conducted six years after the original study, the number of training opportunities available to school psychologists regarding the importance of medication monitoring have increased. Factors such as polypharmacy (Bush, 2006) and the overall increase in the number of school age students prescribed medication (Lam, & Collier-Crespin, 2003; Aman, Lam, & Van Bourgondien, 2005; Witwer & Lecavalier, 2006) may also contribute to increased training opportunities for school-based personnel.

Another important hypothesis is related to where each sample was drawn. The study by Guerasko-Moore et al. (2005) was based on a national sample of 700 school psychologists who were members of NASP. The current study included a sample of 375 members of FASP. The demographics of each sample are inherently different. It is possible that the training opportunities offered in Florida are different than what may be available elsewhere in the nation.

Overall, respondents report receiving training in medication monitoring and report a variety of sources to obtain this training. Future research could examine the opportunities available at professional conferences that offer training on medication monitoring in the schools. Additionally, future research could examine the types of training that prepare school psychologists to most competently engage in medication monitoring. Examining the modalities and preferences for training on this topic could be yet another research avenue in the future.

Research Question 5: Perceived Facilitators and Barriers to Medication Monitoring

Respondents reported a number of factors that facilitate the practice of medication monitoring. Professional training on medication monitoring was most frequently

reported by respondents as a facilitator to increasing the probability that a school psychologist would engage in this practice. Also, collaboration among school psychologists and other professionals (e.g., prescribing physician, teachers, and parents) was cited as an important facilitator. Extant research on collaboration among school psychologists and other professionals supports this as an important facilitator for other activities such as collaborating among school psychologists and other professionals to create a wrap-around support system of care for students receiving services from multiple entities (Carlson, 2008; Drotar, Palmero & Berry, 2004). In fact, creating more cohesive systems of care is advocated as the first step in effective medication monitoring (Wodrich et al., 1999). Additionally, enhancing communication and collaboration between school-based personnel and medical entities can improve overall wrap-around services for children and adolescents. For example, research has found problems related to adherence with medication regimens occurs due to a myriad of factors such as intolerable side effects and misunderstanding of the need to regularly take medication (Bussing, Koro-Ljungberg, & Gary, 2005; Gau, Chen, & Chow, 2008). Because many medications are taken to improve symptoms of disorders that may impact both academic and social functioning, school personnel can also be part of the overall team that helps educate children and families about the importance of adhering to medication regimens as part of an overall home-school partnership.

A number of respondents suggested integrating medication monitoring as a practice on students' Individualized Education Plans (IEP) as a method to facilitate the practice of medication monitoring. This would also likely enhance a cohesive system of care for children and adolescents. Time needs to be set aside for the school psychologist

to collect data and communicate with outside parties. Obtaining easy to use checklists or other data collection methods were also listed as an important facilitator to medication monitoring. There are a number of tools available that would be useful in the practice of medication monitoring. For example, the BOSS (Shapiro, 2011) is sensitive to small changes in behavior that would directly bear a relationship to students who are being titrated for a medication or who may be experiencing negative side effects (e.g., drowsiness) impacting academic functioning. Additionally, as previously mentioned, tools such as the BOSS have been shown to be effective in helping to determine the right dosage for stimulant medications for a particular child (Power et al., 2003). This is important as the same dosage of a medication can have dramatically different effects on different children (Christensen, Helms, & Chesney, 1999). Having more time via fewer students on school psychologists' caseloads was also reported to facilitate medication monitoring. The current study found 38.9% of school psychologists reported a school psychologist to student ratio at or exceeding 1:3,000. NASP recommends a school psychologist to student ratio of no more than 1: 2,500 (Curtis et al., 2010). Thus, respondents to this survey have higher school psychologist to student ratios than is recommended by NASP.

This study found differences compared to previous research with respect to facilitators for medication monitoring. Specifically, Guerasko-Moore et al. (2005) found teacher support to be the strongest facilitator for medication monitoring. This particular facilitator was not reported by respondents in the current study. One hypothesis is that the current study employed an open-ended question format regarding facilitators in contrast to the forced-choice question on the survey related to barriers. It is possible school

psychologists did not consider teacher support as a facilitator to medication monitoring due to the way the question was structured. It is hypothesized that respondents may have not fully understood this question or may have not completely answered it due to its location on the survey as the last question.

This study found no predictive relationship between a number of variables (i.e., degree level, geographic location, types of training, and training program philosophy) and whether a school psychologist engages in medication monitoring. It is likely a number of other factors not examined in this study are related to whether a school psychologist engages in this practice. The predictive nature of various variables and their effects on school psychologist's medication monitoring practices will be discussed later in this chapter.

With respect to barriers to medication monitoring, respondents reported a number of factors that inhibit their efforts to engage in this practice. Lack of time was reported as the largest barrier. This finding is consistent with previous research. Specifically, Guerasko-Moore et al. (2005) found time was the largest barrier to medication monitoring. Lack of community support (e.g., physicians and other providers) was listed as the second largest barrier in the current study. Insufficient knowledge about medication monitoring or methods to engage in the practice was listed as the third largest barrier. Interestingly, a number of respondents utilized the "Other" category to write in their own barriers. Responses included concerns that pediatricians prescribe the most amount of psychotropic medications yet have the least amount of training compared to other medical professionals was listed as a barrier. Extant research has found that the vast majority of psychotropic medications are indeed prescribed by primary care

physicians rather than specialists (i.e., child and adolescent psychiatrists), particularly in rural areas (Bush, 2006). It is likely that pediatricians are unaware of the skills a school psychologist may possess or how to collaborate with them for activities including medication monitoring. Bradley-Klug and colleagues (2010) examined pediatricians' perceptions of school psychologists' roles. Pediatricians reported being largely unaware of school psychologists' training, indicated misperceptions about their role within public schools, and being unsure of with whom to communicate at the school regarding a child in their care. Future research should examine how to minimize barriers school psychologists listed such as time and insufficient training along with the most effective methods school psychologists could use to forge relationships with not only primary care pediatricians but other professionals such as therapists and child/adolescent psychiatrists. Examining methods to increase a cohesive system of care related to ongoing professional communication and collaboration among school psychologists and other professionals would be another important research avenue.

Research Question 6: Direction and Strength of the Relationship Between Geographic Location, Degree Level, Training Program Philosophy, Type of School Served, Types of Training Related to Medication Monitoring, and Frequency of Medication Monitoring by School Psychologists.

This research question examined the interrcorrelations between the school psychologists' geographic location, degree level, training program philosophy, type of schools served, types of training related to medication monitoring, and the frequency school psychologists engage in medication monitoring. Overall, small to moderate significant positive correlations were found for some variables. Specifically, school

psychologists who reported practicing in a rural school setting (r_s = 0.39) and who received in-service training (r_s = 0.38) were the only significant positive correlations. A significant moderate negative correlation was found for school psychologists who reported spending some of their time in a non-student allocation (r_s = -.43).

Several hypotheses could explain the lack of significant relationships between the variables examined other than those previously mentioned. First, the variables selected were chosen based on an *a priori* decision of which variables may potentially be related to school psychologists' practice of medication monitoring. It is possible other variables not examined in this study may be more closely related such as school psychologist to student ratio, years practicing as a school psychologist, and specific facilitators that enable a school psychologist to engage in medication monitoring. Second, this study utilized an overall sample size of 240 respondents. However, for this particular research question, only 77 were included in the analyses as only data from respondents who indicated they do engage in medication monitoring practices were included in the analyses. Therefore, the relatively small sample size may have impacted the results. A larger nationally representative sample may produce different findings than the current study. An additional possible reason could be that the variables examined truly are not related to the degree to which a school psychologist monitors medications. That is, students are taking medications at all grade levels and geographic locations across the U.S. based on previous prevalence research (Abrams, Flood, & Phelps, 2006; Zito, 2003). Also, although it was hypothesized that school psychologists trained at the doctoral level would have more specialized coursework containing components related to medication monitoring, it is possible this is not the case. Training programs may integrate topics

related to medication monitoring throughout coursework, regardless of degree level. It was also hypothesized that training programs which are more intervention focused than assessment focused would incorporate components related to medication monitoring at greater rates. It is possible this is also not occurring in practice. Overall, the relatively weak relationships found should be examined more closely in future research as a larger sample size and examining different interrelationships between variables could yield more significant results.

Additional Information: Predictors of Medication Monitoring

Significant results were not obtained predicting medication monitoring practices by a variety of demographic, training, graduate program philosophy, and degree level variables. Some specific survey items needed to be removed from the regression model due to having a low *n*. Additionally, some variables had to be combined (e.g., types of training) in the analyses due to violations of the assumptions for a multiple regression analysis. The overall sample size for this question was 51, and several respondents' data had to be eliminated due to falling outside of acceptable ranges for a multiple regression analysis (i.e., Mahalanobis distance exceeding cutoff). Therefore, on one hand it is plausible the independent variables examined (i.e., degree level, training program philosophy, type of school served, and types of training reported) were not predictive of whether a school psychologist engages in medication monitoring. As was found when examining the intercorrelations between demographic, training program philosophy, type of schools served, and degree level, there simply may not be a strong relationship between these variables as well as there not being a single variable that predicts whether a school psychologist is going to engage in medication monitoring. Alternatively, it is

possible due to limitations with this study's sample size that significant results could not be obtained. Future research should examine what factors are truly predictive of school psychologists' engagement in medication monitoring at a number of levels. First, replicating this study would further answer whether there are factors that predict if a school psychologist engages in medication monitoring. Second, examining the multitude of other facets that could be predictive (e.g., assignment to a center school specializing in educating children with behavior disorders) of a school psychologist engaging in medication monitoring could also further determine if there are other factors predicting school psychologists' engagement in medication monitoring. Lastly, examining the relationship between the school psychologist to student ratio as part of an overall multiple regression analysis that includes other demographic variables may glean new interesting information and significant results.

Additional Information: Types of Disorders for which School Psychologists Monitor Medications

The current study sought to build on previous research examining medication monitoring practices of school psychologists for stimulant medications utilized to treat the symptoms of Attention-Deficit/Hyperactivity Disorder (ADHD; Guerasko-Moore et al., 2005). One facet of the current study was to examine other disorders of youth for which school psychologists may be monitoring medications. Respondents were asked on the following scale how many students per disorder they have monitored in the past school year: (0 = no students), (1-2 = one-two students), (3-5 = three to five students), (6-8 = six to eight students), and (9+ = nine or more students). The scale for the category "Other" was free response in case there were disorders for which school psychologists

were involved in medication monitoring that were not listed. The disorders which were listed included Attention-Deficit/Hyperactivity Disorder, Oppositional Defiant Disorder, Depressive Disorders, Anxiety Disorders, Autism Spectrum Disorders, Asperger's Disorder, Bipolar Disorder, Tourette's Syndrome and/or Tic Disorders, Thought Disorders (e.g., schizophrenia), Multiple Disorders (e.g., intellectual disability and disruptive behavior disorder), and a category for "Other Disorders" in which respondents were asked to write in the name of the disorder.

The results of this study indicate school psychologists are monitoring medications for a variety of disorders. Although it is not surprising that ADHD was reported as the most frequent disorder in which medication monitoring occurred, other disorders were also prevalent albeit at lower rates. The disorders for which school psychologists reported monitoring medications are listed from most to least frequent: ADHD, Oppositional Defiant/Conduct Disorder, Autism Spectrum Disorders, Depressive Disorders, Anxiety Disorders, Bipolar Disorder, Multiple Disorders, Asperger's Disorder, Tourette's Syndrome and/or Tic Disorders, and Thought Disorders. The results indicate school psychologists are monitoring medications for a variety of disorders but on average for 1-2 students per year.

Overall, the results of this research question provide interesting new data. As previously noted, this study sought to expand on previous research which examined medication monitoring practices of school psychologists limited to students with ADHD. This study found a multitude of disorders for which school psychologists are monitoring medications. Previous research found 39% of children and adolescents receiving special education services were prescribed a psychotropic medication to inhibit externalizing

behaviors and 17% of those students were administered multiple medications (Mattison, 1999).

These findings build upon previous research in determining what other disorders of youth school psychologists may be monitoring medications. To date, no extant research has examined this topic. Future research could look at a myriad of other factors that facilitate or inhibit school psychologists from monitoring medications for various disorders. Additionally, it would be interesting to know what types of methods school psychologists use for each type of disorder. Potentially interviewing school psychologists about how they monitor medications for specific disorders (e.g., externalizing vs. internalizing) along with what tools they feel are most effective and feasible for each particular disorder would likely yield interesting new information.

Implications for Practice: Facilitating Medication Monitoring Practices

Findings from this study build on previous research and underscore the need for school psychologists to engage in medication monitoring in certain situations. Significant numbers of children are attending school while being prescribed a number of psychotropic medications aimed at treating symptoms that frequently inhibit school performance. For example, Mattison (1999) found over one third of students receiving special education services in public schools are prescribed a psychotropic medication and a quarter of those are prescribed multiple medications to treat externalizing behavior problems. Many of the medications being prescribed to children and adolescents have not had substantial research conducted on their effects in children (Bush, 2006). Furthermore, the practice of off-label prescribing along with the fact that children are being prescribed medications by multiple professionals further demonstrates a need to

monitor. Specifically, given the findings that many children are prescribed various psychotropic medications for the purposes of treating symptoms that primarily occur in the school setting (DuPaul & Carlson, 2005), medication monitoring is a necessary role for school psychologists.

The results of this study indicate most school psychologists are in agreement and feel medication monitoring is a necessary role. However, a number of barriers exist as found in the current study. Specifically, time was reported as a major barrier. Advocating for allocated time to conduct activities related to medication monitoring, writing into IEPs the need to conduct monitoring of the child's response to medication, and communication with the prescribing physician will alleviate some of the barriers reported in this study. Additionally, as most practitioners in the field of school psychology hold a specialist degree or equivalent, integrating coursework into both the doctoral and specialist level training programs may increase future practitioner's awareness of methods to engage in medication monitoring. Many programs train practitioners to use methods such as direct behavior observation augmented with tools such as the BOSS (Shapiro, 2010) as well as utilizing a collaborative consultation model with school personnel. These skills practitioners possess make them well suited to engage in medication monitoring when provided with the knowledge of how and time to do so.

Given the extant research on barriers to communication and collaboration with physicians as well as school psychologists (Bradley-Klug et al., 2010), it is important to continue to address and reduce barriers to creating a bi-directional system of care for children who may be prescribed multiple psychotropic medications and are experiencing

adverse side effects. Helping parents to learn to trust school personnel and fostering a partnership to benefit the child along with permission for the school psychologist and prescribing physician to engage in communication will help alleviate some of the barriers to medication monitoring.

Finally, as children increasingly are prescribed multiple medications and the demands in the classroom increase, teachers may not notice subtle changes in children that could be the result of a negative side effect to a medication. School psychologists with the knowledge and skills to assess small changes in behavior or academic performance may be able to educate teachers on strategies to identify problems a child is experiencing related to medication side effects. Using a systematic problem-solving approach, school psychologists can assist teachers and other educators to hypothesize causes for poor academic performance that may be related to psychotropic medication.

Limitations

This study has several limitations that should be considered when interpreting the results. A total of 140 usable surveys were included in the analyses to answer each research question with a notable exception. Respondents who indicated they had not engaged in medication monitoring over the past school year were directed to skip a number of questions. Not all participants reported engaging in medication monitoring. As a result, some research questions were analyzed with a smaller total sample (i.e., 77 respondents). This may have affected the significance of some of those analyses, particularly the predictive analyses.

Although this study resulted in a relatively high response rate of 61%, generalization of the results is restricted by the use of a convenience sample. The sample

was drawn from the FASP membership database representing only school psychologists practicing in the State of Florida. It also is irrespective of whether the school psychologists are also members of NASP or hold a NCSP credential. As a result, there are specific threats to ecological validity which affects the degree to which a researcher can generalize findings across settings or to other situations (Johnson & Christensen, 2004). Another potential threat to the results of this study is population validity. This refers to the degree to which a researcher can generalize the findings to other groups (Johnson & Christensen, 2004). As previously mentioned, this study employed a convenience sample of school psychologists practicing in the State of Florida. The results of this study cannot be generalized outside of the population used in the study and also must be cautiously compared to previous research as other studies on this topic referenced in this chapter utilized a different study population.

There is a possibility that responses obtained do not accurately reflect the practices of school psychologists engaged in medication monitoring. The construct of social desirability bias may affect the results (Dillman, Smyth, & Christian, 2009). Specifically, respondents may assume the researcher wants them to engage in medication monitoring practices and may overestimate their practices as a result. Additionally, this study utilized an up-front incentive format in which each participant was given a dollar bill enclosed in the survey as an incentive for participation. Respondents may have felt indebted to the researcher due to receiving a tangible reward upfront and mistakenly reported engaging in medication monitoring when in fact they do not. Consistent with social exchange theory, the cost to the respondent was kept to a minimum by utilizing a brief (e.g., 15-20 minute completion time) survey and providing a self-addressed stamped

envelope in which to return it based on recommendations from Dillman et al. (2009). In order to minimize the probability of this occurrence, the survey methodology utilized an anonymous design along with pilot testing the survey with 26 school psychologists which produced clear and concise operational definitions of medication monitoring as well as clearly worded questions.

Future Directions

This study was the first to examine the medication monitoring practices of school psychologists for a wide variety of psychotropic medications prescribed to youth. The findings of this study inform both the literature and practice at the pre-service and in-service levels. However, because this study was the first to address these topics, it should be replicated with a larger more representative sample of school psychologists. There are a number of possible future directions to be considered based upon the outcomes of this study. . Examining specific types of training at the pre-service and in-service levels could help inform what types of training are most useful to school psychologists who wish to engage in medication monitoring. Developing standard protocols for use in school districts to assist teachers, paraprofessionals, and school psychologists with medication monitoring would likely help increase this practice. Assessing other school personnel such as administrators' beliefs regarding medication monitoring would be another likely avenue for future research. Further examining pediatricians, child and adolescent psychiatrists, neurologists, and other non-physician providers' beliefs regarding medication monitoring would also be helpful. Determining new methods to collaborate and communicate as well as what types of information (e.g., concise reports)

are most beneficial to both the school psychologist and prescribing physician will be informative.

Final Thoughts

Although it is largely believed that medication monitoring is an important role for school psychologists, more research on how to effectively monitor a child's response to medication is needed. More than half of the school psychologists in this study reported engaging in some form of medication monitoring. A number of barriers were reported that currently limit the ability to collect data and inhibit the frequency of data collection and monitoring. Respondents offered feedback regarding facilitators that would enhance the ability of the school psychologist to engage in medication monitoring. Future research is necessary to further explore this topic and to assist in the development of strategies to promote medication monitoring as a role for school psychologists.

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Appendices

Appendix A
Cover Letter to Participants

School Psychologists' Practices of Psychotropic Medication Monitoring

Dear FASP Member,

You have been selected as a current FASP member to participate in a research study examining the role of school psychologists in medication monitoring of students. The goals of this study are to determine the types of psychotropic medications (e.g., Adderall, Clonidine, Risperidone) school psychologists monitor, how the effects of medications are evaluated, with whom monitoring data are shared (e.g., teachers, parents, physicians), and the barriers to and facilitators of medication monitoring in our schools. Findings will inform both pre-service and in-service training on this important topic.

You are being asked to be part of this study because you are a practicing school psychologist whose primary employment is in a school setting. If you do not currently work in a school setting, please check the box on the front of the survey and return it in the postage paid envelope. **We would like you to be a participant in this study, regardless of the amount of time you currently spend monitoring psychotropic medications. The survey will only take 10-15 minutes to complete and we have provided you with a postage-paid envelope to use in returning the survey.** Participation is completely voluntary and involves completing the enclosed questionnaire and returning it in the enclosed envelope within **2 weeks**. Your participation will be anonymous. A completed and returned survey will be considered consent to participate in the study. Should we publish or disseminate findings from this study, only aggregate data will be published. **As a token of our appreciation for participating in this study, a dollar bill is enclosed to use for coffee, snack, or anything you wish.**

This study was approved by the University of South Florida Institutional Review Board (IRB # Pro00002616) and the Florida Association of School Psychologists. **"The Florida Association of School Psychologists encourages school psychologists to participate in the completion of surveys which increase the knowledge base about the practice of school psychologists in the state of Florida. This survey has been approved by the Research Committee and FASP Executive Board"**.

Thank you in advance for your time and assistance with this research study. If you have any questions or concerns about the study, please feel free to contact us at the numbers or emails listed below. **We also invite you to contact us if you would like to obtain the results of the study as soon as they are available.** If you have questions about your rights as a participant in this study, general questions, or have complaints, concerns or

issues you want to discuss with someone outside the research, call the USF IRB at (813) 974-5638.

Thank you so much for your participation.

Sincerely,

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Appendix B
Follow-up Letter to Participants

School Psychologists' Practices of Psychotropic Medication Monitoring

Dear FASP Member,

You have been selected as a current FASP member to participate in a research study examining the role of school psychologists in medication monitoring of students. The goals of this study are to determine the types of psychotropic medications (e.g., Adderall, Clonidine, Risperidone) school psychologists monitor, how the effects of medications are evaluated, with whom monitoring data are shared (e.g., teachers, parents, physicians), and the barriers to and facilitators of medication monitoring in our schools. Findings will inform both pre-service and in-service training on this important topic.

Our records indicate that as of this date, we have not received a completed questionnaire from you. Please take a few minutes to complete and return the enclosed survey in the postage paid envelope. **The survey will only take 10-15 minutes to complete.** We would like you to be a participant in this study, regardless of the amount of time you currently spend monitoring psychotropic medications. **If you do not work in a school setting at all, please check the box on the front of the survey and return it in the postage paid envelope.**
Your participation will be anonymous. A completed and returned survey will be considered consent to participate in the study. Should we publish or disseminate findings from this study, only aggregate data will be published. **As a token of our appreciation for participating in this study, a dollar bill was enclosed in the first copy of the survey you received to use for coffee, snack, or anything you wish.**

This study was approved by the University of South Florida Institutional Review Board (IRB # Pro00002616) and the Florida Association of School Psychologists. **"The Florida Association of School Psychologists encourages school psychologists to participate in the completion of surveys which increase the knowledge base about the practice of school psychologists in the state of Florida. This survey has been approved by the Research Committee and FASP Executive Board"**.

Thank you in advance for your time and assistance with this research study. If you have any questions or concerns about the study, please feel free to contact us at the numbers or emails listed below. **We also invite you to contact us if you would like to obtain the results of the study as soon as they are available.** If you have questions about your rights as a participant in this study, general questions, or have complaints, concerns or issues you want to discuss with someone outside the research, call the USF IRB at (813) 974-5638.

Thank you so much for your participation.

Sincerely,

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Appendix C
Survey

School Psychologists' Practices of Psychotropic Medication Monitoring

If you work in a school part- or full-time, please continue. If you **DO NOT work in a school setting** at all, please **DISCONTINUE** at this point, check the box below, and return the survey in the enclosed return envelope.

I do not currently work in a school. ☐

SECTION 1: BACKGROUND INFORMATION

Please respond to all items based on your school practice for the 2010-2011 school year.

1. **Gender (Circle one)** **A**. Female **B**. Male

2. **Ethnicity (Circle one)**
   A. Black/African American **C**. Native American/Alaskan Native **E.** Hispanic American/Latino
   B. Asian American/Pacific Islander **D**. White/Caucasian **F.** Other _____

3. **State in which you are currently employed (e.g., FL, NY, CA)** _____

4. **Job Status (circle one)** **A**. Full-time employee **B**. Part-time employee **C**. Contractual/independent consultant

5. **Highest degree earned in School Psychology (circle one)**
   A. Bachelor's **B**. Master's **C.** Master's +30 **D**. Specialist **E**. Doctorate

6. **Highest graduate degree earned NOT in school psychology:** please specify degree (e.g., None, Doctorate)_____

   and the area in which degree was earned (e.g., Educational Leadership) _____

7. **Years practicing as a school psychologist (post-degree, including present year)** _____

8. **The approximate number of students you serve (school psychologist: student ratio)** _____

9. **Number of buildings that you currently serve** _____

10. ***Primary* location of current work site (please choose *one*):**

Urban _____Suburban_____ Rural _____

11. Currently, what percentage of your time is spent working with students in these grade categories? ***Please make sure your percentages total 100%.***

Pre-K: _____ K-5: _____6-8: _____9-12: _____ Non-student allocation_____

SECTION 2: Medication Monitoring Training

12. Have you received any type of training *at any time in the past* on monitoring students taking psychotropic medications?

Definition of Medication Monitoring:

Medication monitoring is defined as including the following activities (*not an exhaustive list*): Consultation with classroom teacher(s) and paraprofessionals, utilization of behavior rating scales, behavior observations, review of work samples, or curriculum-based assessment. If there are activities not listed that you engage in which you believe are considered medication monitoring, please make a note of it in the space below, it will be very helpful information on this important topic.

***Additional medication monitoring activities*:**_____

Yes	No

If Yes, please circle the type(s) of training received. If No, please move onto question #13

A. In-Service Trainings (with some component devoted to medication monitoring)	Number of trainings =_____	N/A (I have not attended in-service trainings on this topic)
B. Online Trainings	Number of trainings =_____	N/A (I have not attended online trainings on this topic)
C. Professional Conferences	Number of professional conferences =_____	N/A (I have not attended professional conferences on this topic)

D. Graduate courses with a component focused on psychotropic medications	Number of courses = _____	N/A (I have not taken courses with a component focused on this topic)
E. Personal reading of scholarly journals focused on monitoring psychotropic medications	Number of hours spent reading = _____	N/A (I have not read scholarly articles focused on this topic)
F. Personal reading (e.g., textbooks, other sources on monitoring psychotropic medications)	Number of hours spent reading = _____	N/A (I have not read textbooks or other sources focused on this topic)
G. Other (Please describe)	Number of hours spent = _____ Describe activity_____ _____	N/A (I have not spent other time on this topic not already included)

13. What was the overall philosophy of your school psychology training program (e.g., courses, practicum, internship)?

(Circle one):

Primarily Assessment Focused	Somewhat Assessment Focused	Balanced Between Assessment and Intervention Focused	Somewhat Intervention Focused	Primarily Intervention Focused
1	2	3	4	5

14. Please indicate your opinion of this statement:

Monitoring the effects of psychotropic medications for students with emotional and behavior disorders (e.g.,ADHD, depression, anxiety) and other disorders is a role in which school psychologists should be involved.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	2	3	4	5

15. Have you been involved in monitoring the effects (beneficial or negative) of a psychotropic medication in any manner for a student with whom you work? (See definition of medication monitoring broadly defined at question #12)

Yes	No

If Yes, move to question #16, If No, please move to question #21.

16. How *frequently* do you monitor the effects (beneficial or negative) of a psychotropic medication for students with whom you work? (Circle one):

Annually	Quarterly (i.e., fall, winter, spring)	Once per month	Once per week	Daily	2-5 Times per day	5+ Times per day

1	2	3	4	5	6	7

17. In the past year, how *many* students have you monitored for the effects (beneficial or negative) of a psychotropic medication in any manner? (Circle one):

0	1-2	3-5	6-8	9-11	12-14	15+

18. In the last year, approximately how many students have you monitored for the effects of psychotropic medications for each of the following disorders (if known)?

Disorder	**Number of students for whom medication monitoring data were collected in the past year**					
A. Attention-Deficit/Hyperactivity Disorder (ADHD)	0	1-2	3-5	6-8	9+	N/A
B. Oppositional Defiant Disorder, Conduct Disorder or any other externalizing disorder	0	1-2	3-5	6-8	9+	N/A
C. Depressive Disorders	0	1-2	3-5	6-8	9+	N/A
D. Anxiety Disorders	0	1-2	3-5	6-8	9+	N/A
E. Autism Spectrum Disorders	0	1-2	3-5	6-8	9+	N/A
F. Aspergers Disorder	0	1-2	3-5	6-8	9+	N/A
G. Bipolar Disorder	0	1-2	3-5	6-8	9+	N/A
H.Tourettes Disorder and/or Tic Disorders	0	1-2	3-5	6-8	9+	N/A
I. Thought Disorders (e.g., schizophrenia)	0	1-2	3-5	6-8	9+	N/A
J. Multiple Disorders (e.g., mental retardation and disruptive behavior Disorders)	0	1-2	3-5	6-8	9+	N/A
K. Other Disorders (please write in below)	0	1-2	3-5	6-8	9+	N/A

19. When you do engage in medication monitoring, in general with whom and how often do you share the information?

Sharing of information	**Less than 1x month**	**1x month**	**About Once Every 2 Weeks**	**1x a week**	**Daily**	**N/A Or 0 times**
A. Parents	1	2	3	4	5	N/A

B. Teacher	1	2	3	4	5	N/A
C. Prescribing Physician	1	2	3	4	5	N/A
D. School-based intervention team (multiple individuals)	1	2	3	4	5	N/A
E. Other (please specify below) _____	1	2	3	4	5	N/A

20. Please indicate how often you have used the following procedures to monitor the effects of psychotropic medications on students:

Procedure	**Less than 1x month**	**1x month**	**About Once Every 2 Weeks**	**1x a week**	**Daily**	**N/A Or 0 times**
A. Teacher rating forms (e.g., Child Behavior Checklist, Behavior Assessment Scale for Children)	1	2	3	4	5	N/A
B. Direct behavior observations	1	2	3	4	5	N/A
C. Parent rating forms (e.g., Child Behavior Checklist, Behavior Assessment Scale for Children)	1	2	3	4	5	N/A
D. Parent interviews	1	2	3	4	5	N/A
E. Child self report via rating scale (e.g., CBCL, Children's Depression Inventory, Reynolds Children's Manifest Anxiety Scale)	1	2	3	4	5	N/A
F. Child interview	1	2	3	4	5	N/A
G. Teacher interview	1	2	3	4	5	N/A
H. Permanent products (e.g., work samples)	1	2	3	4	5	N/A
I. Curriculum based assessment	1	2	3	4	5	N/A
J.Grades	1	2	3	4	5	N/A
K. Other (please specify in the space below) _____	1	2	3	4	5	N/A

21. To what extent do you agree or disagree that each of the following factors is a <u>barrier</u> to school psychologists monitoring psychotropic medications students are taking?

Factor	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
A. Lack of Time	1	2	3	4	5
B. Insufficient Knowledge (e.g., how to monitor medications and/or training on medication monitoring)	1	2	3	4	5
C. Lack of Resources (e.g., availability of rating scales and communication with outside providers).	1	2	3	4	5
C. Lack of Teacher Support	1	2	3	4	5
D. Lack of Support of other colleagues (e.g., school-based student assistance team members)	1	2	3	4	5
E. Lack of Parent Support (e.g., parent permission/cooperation)	1	2	3	4	5
E. Lack of School-based administrative support (e.g., principal and vice principal)	1	2	3	4	5
G. Lack of Support of school psychologist's supervisor	1	2	3	4	5
H. Teacher Availability (e.g., for consultation, progress monitoring, review of work samples)	1	2	3	4	5
I. Lack of Community Support (e.g., collaborative relationships with mental/physical health providers in the community)	1	2	3	4	5
J. Other Barriers not listed above (please write in)					

22. Given the listing of potential barriers in the previous question, please list what you feel may be a <u>facilitator</u> to school psychologists monitoring psychotropic medications:

_____

_____

_____

_____

Lastly, please use the space below to add any comments about this topic or survey:

_____

_____

_____

_____

_____

End of Survey. Thank you!

USF
UNIVERSITY OF
SOUTH FLORIDA

DIVISION OF RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
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January 6, 2011

Jason Hangauer
Psychological and Social Foundations
14535 Bruce B Downs Blvd #1036

RE: **Expedited Approval** for Initial Review
IRB#: Pro00002616
Title: Medication Monitoring in the Schools: An Investigation of Current Practices of School Psychologists

Dear Mr. Hangauer,

On 1/6/2011 the Institutional Review Board (IRB) reviewed and **APPROVED** the above referenced protocol. Please note that your approval for this study will expire on 1/6/2012.

Approved Items:
Protocol Document(s):
Dissertation Proposal

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your study qualifies for a waiver of the requirements for the documentation of informed consent as outlined in the federal regulations at 45CFR46.116 (d) which states that an IRB may approve a consent procedure which does not include, or which alters, some or all of the elements of informed consent, or waive the requirements to obtain informed consent provided the IRB finds and documents that (1) the research involves no more than minimal risk to the subjects; (2) the waiver or alteration will not adversely affect the rights and welfare of the subjects; (3) the research could not practicably be carried out without the waiver or alteration; and (4) whenever appropriate, the subjects will be provided with additional pertinent information after participation.

About the Author

Jason Hangauer received a Bachelor's Degree in Psychology with a minor in Business Administration from the State University of New York at Buffalo in 2002. Prior to entering the Ph.D. program at the University of South Florida, he held positions teaching adolescents and adults with developmental disabilities how to utilize personal computers for vocational and personal pursuits as well as providing case management services for children, adolescents, and adults with developmental disabilities.

While in the Ph.D. program at the University of South Florida, Jason was active in research groups studying risk factors for adolescents, pediatric school psychology, and response to intervention (RtI) practices in schools. He has co-authored a number of book chapters on topics related to assessing adaptive behavior, intellectual functioning, and methods of integrating assessment techniques to determine response to intervention in children and adolescents. He has presented several paper and poster presentations at national and state conferences. During his pre-doctoral internship at both Pasco County Schools and the University of South Florida School of Medicine- Department Of Pediatrics Jason conducted assessments and provided cognitive-behavioral therapeutic services. He also provided training to school personnel regarding professional practices. Jason is currently holds a position at the University of South Florida in a practitioner capacity teaching a behavioral parent training program as well as providing evaluation and direct therapeutic services to children ages birth through three.