A META-ANALYSIS OF SCHOOL-BASED PROBLEM-SOLVING CONSULTATION OUTCOMES: A REVIEW FROM 1986 TO 2009

A Dissertation

by

COLE RAY DAVIS

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2012

Major Subject: School Psychology

A Meta-Analysis of School-Based Problem-Solving

Consultation Outcomes: A Review from 1986 to 2009

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ABSTRACT

A Meta-analysis of School-Based Problem-Solving Consultation Outcomes:

A Review from 1986 to 2009. (August 2012)

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School-based problem-solving consultation is an indirect problem-solving process where the consultant works directly with the teacher in order to solve a current work problem of the teacher. The focus of school-based problem-solving consultation was to remediate a current difficult; however, during school-based problem-solving consultation, the teacher developed coping skills that improved his/her ability to handle future problems. Although the subject of several previous syntheses of the literature attesting to its promise, the current state of school-based problem consultation effectiveness was not known.

This study sought to update the school-based problem-solving consultation effectiveness literature as measured by conducting a meta-analysis spanning the years 1986 to 2009. A secondary goal was to identify variables that functioned as moderators. Following procedures advocated by Lipsey and Wilson in 2001, 19 studies were identified producing 205 effect sizes. However, these effect sizes were not calculated independently. Instead, the effect sizes from each study were averaged in order to form

a mean effect size per study. The mean effects were then averaged to form the omnibus mean effect size.

The omnibus mean effect size from the 19 studies was $g = 0.42$, with a range of -0.01 to 1.52 demonstrating a medium-sized effect. This effect size was more modest in magnitude when compared to the previous school-based problem-solving consultation meta-analyses; however, the results indicated that school-based problem-solving consultation positively impacted client-level outcomes. With the exception of grade level, moderator analyses produced little information in terms of statistical differences between and among categories for "teacher type of class, consultant type, school type, referral source, referral reason, consultation model, comparison group, intervention type, design quality, outcome measured, and data type. For grade level, students in the "Other/Not Specified" category benefited most from school-based problem-solving consultation when compared to the "Elementary (K-6)" category. In addition to examining the omnibus mean effect size and potential moderators, limitations and implications for practice and future research were discussed.

DEDICATION

To my future students who decide to read my dissertation. I hope it provides the same guidance, direction, and escape from discussing cases during supervision.

ACKNOWLEDGEMENTS

I would like to thank God for providing me with the strength and abilities to achieve my goals. To my family, thank you for the phone calls, the words of encouragement and motivation, moon pies, and weekend trips. I promise one day I will have a place that has a guest bedroom.

To Dr. Gonzalez, my advisor, thank you for the mentorship, guidance, motivation, and support during the entire dissertation and internship process. You helped shape my love of school-based problem-solving consultation. I know my dissertation defense and internship interviews would have not been successful without your mentorship. To Dr. McCormick, thank you for "allowing" me to read your dissertation's dedication and acknowledgment during group supervision. I must also thank you for the additional supervision, creating additional practicums, telling me to sleep, and pushing me to embrace the projective assessment. To the rest of my dissertation committee, Dr. Goetz and Dr. Rupley, thanks for the feedback that made my proposal and defense successful. To Dr. Melinda Burgess and Dr. Stephen Burgess, thanks for being my mentors while I was at Southwestern Oklahoma State University and encouraging me to apply to graduate school.

To Josh Miller, thanks for calling me ever few weeks to make sure I was not working all the time but to also let me talk about my research. To the King family, thanks for the graduation pen, cheesy westerns, and the weekend trips to Georgia. To my Counseling Psychology friends, thank you for the support and being awesome, in particular to Norma, the most awesome of the awesome crowd. To Cesar, thanks.

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CHAPTER I

INTRODUCTION

School-based problem-solving consultation is an indirect problem-solving service delivery approach where a school psychologist works directly with a teacher to solve a teacher's work-related problem. School-based problem-solving consultation is an alternative to the conventional refer-test-place paradigm of service delivery in schools and it is consistent with important educational reform efforts (e.g., Individuals with Disabilities Education Improvement Act of 2004; No Child Left Behind Act of 2001). These reform efforts place a far greater emphasis on prevention, early intervention, quality instruction, and accountability in regular education settings (Zins, 2007; Zins & Ponti, 2004). In the context of these reform efforts, school psychologists indicate a desire for more time spent in alternative models such as school-based problem-solving consultation to meet the growing numbers of students with educational and psychological needs (Brown, Holcombe, Bolen, & Thomson, 2006).

Previous reviews of the consultation effectiveness literature revealed a dated and complex picture limiting our current understanding of consultation. For example, the last synthesis of the consultation literature that examined only between-groups research designs occurred in 1985 (see Medway & Updyke, 1985). The primary purpose of this study was to update the school-based problem-solving consultation effectiveness literature as measured from between-group client-level outcomes by conducting a meta-analysis spanning 1986 to 2009.

This dissertation follows the style of *School Psychology Review*.

Background

School-based problem-solving consultation was a multi-step process that generally occurred between a school psychologist and a teacher that was characterized as voluntary, indirect, and collaborative. School-based problem-solving consultation generally addressed improving the learning, behavior, or functioning of a student, group of students, or a system (Brown, Pryzwansky, & Schulte, 2006; Medway, 1979) by indirectly producing a change in a student's behavior or organization (Erchul & Sheridan, 2008) through assisting teachers to engage in remediation (Gutkin & Curtis, 1999) and/or prevention (Erchul & Martens, 2002). In order to assist more teachers and thereby more students, school psychologists need to be provided with more opportunities to engage in school-based problem-solving consultation.

Although school psychologists have expressed a desire to increase school-based problem-solving consultation while decreasing assessment-related activities (Brown, Holcombe, Bolen, & Thomson, 2006), they continue to spend approximately one-half to two-thirds of their time engaged in special education assessment-related activities (Reschly, 2008). Due to changes in educational law (Individuals with Disabilities Education Improvement Act of 2004; No Child Left Behind Act of 2001), school psychologists are, however, well positioned for more school-based problem-solving consultation opportunities. For these opportunities to continue, school-based problem-solving consultation must demonstrate its effectiveness (Gutkin, 1996).

Over the past 30 years, several school-based problem-solving consultation models have appeared in the literature. These models have included Mental Health

Consultation (Caplan, Caplan & Erchul, 1995), Behavioral Consultation (Kratochwill & Bergan, 1990), Conjoint Behavior Consultation (Sheridan, Kratochwill, & Bergan, 1996), and Instructional Consultation (Rosenfield, 2008). From this body of work, researchers have identified several criticisms of the various models of school-based problem-solving consultation (Brown, Pryzwansky, et al., 2006). While school-based problem-solving consultation has demonstrated much promise as an alternative service delivery framework, its viability to school psychologists rests squarely on demonstrating its effectiveness. Over the years, several researchers have empirically summarized the school-based problem-solving consultation literature as a means of informing the field. These reviews of the literature have taken the form of vote counting reviews and meta-analyses.

Within the school-based problem-solving consultation literature, two types of quantitative reviews (e.g., meta-analysis and vote counting) have appeared between 1975 and 2008. A vote counting review was defined as the process of determining effectiveness by comparing the number of statistically significant findings to the number of non-significant findings within each study (Borenstein, Hedges, Higgins, & Rothstein, 2009). In general, vote counting reviews have demonstrated that most school-based problem-solving consultation studies have used Behavioral Consultation, and the outcomes from well executed and defined school-based problem-solving consultation models have consistently shown positive effects (e.g., Sheridan, Welch, Orme, 1996). On the other hand, studies that have employed meta-analytic techniques have provided better insight into the school-based problem-solving consultation literature.

A meta-analysis was used to synthesize, integrate, and identify variables that influence treatment outcomes from independent studies using effect sizes (Borenstein et al., 2009). By converting each outcome to an effect size, researchers are then able to compare results across several studies in an objective and replicable manner (Bornstein et al., 2009). Previous meta-analyses of school-based problem-solving consultation have found that consultation generally yielded significant and positive effects for children and youth in academics, attitudes, and behaviors, especially when a school psychologist followed sound conceptual and theoretical methods of consulting (e.g., Reddy, Barboza-Whitehead, Files, & Rubel, 2000).

Although both review approaches have shed some light on important moderators of effective school-based problem-solving consultation practices, it has been over ten years since the school-based problem-solving consultation literature has been empirically summarized in the form of a quantitative review. In the intervening years, much has changed in (a) methods of conducting meta-analyses, (b) study quality, (c) consultation characteristics, (d) consultee characteristics, (e) client characteristics, (f) nature of problems, (g) characteristics of students, (h) schools and (i) and the education of children and youth. These changes necessitated an update of the school-based problem-solving consultation literature.

Purpose of the Study

The purpose of this study was to update the school-based problem-solving consultation effectiveness literature by conducting a meta-analysis spanning the empirical school-based problem-solving consultation body of studies from 1986 to 2009.

The current meta-analysis followed Lipsey and Wilson's (2001) suggested techniques for identifying and obtaining the empirical studies on school-based problem-solving consultation. Relevant studies were identified, reviewed for relevance, coded, and analyzed to produce summative effectiveness information about school-based problem-solving consultation. The unit of analysis was individual studies, with effect sizes, especially Hedges's *g* as the measure of effectiveness.

In summary, the purpose of the present study was to conduct a meta-analysis to assess the effectiveness of school-based problem-solving consultation body of studies between 1986 and 2009. This was a needed study for several reasons. Because only between-group research design studies were included, all within-group and single-n research design studies examining school-based problem-solving consultation were excluded. These were excluded because within-group research design studies do not have the same methodological rigor as their between-group research design counterparts (Gresham & Vanderwood, 2008), and single-n designs were excluded because single-n design using traditional effect size metrics tend to produce unreliable effect sizes that violate the assumptions of parametric statistics (Parker, 2006; Parker, Vannest, & Brown, 2009). Second, the present review provided a way to determine if recent school-based problem-solving consultation studies produced similar outcomes to those conducted previously. Third, this was the first meta-analysis, to my knowledge, that compared Instructional Consultation (Rosenfield, 2008), a recent innovation in school-based problem-solving consultation, to other school-based problem-solving consultation frameworks. Two research questions guided this meta-analysis:

1. What was the overall effectiveness of school-based problem-solving consultation?
2. Was the effectiveness of school-based problem-solving consultation moderated by (a) student grade, (b) teacher type of class, (c) consultant type, (d) school type, (e) referral source, (f) referral reason, (g) consultation model, (h) comparison group, (i) intervention type, (j) design quality, (k) outcome measured, and (l) data type?

CHAPTER II

REVIEW OF LITERATURE

Overview

The purpose of this chapter was to review the literature relevant to school-based problem-solving consultation. This chapter started with a description of school-based problem-solving consultation, a brief history of school psychologists' activities relative to school-based problem-solving consultation, the importance of school-based problem-solving consultation, descriptions of effective consultants and school-based problem-solving consultation, and how changes in the law have influenced school-based problem-solving consultation. Next, the focus turned to school-based problem-solving consultation models. Finally, the chapter concluded with a discussion reviewing previous meta-analyses and vote counting reviews.

What is School-Based Problem-Solving Consultation?

Although several definitions of school-based problem-solving consultation have existed, it has been routinely defined as a voluntary, indirect, collaborative interaction between a help-giver and a help-seeker to improve the learning, behavior, or functioning of a student, group of students, or a system (Brown, Pryzwansky, & Schulte, 2006; Erchul & Martens, 2002; Zins & Ponti, 2004). Because school-based problem-solving consultation primarily, although not exclusively, occurred between a teacher and a school psychologist, hereafter the help-giver will be identified as a school psychologist; help-seeker as a teacher; and student, group of students, or a system as the client. During school-based problem-solving consultation, the school psychologist and teacher

worked together to jointly identify a problem or concern of the teacher; analyze the antecedents, consequences or sequential events related to the problem, and select effective interventions in an iterative fashion until the problem was resolved (Bramlett & Murphy, 1998; Martens, 1993). Although, the majority of school-based problem-solving consultation research focused on remediation (Gutkin & Curtis, 1999) another goal focused on prevention (Erchul & Martens, 2002). The aim of prevention generally targeted enhancement of teacher skills to influence the educational and psychological outcomes of current or future clients (Erchul & Sheridan, 2008; Meyers & Parsons, 1987). Remediation and prevention were secondary goals of school-based problem-solving consultation, whereas, the principle goal was to produce a change in client's behavior or an organization in an indirect manner (Erchul & Sheridan, 2008).

To distinguish school-based problem-solving consultation from other school psychologist roles and functions, it was important to identify what was *not* school-based problem-solving consultation. Other helping relationships not considered school-based problem-solving consultation included: (a) organizational development, (b) teaching, (c) advocacy, (d) therapy/counseling, (e) supervision, and (f) advice giving (Brown, Pryzwansky, et al., 2006; Zins & Ponti, 2004). Organizational development used group dynamics and social psychology to understand the organization in order to improve the functioning of the organization at the systems-level (Reddy, Barboza-Whitehead, Files, & Rubel, 2000). Teaching was a way to impart information in a systematic manner (Brown, Pryzwansky, et al., 2006). Teaching that involved lectures and homework in a non-collaborative manner; whereas, teaching that occurred as a part of consultation was

informal and involves modeling rather than lectures (Brown, Pryzwansky, et al., 2006). Advocacy was when a school psychologist acts on the behalf of another person to help him/her gain resources and services (Brown, Pryzwansky, et al., 2006). Therapy/counseling was a direct relationship where the goal was to assist the client who seeks services (Brown, Pryzwansky, et al., 2006). Supervision occurred when the school psychologist was the expert, the authority figure, and evaluated the other member of the relationship (Brown, Pryzwansky, et al., 2006). Advice giving occurred when a school psychologist assumed an expert role to assist a teacher (Brown, Pryzwansky, et al., 2006). Although advice giving was similar to school-based problem-solving consultation, the goal of this relationship focused only on the remediation of the current problem and not the prevention of future difficulties (Brown, Pryzwansky, et al., 2006). Even though school psychologists have engaged in these six other helping relationships, there were six criteria that distinguished school-based problem-solving consultation from these other helping relationships.

Erchul and Sheridan (2008) outlined six criteria that distinguished school-based problem-solving consultation from these other helping-related activities. These criteria were: (a) triadic nature of the relationship, (b) coordinate relationship between the school psychologist and teacher, (c) direct focus on work-related teacher problems, (d) responsibility for the client stays with the teacher, (e) teacher has the freedom to accept or reject all consultant guidance, and (f) confidential communication. Together, these six characteristics have defined school-based problem-solving consultation.

First, the triadic relationship, a critical feature of school-based problem solving consultation, involved a school psychologist, teacher, and a client (Erchul & Martens, 2002; Erchul & Sheridan, 2008). Within this relationship, the school psychologist interacted with a teacher who then has direct contact and works directly with the client (Gutkin & Curtis, 1999; Kratochwill, 2008). This unique feature of consultation has often been referred to as the "paradox of school psychology" (Gutkin & Conoley, 1990). That was, to help the client a school psychologist must first and foremost work with the adults (e.g., teachers) who interacted daily with the client (Bradley-Johnson & Dean, 2000). By working directly with the teacher, the school psychologist indirectly impacted the client (Erchul & Sheridan, 2008; Zins & Ponti, 2004) and gives away psychology principles to the teacher thus affecting future students with similar difficulties.

Second, the relationship between the school psychologist and teacher must be equal (e.g., non-hierarchical) (Erchul & Sheridan, 2008). An equal relationship has been defined as a fundamental tenant of the school-based problem-solving consultation process because it encouraged trust and respect (Kratochwill, 2008). In addition, an equal relationship allowed the teacher to feel safe to discuss current problems, accept or reject any of the school psychologist's suggestions, and confidentially contribute information since the teacher was an expert within his/her class (Erchul & Martens, 2002).

Third, school-based problem-solving consultation focused exclusively on work problems and not personal problems (Zins, Kratochwill, & Elliott, 1993). However, the school psychologist may point out personal problems that impaired the teacher's ability

to function optimally (Brown, Pryzwansky, et al., 2006). The focus on work problems assisted the teacher to develop skills or attitudes that allow him/her to function more effectively in the work environment (Brown, Pryzwansky, et al., 2006). This promoted teacher empowerment and confidence to respond effectively to future client difficulties (Brown, 1993; Meyers & Parsons, 1987).

Fourth, ultimate responsibility for client well-being remained with the teacher (Erchul & Sheridan, 2008). The teacher was responsible for collecting data, and implementing interventions (Brown, 1993; Kratochwill, 2008). Whenever the teacher retained responsibility for his/her actions, intervention creation and implementation, and teacher learning and generalization improved (Gutkin & Curtis, 1999).

Fifth, a defining characteristic of school-based problem-solving consultation was the teacher has the freedom to reject or accept some or all of the school-based problem-solving consultant's assistance (Erchul & Martens, 2002) since the relationship was voluntary and equal (Meyers & Parsons, 1987). This encouraged active and open participation by the teacher (Kratochwill, 2008).

Sixth, another central tenet of school-based problem-solving consultation was that communication was confidential (Erchul & Sheridan, 2008; Zins et al. 1993). For the school psychologist, confidential communication reflected ethical standards of the American Psychological Association (APA) and National Association of School Psychologists (NASP) (APA, 2002; NASP, 2000). However, the most important reason for confidential communication concerned the teacher. In general, confidential communication encouraged the teacher to be open, honest, and free to discuss current

work difficulties without the fear of reprisal (e.g., school administration) (Knoff, Sullivan, & Liu, 1995). These six characteristics distinguished school-based problem-solving consultation from other helping relationships.

In summary, school-based problem-solving consultation was an indirect problem-solving process where the consultant worked directly with the teacher in order to solve a current work problem of the teacher (Erchul & Sheridan, 2008). This relationship was voluntary, equal, and open where both school psychologist and teacher actively share in problem solving (Brown, Pryzwansky, et al., 2006). Although the focus of school-based problem-solving consultation was to remediate a current difficulty, the teacher developed coping skills that improved his/her ability to handle future problems (Erchul & Martens, 2002; Meyers & Parsons, 1987).

Over the past five decades, school psychologists have consistently stated a desire to increase school-based problem-solving consultation opportunities and decrease assessment-related activities (Bradley-Johnson & Dean, 2000; Watkins, Crosby, & Pearson, 2001). However, this has not occurred. In fact, studies have demonstrated that school psychologists continue to spend approximately 46% to 67% of their time in special education assessment-related activities (Bramlett, Murphy, Johnson, Wallingsford, & Hall, 2002; Meacham & Peckham, 1978; Reschly, 2000, 2008). Despite the current state of affairs, school psychologists have stressed several reasons for increasing school-based problem-solving consultation opportunities in the schools. These reasons included: (a) more children are coming to school at-risk of mental health or achievement problems (Conoley, 2008; Erchul & Martens, 2002), (b) school

psychologists tend to work in school districts exceeding psychologist-to-child NASP recommended ratios (Charvat, 2005; Thomas, 2000), and (c) the current mental health and special education service delivery system has limited school psychologists' time and efforts solely to special assessment, identification, and placement (Gresham, 2007; Knotek, 2005; Siegel & Cole, 2003).

It has been well documented that increasing numbers of students attend school with risks and stressors that negatively impact their achievement and behavior (Erchul & Martens, 2002; Zins et al., 1993). Some of these risks and stresses included: (a) poverty, (b) violence, (c) bullying and harassment, (d) teen pregnancy, and (e) alcohol and drug abuse. However, the major risk involved mental and educational issues (Crockett, 2004). In fact, most students have received preventative or remedial services primarily in the schools, making the school setting the defacto source of service delivery (Farmer, Burns, Phillips, Angold, & Costello, 2003). Specifically, approximately 21% of students between nine and 17 suffered from a mental disorder with minimal impairment, 11% suffered from a mental disorder with significant impairment, and 5% suffered from an extreme functional impairment (U.S. Public Health Service, 1999). Unfortunately, evidence has shown that approximately only 6% of students with disorders receive any help (Doll, 1996). Clearly, only a fraction of students have received the necessary help and simple math shows that about 15% of students who need services do not receive any (Gonzalez, Nelson, Gutkin, & Shwery, 2004). While the root causes vary, these statistics demonstrated that there are untold numbers of children and youth not receiving needed services.

Despite the growing numbers of children and youth in need of educational and mental health services, school psychologists have been stymied in their efforts to address the need through an overreliance on traditional "refer-test-place" model of service delivery. For the most part, this traditional model forced school psychologists to primarily focus on their assessment-related skills even though they have training in a myriad of other skills (e.g., therapy, curriculum based assessment, organizational consultation, staff development) beyond assessment (Erchul & Martens, 2002; Worrell et al., 2006). In addition, the traditional model limited the type of children school psychologist see to those who are failing academically or in need of tertiary services. This role often reduced a school psychologist's ability to work with teachers, parents, or schools and other entities in a student's microsystem to address how these multiple systems interacted to influence student academic and behavior difficulties (Conoley & Gutkin, 1995; Gresham, 2007; Kratochwill, 2008). In essence, the "refer-test-place" model has forced school psychologists into a reactive relationship with teachers, parents, and schools (Braden et al., 2001).

In addition to the limiting effect of the refer-test-place paradigm on school psychologists' ability to impact greater numbers of students, extant literature has documented problems with the "refer-test-place" model. These problems included: (a) uncertain benefits of special education; (b) irrelevant, arbitrary, and stigmatizing labels; (c) questionable classification practices; (d) the failure of aptitude-by-treatment interactions; (e) poor treatment utility of instruments; and (f) disproportionate representation of minorities (NASP, 2003, 2009; Reschly, 2008; Siegel & Cole, 2003;

Truscott, Catanese, & Abrams, 2005). While a thorough discussion of the problems of the current service delivery model was beyond the scope of this review, suffice it to say that surveys of school psychologists consistently indicated that an alternative service delivery model with school-based problem solving consultation as its core would address many of the stated problems (Knotek, 2005; Reschly, 2000).

School-based problem-solving consultation was a multi-step process that allowed school psychologists the ability to assist the increasing numbers of students in need of services (Erchul & Martens, 2002). More students received services, and the school environment improved because the major purpose of school-based problem-solving consultation was to enhance a person's or system's (i.e., parent or educator) ability to prevent, treat, and reduce both current and future student mental health and achievement problems (Alkon, Ramler, & MacLennan, 2003; Erchul & Sheridan, 2008; Zins & Ponti, 2004). By improving a person's or system's ability to prevent future difficulties, school psychologists thereby give psychology away (Miller, 1969). School psychologists have recognized, however, that their ability to "give psychology away" was dependent on their ability to influence the behavior of adults who work with children and youth (Miller, 1969; Sheridan & Gutkin, 2000).

Even though school psychologists have pushed for more school-based problem-solving consultation opportunities and fewer assessment-related activities (Bradley-Johnson & Dean, 2000; Siegel & Cole, 2003), school-based problem-solving consultation will not likely achieve its potential if school psychologists do not possess characteristics that promote a trusting relationship with teachers. Past research has

examined the effectiveness of school-based problem-solving consultation by evaluating teacher perceptions of the school-based problem-solving consultation process (Gutkin, 1986; Knoff, Sullivan, & Liu 1995) and verbal interactions within the consultation relationship (Bergan & Tombari, 1975; Hughes, Erchul, Yoon, Jackson, & Henington, 1997). Results from these studies suggested that to be an effective consultant, school psychologists must exhibit similar characteristics as a therapist (Gutkin & Conoley, 1990).

As with psychotherapy, success of school-based problem-solving consultation depended on the school psychologist's ability to communicate and develop a collaborative, interpersonal relationship with the teacher (Grover, 2005; Gutkin & Curtis, 1982; Kratochwill & Bergan, 1990). This interpersonal relationship can be created by being: (a) friendly (Conoley & Conoley, 1992); (b) open (Conoley & Conoley, 1992; Hughes & DeForest, 1993); (c) non-threatening (Conoley & Conoley, 1992); (d) trusting (Gutkin & Curtis, 1999; Hughes & DeForest, 1993); (e) active, attentive listener (Knoff et al., 1995); (f) sympathetic (Conoley & Conoley, 1992); (g) flexible (Conoley & Conoley, 1992); (h) ethical (Knoff et al., 1995); and (i) confidential in their communication (Knoff et al., 1995). Of these characteristics, teachers perceived that confidentiality is the most important school psychologist behavior (Knoff et al., 1995). Overall, these characteristics underscored that effective school psychologists create positive and safe environments where the teacher feels free to express all concerns (Gutkin, 1996).

After the school psychologist developed a trusting relationship with the teacher, the school psychologist entered the school-based problem-solving consultation process. For effective school-based problem-solving consultation to occur, the school psychologist must demonstrate specific behaviors. These behaviors generally included: (a) staying on topic (Bergan & Tombari, 1975), (b) directing the interview (Gutkin, 1999; Kratochwill & Bergan, 1990), (c) asking questions and respecting the teacher's perceptions and interpretations of the current problem (Gutkin, 1996), (d) adapting interpretations and observations to the teacher's perceptions (Hughes & DeForest, 1993), and (e) demonstrating to the teacher that he/she understands the consultation process (Gutkin, 1996). School psychologists need to combine these general relationship building skills with these specific problem-solving skills in order to share leadership of the problem solving process with the teacher (Gutkin, 1999).

A school psychologist's ability to share leadership of the problem-solving consultation process with a teacher was paramount to school-based problem-solving consultation's success. The ability to share leadership indicated to the teacher that there was an equal relationship between the school psychologists and the teacher- a hallmark of school-based problem-solving consultation (Erchul & Martens, 2002; Gutkin & Curtis, 1999). Even though the school psychologist shared leadership with the teacher, the school psychologists and teacher do not share the same responsibilities (Gutkin, 1996). This further encouraged a collaborative relationship. Both school psychologist and teacher shard their area of expertise with the other member in order to identify and remediate the current difficulty (Gutkin & Curtis, 1990). Even though the school

psychologist assisted the teacher in identification of the current concern, the school psychologist must also demonstrate his/her knowledge of psychological principles (Gutkin, 1986). School-based problem-solving consultation improved when a teacher perceived that the school psychologist understands psychological principles and how these principles apply to the specific problem of concern to the teacher (Gutkin, 1986). If a school psychologist was able to cultivate a collaborative, interpersonal relationship and share leadership with the teacher, then there can be optimism that the teacher will effectively implement the intervention (Erchul & Martens, 2002; Knoff et al., 1995). Following is a discussion related to the most prominent models of school-based problem.

School-Based Problem-Solving Consultation Models

Over the last three decades, several consultation models have appeared in the literature. However, this synthesis of the consultation literature focused primarily on models used in schools. These models were Mental Health Consultation (MHC: Berkovitz & Sinclair, 2001; Berlin, 2001; Caplan, Caplan & Erchul, 1995), Behavioral Consultation (BC: Bergan, 1995; Kratochwill, 2008; Kratochwill & Bergan, 1990), Conjoint Behavior Consultation (CBC: Clarke, Burt, & Sheridan, 2008; Sheridan, Clarke, & Burt, 2008; Sheridan, Kratochwill, & Bergan, 1996), and Instructional Consultation (IC: Rosenfield, 1995a, 1995b, 2008). MHC was the first problem-solving consultation model to receive attention.

Mental health consultation. MHC was the first consultation model defined (Brown, Pryzwansky, et al., 2006). In fact, other problem-solving consultation practitioners/researchers used Caplan's theories of relationship building and the

voluntary, triadic, collegial, and indirect nature of consultation when they created their problem-solving consultation model (Caplan et al., 1995). More than any other model of consultation, MHC placed a great emphasis on intrapsychic variables such as feelings, attitudes, and beliefs that are important to behavior change (Brown, Pryzwansky, et al., 2006). It also represented a strong environmental focus recognizing the importance of norms, roles, and knowledge and organizational affiliation (Caplan et al., 1995). As in other models of consultation, the teacher was solely responsible for actions emerging from MHC (Brown, Pryzwansky, et al., 2006).

Equally important to MHC was the recognition that teacher attitudes and affect are important in consultation but cannot be dealt with directly (Knotek & Sandoval, 2003). Rather, the consultant dealt with attitudes and feelings indirectly by forming hypotheses about the types of personal issues interfering with the teacher's ability to function usually by using a work-related problem as a metaphor (Caplan et al., 1995).

Four school-based MHC models (e.g., client-centered case consultation, consultee-centered case consultation, program-centered administration consultation, and consultee-centered administrative consultation) have been described (Brown, Pryzwansky, et al., 2006; Knotek, 2005). Of these four models, consultee-centered case consultation (CCCC) has received most of the school-based attention (Berkovitz & Sinclair, 2001; Knotek, 2007). Specifically, CCCC was concerned with the difficulties a teacher faces with a particular client with whom he/she has a work-related problem (Knotek & Sandoval, 2003). It was the "shortcomings" of the teacher's professional functioning that are the cause of the work-related, child-centered problem (Brown,

Pryzwansky, et al., 2006). These were four types of "shortcomings:" (a) lack of knowledge, (b), lack of skill, (c) lack of confidence, and (d) lack of objectivity (Brown, Pryzwansky, et al., 2006). Of these, lack of objectivity was most prominent in CCCC research (Brown, Pryzwansky, et al., 2006).

Lack of objectivity, according to Caplan, occurred when a teacher lost their professional distance or objectivity when working with a client (e.g., child) and could not apply their skills to resolve the problems (Brown, Pryzwansky, et al., 2006). Lack of objectivity often took the form of (a) direct personal involvement; (b) simple identification; (c) transference; (d) characterological distortion; (e) and most importantly to Caplan, theme interference (Brown, Pryzwansky, et al., 2006). Caplan gave a central place to theme interference (Brown, Pryzwansky, et al., 2006). Theme interference represented an unresolved problem or defeat that the teacher experienced that influenced either positively or negatively their expectations regarding a client and often took the form of a syllogism (i.e., all A inevitably leads to B) (Brown, Pryzwansky, et al., 2006). When a teacher experienced theme interference, they viewed the identified problem as hopeless and/or manipulated the situation to fit their preconceived notions (Caplan et al., 1995). Two intervention techniques commonly used to address theme interference are "unlinking" and "theme interference reduction" (Brown, Pryzwansky, et al., 2006). Of these, theme interference reduction was the preferred choice such that the school psychologist accepts the teacher's unconscious premise that client difficulty is a test, and then the school psychologists persuades the teacher that the outcome is not inevitable, thus invalidating the theme (Brown, Pryzwansky, et al., 2006). Recently, researchers

(Knotek, 2005; Knotek & Sandoval, 2003) have applied Caplan's model of CCCC conflicts experienced by teachers as authority conflicts, dependency, anger and hostility, and identification.

Several criticisms of MHC have appeared in the literature. However, many of the criticisms have related to its basis in psychodynamic theory and use of manipulation (Caplan et al., 1995; Knotek et al., 2008). The use of psychodynamic theory limited the number of empirical studies and its usage within schools since the original focus of MHC did not address academic issues (Knotek et al., 2008).

Behavioral consultation. Typically, school psychologists associated BC with school-based problem-solving consultation (Kratochwill, & VanSomeren, 1985). Most school psychologists have preferred to use BC due to its well-operationalized interviews and reliance on applied behavior analysis methods (Wnek, Klein, & Bracken, 2008). BC was a four-stage problem-solving process where the school psychologist used three different interviews when meeting with the teacher to identify and remediate student difficulties (Kratochwill, Elliott, & Callan-Stoiber, 2002; Martens, DiGennaro, 2008). The four stages of BC were problem identification, problem analysis, plan implementation, and plan evaluation (Bergan, 1995).

Problem identification. The most critical stage of BC was problem identification (Kratochwill & Bergan, 1990). This was the most important stage because this was the first contact with the teacher; the goals of this stage were to obtain an understanding of the student's needs, identify current problem or concern, and establish the goals of consultation (Martens & DiGennaro, 2008). To identify the problem, the

school psychologist assisted the teacher to describe and operationally define the problem, recognize the discrepancy between current versus desired behavior, and estimate how often and under what conditions the problem occurs (Kratochwill, 2008). Occasionally a school psychologist recommended a functional assessment to determine if the problem is a result of the environment (Kratochwill, 2008). However, this stage typically ended when the school psychologist and teacher agree upon an identified problem, and the teacher begins collecting baseline data to establish the discrepancy between expected/desired and actual behavior (Kratochwill & Bergan, 1990). After this stage, the school psychologist and teacher moved to problem analysis.

Problem analysis. The second stage in BC was problem analysis (Martens & DiGennaro, 2008). Problem analysis began when the teacher's baseline data of present concerns indicated the existence of a problem (Kratochwill & Bergan, 1990). The school psychologist and teacher used the data to explore the antecedent, behavior sequence, and consequences of the present concern (Kratochwill, 2008). After the school psychologist and teacher explored the circumstances underlying the child's difficulties, the school psychologist worked with the teacher to establish performance and assessment objectives, and identify factors that might lead to problem resolution (Martens & DiGennaro, 2008). Once these questions are answered, the school psychologist and teacher design a treatment acceptable to the teacher, where the teacher began implementing the plan during plan implementation (Kratochwill, 2008).

Plan implementation. The third stage in BC was plan implementation (Kratochwill, 2008; Kratochwill & Bergan, 1990). There were two objectives for this

stage. These objectives were to select an appropriate intervention to address the problem and implement the intervention (Kratochwill, 2008). It was important to select an appropriate, evidenced-based intervention because the intervention needs to improve the client's current difficulties (Witt & Elliott, 1985). In order to improve intervention implementation, these interventions should be low cost and easy to implement (Kratochwill & Bergan, 1990). After selecting the intervention, plan implementation moved to its second objective.

The second objective of plan implementation was actual implementation. To implement the intervention, the school psychologist assisted the teacher in obtaining the appropriate skills and modeled to the teacher how to monitor the effects of the intervention by collecting intervention data (Kratochwill & Bergan, 1990). This objective can last for several weeks or months (Kratochwill, 2008). While the teacher was collecting data and implementing the intervention, the school psychologist continued to interact with the teacher to monitor intervention fidelity and assist in any plan revisions if the situation was not improving (Kratochwill, 2008). Following plan implementation was plan evaluation.

Plan evaluation. Plan evaluation was the final stage in BC. The primary goal of this stage was to interpret outcomes of the intervention by comparing baseline date from the problem identification stage to the intervention data (Kratochwill, 2008). After the baseline and intervention data were compared, the school psychologist and teacher moved to post-implementation planning (Kratochwill & Bergan, 1990). During post-implementation planning, the school psychologist and teacher used this meeting to

decide to terminate, revise, continue consultation, or measure student's skill generalization (Martens & DiGennaro, 2008).

Since BC was the most common problem-solving consultation model, BC received the most criticisms. There were two major criticisms specific to BC (Witt, Gresham, and Noell, 1996). First, there was a lack of evidence that a school psychologist can use the BC steps to assist a teacher in accurately describing the client's problematic behavior especially since direct involvement between the school psychologist and client does not occur. Second, there was a lack of evidence that a teacher can return to the classroom and implement the intervention with high fidelity, and use it correctly with the current student and future students who are in need of help.

Conjoint behavior consultation. CBC was an elaboration of and similar to BC in that it has structure, and was an indirect model of service delivery; however, it involved the parents or significant adult as well as teachers to address student behavioral, social, or academic issues (Sheridan, Kratochwill, et al, 1996). This model combined resources and perspectives across two areas of a student's life that constantly interacted with each other-school and home. In effect, CBC was consultation using Bronfenbrenner's (1977) ecological theory. Bronfenbrenner's theory described the relationship between a student's microsystem (i.e., setting such as school or home that a student has direct contact), mesosystem (i.e., system of microsystems), exosystem (i.e., other social systems that indirectly impact a student such as parent's workplace), and macrosystem (i.e., cultural values). CBC focused on how two microsystems (i.e., home and school) influenced and related to each other within the student's mesosystem. What

happened at home influenced what happened at school and vice versa. The problem does not have to occur in both microsystems; however, the focus was on the facilitation of parent-teacher communication and shared decision-making (Sheridan & Colton, 1994).

The major criticisms of CBC were similar to BC's. In fact, the two criticisms by Witt et al. (1996) of BC would apply to CBC. First, there was a lack of evidence that a school psychologist can use the BC steps to assist the teacher or parent in accurately describing the client's problematic behavior especially since direct involvement between the school psychologist and client does not occur. For CBC, this appeared to be a major criticism because CBC worked with both home and school environments. Second, there was a lack of evidence that a teacher can return to the classroom or a parent to his/her home and implement the intervention with high fidelity. Similar to CBC, IC focused on the environment rather than student deficits.

Instructional consultation. IC was a combination of collaborative consultation and instructional psychology (Rosenfield, 1995a, 1995b). IC, like the other models, was a structured, collaborative, and indirect problem-solving service delivery model that occurred through a series of stages to either an individual teacher or a group of teachers (Rosenfield 1987). These stages were entry and contracting, problem identification and analysis, intervention design and planning, intervention implementation and evaluation, and closure; these stages are similar to BC's stages (Rosenfield, 2008). Although, IC shared many similarities of the other models, IC diverged from the other models in that its primary focus was student achievement (Rosenfield, Silva, & Gravois, 2008).

IC assumed that current student difficulties arose due to the mismatch between instruction and instructional level (Knotek, 2007). Therefore, an IC school psychologist examined the relationship between academics and behavior (Rosenfield et al., 2008). In order to understand student problems, a school psychologist and teacher reviewed the student's past knowledge, class instruction and management styles, and task demands (Rosenfield et al., 2008). The interactions of these areas were known as the "instructional triangle" (Rosenfield et al., 2008). After reviewing these three areas, the school psychologist and teacher worked together to improve the teacher's performance. This occurred by providing the teacher with quality instructional and behavior management skills that the teacher then used to match to the student's current skill level (Rosenfield, 2008). Once teacher skills improved, student success increased, there was a reduction in behavioral problems, and special education services were no longer needed (Rosenfield et al., 2008). Although there were several school-based problem-solving consultation models, they share several similarities.

Initially, it was easy to see the similarities of these models since several of Caplan's ideas are a part of the other problem-solving consultation models (Brown, Pryzwansky, et al., 2006). The Caplan ideas that were generally accepted among consultation models were the triadic nature and the collegial relationship between the school psychologist and teacher (Brown, Pryzwansky, et al., 2006). However, these were not the only similarities. Other similarities included: (a) the school psychologist assisted the teacher to identify an area of concern (Cowan, 2007), (b) both examined conditions that precipitate the problem behaviors (Cowan, 2007), (c) school psychologist

and teacher worked together to develop a solution (Rosenfield, 1995a), (d) school psychologist directed the meeting (Caplan et al., 1995), (e) each contained phases and principles that if followed ensure better outcomes (Kratochwill, 2008; Rosenfield, 2008), and (f) all focused on remediation and prevention (Gutkin & Curtis, 1999; Caplan et al., 1995; Kratochwill, 2008; Rosenfield, 2008). Since these models have similarities, they also shared several criticisms.

Criticisms of School-Based Problem-Solving Consultation

While school-based problem-solving consultation has much promise as an important activity of school psychologists, school-based problem-solving consultation has been criticized within the literature. To begin with, a major criticism of school-based problem-solving consultation was a true theory or singular definition does not exist (Brown, Pryzwansky, et al., 2006; Erchul & Sheridan, 2008). Other criticisms included: (a) lack of empirically sound studies (Gravois & Rosenfield, 2006; Knotek & Sandoval, 2003; Silva, 2008), (b) focus on remediation rather than prevention (Zins, 2007), (c) lack of attention beyond client outcomes (Sheridan, Welch, & Orme, 1996), (d) absence of long-term follow-up (Hughes, Loyd, Buss, 2008), and (e) studies rarely assess consultation integrity and skill generalization (Hughes et al., 2008). Although there were several criticisms of problem-solving consultation, school psychologists will have more opportunities to engage in school-based problem-solving consultation due to changes in the law (Reschly, 2008).

Changes in the Law Effecting Consultation

In the past, a school psychologist's primary job was to provide assessments for special education identification; however, with the passage of the No Child Left Behind Act of 2001 (NCLB), and the reauthorization of the Individuals with Disabilities Education Improvement Act of 2004 (IDEIA) this is no longer true. NCLB targets the needs of disadvantaged children through Title 1. Title 1 was a policy that placed greater emphasis on early intervention, quality instruction, and accountability for achievement outcomes. Although school psychologists were able to assist in all of these areas, their greatest impact related to NCLB's focus on early intervention and prevention for academic and behavioral problems rather than remediation (Erchul & Martens, 2002; Fletcher & Vaughn, 2009; Gutkin & Curtis, 1999). NCLB was one law that provided school psychologists with the opportunity to prevent future students problems or "give psychology away" (Miller, 1969) with the other law being the recent reauthorization of IDEIA.

With the reauthorization of IDEIA (2004), states were able to opt out of the classic "discrepancy" model to diagnose learning disabilities in favor of a model that allowed schools to assess a student's response to intervention as a general education pre-referral option (Barnett, VanDerHeyden & Witt, 2007; Burns & Ysseldyke, 2005). IDEIA placed a far greater emphasis on intervention and assessment within the regular education settings (Knotek, 2007). Schools no longer must wait for students to fail before they received services (Gresham, 2007). Instead, schools were able to use data from empirically based interventions to assess and provide services to children who were

struggling either academically or behaviorally (Jimerson, Burns, & VanDerHeyden, 2007). From these two policies, schools must now attend to early intervention and prevention rather than remediation (Erchul & Sheridan, 2008). Both these policies encouraged and/or mandated the use of problem-solving approaches.

If school psychologists are going to assist in changing the school climate from remediation to prevention, then school psychologists must have the opportunity to increase their school-based problem-solving consultation opportunities. In fact, school psychologists recognized that school-based problem-solving consultation was the principle role that allows them the greatest opportunity to assist in the school service delivery reform (Wizda, 2004). However, the question remains-was school-based problem-solving consultation effective? The following section reviewed previous meta-analyses or other quantitative reviews of consultation effectiveness.

Does School-Based Problem-Solving Consultation Work?

Although school psychologists have stated a desire to use an alternative model to the traditional refer-test-place paradigm, a review of school-based problem-solving consultation effectiveness over the years reveals a dated and complex picture. Every few years, researchers have published school-based problem-solving consultation quantitative syntheses to inform the school psychology profession. Among these were three consultation meta-analyses spanning the years 1985 to 2000 and seven narrative, vote counting reviews between 1975 and 2008.

Meta-analyses. The goals of any meta-analysis are to synthesize, integrate, and identify variables that influenced treatment outcomes from independent studies using

effect sizes (Borenstein, Hedges, Higgins, & Rothstein, 2009; Busse, Kratochwill, & Elliott, 1995). By converting each outcome to an effect sizes, researchers were able to compare results across several studies in an objective and replicable framework (Bornstein et al., 2009). From these results, researchers determined the effectiveness of the variable in question (Bornstein et al., 2009). In this case, the goal of the following meta-analyses were to determine the effectiveness of school-based problem-solving consultation. The following review focused on basic outcomes that cut across the three meta-analyses (Busse et al., 1995; Medway & Updyke, 1985; Reddy et al., 2000). These basic outcomes were (a) global effect size, (b) consultation model, (c) outcome source, and (d) outcome type.

Omnibus effect size. Three meta-analyses (Busse et al., 1995; Medway & Updyke, 1985; Reddy et al., 2000) reviewed 89 studies and 44 single-n cases. The omnibus summative effect ranged from $d = 0.47$ to 1.29. These analyses reviewed single case studies with single persons and groups, and experimental studies. Overall, school-based problem-solving consultation produced positive outcomes. At first glance, it appeared school-based problem-solving consultation effectiveness increased when researchers used single-n studies over group designs. However, the difference in effect sizes between single case studies and group designs occurred due to the inflated error from the single-case studies (Parker, 2006). These three meta-analyses covered the school-based consultation outcome research from 1970 to 1997 excluding 1983 to 1985. Table 1 summarizes the major findings of the meta-analyses conducted between 1985 and 2000.

Table 1

Summary of Notable Findings in Previously Published Meta-Analyses Spanning 1985-2000

Study	Year	Type	Years Covered	Studies	Model	Outcome Source	Outcome Type	Grade	Gender	Global Effect Size
Medway & Updyke	1985	Exp	1970 – 1982	54	B (.72; n= 18) M (.73; n= 24) O (.65; n=21)	CON (.62; n=9) CEE (.55; n =83) CLI (.39; n=100)	Beh (.54; n= 99) Att (.43; n=69) Ach (.31; n=24)			U = .71 W = .47
Busse, Kratochwill, & Elliott	1995	Single Case	5 years	44	B (.95; n= 23)	CLI (.95; n=23)	Tantrums (-.43; n=2) Work Completion (1.54; n=2) Aggression (1.08; n=5) Work Skills (1.23; n=1) Disruptive (1.08; n=2) Off-Task (1.48; n=4) On-Task (1.97; n=1) Class Transitions (.93; n=2) Noncompliance (.30; n=2) Social Withdrawal (.29; n=2)	Pre (.94; n=14) 1st (.53; n=3) 2nd (.04; n=2) 3rd (1.6; n=2) 5th (2.07; n=2)	M (.78; n=15) F(1.51; n=5) Class (.85; n=3)	.95
Reddy, Barboza-Whitehead, Files, & Rubel	2000	Exp and Single Case	1986 – 1997	35	B (1.36; n=29) M (.53; n=2) O (2.43; n=3) E (-.19; n=1)	CLI(1.30; n=26) CEE (1.22; n=16) SYS (2.25; n=3)	Int (.45; n=3) Ex (1.49; n=21) SS (.50; n=5) Aca (.69; n=14) Med (0.00; n=1) SA (2.29; n=6) IK (.58; n=1) AC (.51; n=10) DR (.86; n=2) RSEP (.29; n=1) IUS (3.81; n=3)	Pre (1.12; n=3) 5 to 12 (1.27; n=24) Adol (3.22; n=2)	MO (2.20; n=4) FO (4.20; n=2) Mixed (1.10; n=23)	1.29

Note: Exp = Experiment; B = Behavioral Consultation; M = Mental Health Consultation; O = Organizational Consultation; E = Eclectic; CON = Consultant; CEE = Consultee; CLI = Client; SYS = System; Beh = Behavior; Att = Attitude; Ach = Achievement; Int = Internalized; Ex = Externalized; SS = Social Skills; Aca = Academic; Med = Medical; SA = Skill Acquisition; IK = Increased Knowledge; AC = Attitude Change; DR = Decreased Referrals; RSEP = Reduced Special Education Placement; IUS = Increased Use of Services; Pre = Preschool; Adol = Adolescence; MO = Male Only; FO = Female Only; Mixed = Mixed Gender group; U = Unweighted; W = Weighted. Effect Sizes in Parenthesis with number of studies.

Consultation model. The three meta-analyses reviewed BC, MHC, Organizational development, and Eclectic consultation models. The consultation model effect sizes ranged from d = -0.19 to d =2.43. The d = -0.19 effect size was from the eclectic consultation study (Reddy et al., 2000). It appeared that eclectic consultation produced a negative effect size or a worsening in the outcome since eclectic consultation does not rely on a complete theory to identify, define, and treat the problem behavior.

Organization development consultation effect sizes ranged from d = 0.65 (Medway & Updyke, 1985) to d = 2.43 (Reddy et al., 2000). Although the highest effect size occurred in Organizational development studies (Reddy et al., 2000), the effect size does not accurately represent Organizational development because the standard deviation produced from these three studies was SD = 3.13. The elevated standard deviation of 3.13 and mean effect size of d = 2.43 indicated that the results from the three Organizational development studies are extremely varied and possibly come from highly distinct populations; thus, these results possibly do not appropriately reflect one effect size (Bornstein et al., 2009; Reddy et al., 2000).

MHC effect sizes ranged from d = 0.53 (Reddy et al., 2000) to d = 0.73 (Medway & Updyke, 1985). Even though MHC effect sizes have decreased slightly from 1985 to 2000, these results are still positive. These two effect sizes indicated that MHC produced beneficial gains for the people involved in problem-solving consultation.

BC was the only model reviewed in all the studies. Effect sizes from the BC studies were d = 0.72 (Medway & Updyke, 1985), d = 0.95 (Busse et al., 1995), and d = 1.36 (Reddy et al., 2000). The effect sizes for BC increased for each subsequent meta-

analysis due to single-case inclusion. However, the overall results were positive. Other than the Eclectic consultation, the other models produced generally positive outcomes. In addition to measuring global outcomes, the three meta-analyses examined outcome source.

Outcome source. Outcome source concerned the participants in the consultation relationship (Reddy et al., 2000). For these three reviews, consultation focused on consultant, consultee, client, and system-level outcomes. Of these four sources, the majority of the studies measured client (n = 123) and consultee (n = 99) outcomes. In contrast, studies rarely measured consultant (n = 9) and system-level (n = 3) outcomes. Effect sizes for these four outcome sources were primarily between $d = 0.39$ (client) and $d = 1.30$ (client); however, system-level outcomes resulted in an extremely large effect size of $d = 2.25$. Effect sizes for outcome source across the three meta-analyses demonstrated that school-based problem-solving consultation produced a positive change for all members involved in consultation. Knowing that school-based problem-solving consultation produced positive benefits for members of the consultation process is important; however, it is important to know the types of problems that consultation ameliorated.

Outcome type. Outcome type concerned the academic, attitude, or behavioral focus the school psychologist and teacher work together to change. In addition to academics, attitudes, and behaviors, Reddy et al. (2000) examined system-level outcomes. The outcome type effect sizes ranged from $d = -0.43$ to 3.81. Most of the studies measured behavioral variables, in particular, student externalizing behavioral

variables (i.e., tantrums, social skills, aggression, disruption, off-task, on-task, class transitions, and noncompliance) rather than internalizing behaviors (i.e., social withdrawal). Of these behaviors, only tantrums produced a negative effect size or worsening of behavior. Overall, school-based problem-solving consultation produced a positive change in student behavior. Another notable finding from these meta-analyses was studies that focused on achievement.

Achievement was the only variable that focused on student and teacher. From these meta-analyses, achievement focused on child academics, work skills, work completion, teacher skill acquisition, and increased teacher knowledge. The effect sizes ranged from $d = 0.31$ to 2.29.These effect sizes demonstrated that consultation positively influenced student achievement and teacher skill. Overall, the meta-analyses revealed that school-based problem-solving consultation produced a positive change for academics, attitudes, and behaviors. Even though there have been three consultation meta-analyses, researchers have also used vote counting reviews (Bornstein et al., 2009). Although vote counting reviews were not as empirically rigorous as the quantitative reviews, the vote counting reviews provided some important insight into school-based problem-solving consultation and moderators of effectiveness (Borenstein et al., 2009).

Vote counting reviews. In addition to the conventional consultation meta-analyses, there were seven consultation vote counting studies that reviewed 411 articles between 1958 and 2004 (see Alpert & Yammer, 1983; Fuchs, Fuchs, Dulan, Roberts, & Fernstrom, 1992; Hughes et al., 2008; Mannino & Shore, 1975; Medway, 1979, 1982;

Sheridan, Welch, et al., 1996) to determine the effectiveness of consultation. Table 2 summarizes the major findings from these vote counting reviews.

When using the voting method, effectiveness of consultation is determined by comparing the number of statistically significant findings to the number of non-significant findings within each study (Borenstein et al., 2009). Within a vote counting review, all non-significant findings are treated as the same; thus it under-represents the true effects. Even though the vote counting reviews did not provide the magnitude of the effect, they did provide information about the effectiveness of consultation. These studies reviewed similar variables as the meta-analyses. These included: (a) overall outcomes, (b) consultation model, and (c) outcome source/type. In addition, these studies reviewed variables not found in the previous meta-analyses.

Overall outcomes. Of these reviews, four provided overall effectiveness (see Hughes et al., 2008; Mannino & Shore, 1975; Medway, 1979; Sheridan, Welch, et al., 1996). Of the 124 outcomes, 65% (n = 80) demonstrated positive outcomes, 20% (n = 25) demonstrated neutral or mixed outcome, and 15% (n = 19) demonstrated negative outcomes. These outcomes, similar to the three meta-analyses, consistently produced positive results. However, the magnitudes of the positive outcomes from these vote counting reviews were unknown. Similar to the meta-analyses, the vote counting reviews examined consultation model.

Table 2

Vote Counting Reviews

Study	Year	Years Covered	Studies	Model	Outcome Type	Measures
Mannino & Shore	1975	1958 to 1972	35	E (45%; n = 9) P (15%; n=3) M (20%; n=4) Psy (5%; n=1) BS (10%; n=2) NS (5%; n=1)	CEE (75%; n=15) CLI (70%; n=14) SYS (15%; n=3)	
Medway	1979	1972 to 1977	29	B (45%; n=13) M (21%; n=6) NS (21%; n=6) O (14%; n=4)	CEEA (52%; n=12) CEEB (30%; n=7) CEEM (17%; n=4) CLIA (17%; n=2) CLIB (67%; n=8) CLIACH (8%; n=1) CLIM (8%; n=1) SYSB (50%; n=1) SYSM (50%; n=1)	
Medway	1982	1970s	34			Qu (64%; n=22) DO (23%; n=8) ST (10%; n=3) CA (10%; n=3)
Alpert & Yammer	1983	1970 to 1982	132	B (33%; n=44) M (7%; n=9) O (5%; n=6)	Rem (30%; n=40) Pre (19%; n=24)	Qu (23%; n=31) BL (23%; n=30) LA (1%; n=13) TA (7%; n=9) Int (5%; n=6) HC (3%; n=4)
Fuchs, Fuchs, Dulan, Roberts, & Fernstrom	1992	1969-1989	119	B (50%; n=59) Oth (23%; n=27) M (13%; n=16) O (8%; n=9) Jnt (7%; n=8)	Beh (39%; n=46) BehT (65%; n=77) AA (7%;n=8) AAT (27%; n=32) Att (19%; n=23) AttT (31%; n=37) Oth (7%; n=8) OthT (10%; n=12)	SO (28%; n=33) SOM (50%; n=60) QI (24%; n=28) QIM (45%; n=53) T (4%; n=5) TM (21%; n =25) R (2%; n=2) RM (14%; n=17)
Sheridan, Welch, & Orme	1996	1985 to 1995	46	B (46%; n=21) Oth (28%; n=13) M (11%; n=5) NS (11%; n=5) O (4%; n=2)	CLIB (48%; n=22) CLIA (33%; n=15) CLINS (4%; n=2) CEES (22%; n=10) CEEA (9%; n=4) CEEO (4%; n=2) CEENS (2%; n=1) SYSR (13%; n=6) SYSO (4%; n=2) SYSNS (2%; n=1) NS (2%; n=1)	DO (43%; n=20) R (59%; n=27) T (17%; n=8) Ref (17%; n=8) O (9%; n=4) NS (4%; n=2)
Hughes, Loyd, & Buss	2008	1994-2004	16		SE (13%; n=2) SB (50%; n=8) CS/K (6%; n=1) Mx (31%; n=5)	

Table 2 Continued

Study	Design	Consumer Satisfaction	Social Validity	Process Integrity	Follow-Up	Generalization
Mannino & Shore	CG (80%; n=16) CmG (15%; n=3) NC (15%; n=3) NS (5%; n=3)					
Medway	CG (62%; n=18) NC (38%; n=11)				Y (17%; n=5) N (83%; n=24)	
Medway Alpert & Yammer	PP (10%; n=13) CG (13%; n=17) BL (18%; n=24)					
Fuchs, Fuchs, Dulan, Roberts, & Fernstrom	Gp (66%; n=79) SC (34%; n=40)					
Sheridan, Welch, & Orme	ExG (37%; n=17) QsG (7%; n=3) ExS (11%; n=5) QsS (22%; n=10) Des (11%; n=5) Cor(7%; n=3) NS (7%; n=3)	Y (46%; n=21) N (54%; n=25)	Y (37%; n=17) N (63%; n=29)	Y (26%; n=12) N (74%; n=34)	Y (24%; n=11) N (76%; n=35)	Y (4%; n=2) N (96%; n=44)
Hughes, Loyd, & Buss	ExG (6%; n=1) QsG (13%; n=2) SC (75%; n=12) Mx (6%; n=1)					

Table 2 Continued

Study	CON	Consultant Educational Level	CEE	Focus of Study	Length Of Consultation
Mannino & Shore					
Medway					
Medway					
Alpert & Yammer				Ind (35%; n=46) AP (20%; n=27)	
Fuchs, Fuchs, Dulan, Roberts, & Fernstrom				Stu (39%; n=47) Tea (35%; n=42) Combo (25%; n=30)	
Sheridan, Welch, & Orme					
Hughes, Loyd, & Buss	SP (75%; n=12) OC (6%; n=1) Mx (19%; n=3)	Stu (75%; n=12) Pro (19%; n=3) Mx (6%; n=1)	Tea (50%; n=8) Mx (50%; n=8)	Prg (13%; n=2 Case (88%; n=14)	2 weeks (6%; n=1) 3 weeks (19%; n=3) 3.5 weeks (6%; n=1) 4 weeks (13%; n=2) 6 weeks (13%; n=2) 7 weeks (13%; n=2) 8 weeks (6%; n=1) 14 weeks (6%; n=1) Cross Year (6%; n=1) NS (13%; n=2)

Table 2 Continued

Study	Who takes the data?	Research Techniques	Settings	Overall Results
Mannino & Shore				Pos (66%; n=21) Mx (3%; n=1) Neg (31%; n=10)
Medway	CEE (41%; n=12) CLI (18%; n=5) NS (41%; n=12)			Pos (28%; n=8) Mx (48%; n=14) Neg (24%; n=7)
Medway		ANOVA (23%; n=8) Time-Series Analysis (17%; n=6) *T* test (17%; n=6) Chi-square (17%; n=6) Correlation (11%; n=4)		
Alpert & Yammer		Percentages (16%; n=21) ANOVA (11%; n=15) Inter-rater reliability (8%; n=10) Chi-square (5%; n=6) Multivariate analysis (<4%; n=≤5) T tests (<4%; n=≤5) Factor analyses (<4%; n=≤5) Multiple regression (<4%; n=≤5) Q sorts (<4%; n=≤5) Whitney-Mann (<4%; n=≤5) Correlations (<4%; n=≤5) Discriminant analyses (<4%; n=≤5)	Pre/K (11%; n=5) Ele (59%; n=27) Jr. High (2%; n=1) SPED (28%; n=13)	
Fuchs, Fuchs, Dulan, Roberts, & Fernstrom			K-8 (65%; n=77) 9-12 (8%; n=9) K-8/SPED (5%; n=6) 9-12/Sped (3%; n=3) NS (20%; n=24)	
Sheridan, Welch, & Orme				Pos (67%; n=31) Neu (28%; n=13) Neg (5%; n=2)
Hughes, Loyd, & Buss	CON (6%; n=1) CEE (13%; n=2) BO (6%; n=1) CP (13%; n=2) Mx (63%; n=10)			Pos (74%; n=20) Neu (26%; n=7)

Note: E = Educational Consultation; P = Psychological Consultation; M = Mental Health Consultation; Psy = Psychiatric Consultation; BS = Behavioral Science; B = Behavioral Consultation; O = Organizational Development; Jnt = Joint Consultation; CEE = Consultee; CEEA = Consultee Attitudes; CEEB = Consultee Behavior; CEEM = Consultee Mixed; CEES = Consultee Skill; CEEO = Consultee Other; CEENS = Consultee Not Specified; CLI = Client; CLIA = Client Attitudes; CLIB = Client Behavior; CLIACH = Client Achievement; CLIM = Client Mixed; CLINS = Client Not Specified; SYS = System; SYSB = System Behaviors; SYSM = System Mixed; SYSR = System Referral; SYSO = System Other; SYSNS = System Not Specified; Rem = Remediation; Pre = Prevention; Beh = Behavior; BehT = Behavior plus another target; AA = Academic Achievement; AAT = Academic Achievement plus another target; Att = Attitudes; AttT = Attitudes plus another target; OthT = Other plus another target; SE = Student Educational; SB = Student Behavioral; CS/K = Consultee Skill/Knowledge; Qu = Questionnaire; DO = Direct Observations; ST = Standardized Tests; CA = Content Analysis; BL = Baseline; LA = Linguistic Analysis; TA = Time Analysis/time-series; Int = Interviews; HC = Hypothetical Cases; SO = Systematic Observations; SOM = Systematic Observation plus another measure; QI = Questionnaire/Interview; QIM = Questionnaire/Interview plus another measure; T = Tests; TM = Tests plus another measure; R = Rating; RP = Rating plus another measure; Ref = Referrals to Special Education; CG = Control Group; CmG = Comparison Group; NC = No Control; PP = Pre-post; SC = Single Case; Gp = Group; ExG = Experimental/Group; QsG = Quasi-experimental/Group; ExS = Experiment/Single Case; QsS = Quasi-experimental/Single; Des = Descriptive; Cor = Correlation; SP = School Psychologist; OC = Other Consultant; Stu = Student; Pro = Professional; Tea = Teacher; Ind = Individual; AP = Administrative Program; Prg = Program; Combo = Combination; CON = Consultant; BO = Blind Observer; CP = Child Performance; Y = Yes; N = No; Oth = Other; NS = Not Specified; Pos = Positive; Neg = Negative; Mx = Mixed; Neu = Neutral. Percentages and number of studies within each parenthesis.

Consultation model. Of the vote counting reviews, five identified consultation model (see Alpert & Yammer, 1983; Fuchs, Fuchs, Dulan, et al., 1992; Mannino & Shore, 1975; Medway, 1979; Sheridan, Welch, et al., 1996). However, Mannino and Shore (1975) did not use the same consultation models as the other reviews. Of the previously discussed consultation models (i.e., MHC, BC, CBC, and IC), the vote counting reviews only examined BC and MHC. Of these two consultation models, BC (n = 137) was used most often followed by MHC (n = 36). The vote counting reviews demonstrated that as consultation research continues, more studies used BC and fewer used MHC and Organizational development. Only Sheridan, Welch, et al. (1996) identified the model and direction of the outcome.

Sheridan, Welch, et al. (1996) reviewed BC (n = 21), MHC (n = 5), and Organizational development (n = 2). Of all the BC studies, 95% reported at least one positive outcome, and 9% reported at least one neutral outcome. Of all BC outcomes, 89% were positive and 11% were neutral. As for MHC studies, 60% produced positive outcomes and 60% produced neutral outcomes. Of all MHC outcomes, 57% were positive and 43% were neutral. There were only two Organizational development studies reviewed; however, both studies produced all positive outcomes. The results, similar to the meta-analyses, indicated that school-based problem-solving consultation produced positive results. In addition to examining school-based problem-solving consultation models, the vote counting reviews examined outcome source/type.

Outcome source/type. The vote counting reviews did not separate outcome source from outcome type. Outcome source concerned the participants in the

consultation relationship, and outcome type examined the academic, achievement, or behavioral focus of the consultation relationship. The seven reviews did not identify which outcome source/type that produced positive, negative, or neutral findings since the focus of these reviews was to identify problem-solving consultation variable. Typically, outcome source focused on client, and outcome type focused on behavior. The current reviews demonstrated most consultation studies focus on individuals, used single-case designs to determine the effectiveness of consultation, and consultation focused on remediation rather than prevention. In addition to reviewing similar variables as the meta-analyses, these studies reviewed extra variables.

These extra variables included were: (a) types of measures, (b) consumer satisfaction, (c) social validity, (d) process integrity, (e) follow-up, (f) generalization, (g) types of consultants, (h) consultant educational level, (i) type of consultee, (j) length of consultation, (k) who collects the data, and (i) research techniques. Sheridan, Welch, et al. (1996) defined process integrity as how well the consultant followed a specific model's procedures. From these reviews, it appeared that researchers typically do not measure long-term outcomes, consumer satisfaction, social validity, process integrity, outcome generalizations, or length of consultation. An interesting finding from these studies related to long-term outcomes and consultant type.

Most studies lasted eight weeks or less with only one study measuring outcomes over multi-years (Hughes et al., 2008). As for consultant type, most studies used school psychology graduate students. Using students for consultation research has been a common practice and was similar to the Busse et al. (1995) review. The use of school

psychology doctoral students in consultation research forced the study to reflect an analogue rather than a naturalistic approach. Analogue studies are known to reduce the ability to generalize the overall effectiveness of school-based problem-solving consultation to a larger population.

In summary, the best evidence for school-based problem-solving consultation emerged from the three meta-analyses (Busse et al., 1995; Medway & Updyke, 1985; Reddy et al., 2000). These meta-analyses examined global effect size, consultation model, outcome source, and outcome type. Taken together, these meta-analyses reviewed 89 studies and 44 single-n cases that used BC, MHC, Organizational development, and Eclectic consultation models. Results indicated that school-based problem-solving consultation produced positive outcomes, especially if the school psychologist followed a theory. School-based problem-solving consultation measured academic, attitude, or behavioral outcomes for school psychologists, teachers, clients, and systems. School-based problem-solving consultation produced a positive change in academics, attitudes, behaviors, and systems, and for all members involved in consultation.

Another look at the effectiveness of school-based problem-solving consultation came from seven vote counting reviews (see Alpert & Yammer, 1983; Fuchs, Fuchs, Dulan, et al., 1992; Hughes et al., 2008; Mannino & Shore, 1975; Medway, 1979, 1982; Sheridan, Welch, et al., 1996). These studies reviewed similar variables as the meta-analyses such as overall outcomes and consultation model. Four reviews demonstrated overall effectiveness of school-based problem-solving consultation. Five reviews

demonstrated that as consultation research continues, more studies used BC and fewer used MHC and Organizational development, which was similar to findings in the meta-analyses. In addition, Sheridan, Welch, et al. (1996) demonstrated that all defined consultation models produced positive or neutral effects.

In summary, previous syntheses of empirical work done involving school-based problem-solving consultation demonstrated much promise for its use in addressing the myriad of problems experienced by children and youth in schools. Its promise notwithstanding, previous reviews of school-based problem solving consultation are dated, do not represent current innovations in consultation, and often methodologically weak.

The purpose of this study was to conduct a meta-analysis to assess the effectiveness of school-based problem-solving consultation literature between 1986 and 2009. First, to my knowledge, this was the first school-based problem-solving consultation meta-analyses to occur in almost ten years. Second, it was the first school-based problem-solving consultation meta-analysis since 1985 to examine the effectiveness of school-based problem-solving consultation study using only between-group research design studies (see Medway & Updyke, 1985). Between-group research designs were the only research designs included because of their improved scientific rigor over within-group research designs (Gresham & Vanderwood, 2008) and single-n design using traditional effect size metrics tend to produce unreliable effect sizes that cannot be compared to between-group effect sizes (Parker, 2006; Parker, Vannest, & Brown, 2009). Third, the current meta-analysis provided information to determine if

recent school-based problem-solving consultation studies produced similar outcomes as previously reported. Finally, this was the first meta-analysis, to my knowledge, that compared IC (Rosenfield, 2008) to other school-based problem-solving consultation models.

CHAPTER III

METHOD

Study Inclusion Criteria

General characteristics. The purpose of the current meta-analysis was to examine the effectiveness of school-based problem-solving consultation using studies between 1986 and 2009. This span in years was selected because the last between-group only school-based problem-solving consultation meta-analysis was published in 1985 (see Medway & Updyke, 1985). Between-group research designs were selected because of the implied scientific rigor over within-group research designs (Gresham & Vanderwood, 2008) and traditional effect sizes calculated from single-n research designs cannot be accurately compared to between-group effect sizes (Parker, 2006; Parker, Vannest, & Brown, 2009). For the current meta-analysis, school-based problem-solving consultation was defined as a voluntary, indirect, collaborative interaction between a consultant (e.g., school psychologist, master teacher, team) and a teacher to improve the learning, behavior, or functioning of a client (Brown, Pryzwansky, & Schulte, 2006). Since the current meta-analysis focused on the school environment, studies were required to describe a consultation model consistent with the previously mentioned definition occurring in school settings. In addition, as a measure of study quality, only peer-reviewed studies published in or translated to English were included. The use of peer-reviewed studies removed all dissertation and unpublished manuscripts.

Outcomes measures. Studies were required to measure at least one academic, behavioral, social, or emotional student outcome. Studies measuring system-level

outcomes were also included only if the system-level outcomes (e.g., special education evaluations placements, and/or referrals) were related to student outcomes. Since the meta-analysis examined the effects of school-based problem-solving consultation on student outcomes, studies related to teacher outcomes (e.g., attitudes or behaviors) were excluded.

Participants and settings. Studies were included that involved students in grades preschool/pre-k through 12. In addition, studies were included that used general and special education students as well as students attending a public or private school. Therefore, all studies that used adults or children prior to preschool/pre-k were excluded.

Research design. The goal of the current meta-analysis was to determine the effectiveness of school-based problem-solving consultation as compared to an alternative treatment or control group. This was accomplished by only including between-group studies and excluding single-n as well as within-group designs. Therefore, both experimental and quasi-experimental research designs were included as long as they compared school-based problem-solving consultation to another comparison or control group and reported sufficient information to calculate effect sizes.

In summary, the current meta-analysis required studies to meet several inclusionary criteria. These criteria were: (a) published between 1986 and 2009, (b) provided a definition of school-based problem-solving consultation consistent with typical school-based problem-solving consultation models; (c) peer-reviewed, (d) conducted in or translated to English, (e) measured student- or system-level student outcomes, (f) used clients ranging from preschool/pre-k to grade 12, (g) used an

experimental or quasi-experimental between-group design, and (h) provided sufficient quantitative information to calculate effect sizes. Studies were eliminated if they did not meet one or more of the inclusion criteria.

Study Retrieval

The goal of the current meta-analysis was to obtain all school-based problem-solving consultation studies between 1986 and 2009. In order to accomplish this, the current meta-analysis followed Lipsey and Wilson's (2001) suggested techniques. These techniques included: (a) using a computerized bibliographical search, (b) reviewing recent vote counting narratives (see Fuchs, Fuchs, Dulan, Roberts, & Fernstom, 1992; Hughes, Loyd, & Buss, 2008; Sheridan, Welch, & Orme, 1996) and meta-analyses related to school-based problem-solving consultation (see Guli, 2005; Reddy, Barboza-Whitehead, Files, & Rubel, 2000), (c) hand-searching several school psychology journals, and (d) reviewing studies appearing in the references within the obtained articles (e.g., ancestral searches).

Bibliographical search. First, the computerized database Cambridge Scientific Abstracts with all possible search engines (e.g., Education: A SAGE Full-Text Collection, ERIC, PsycARTICLES, PsycBOOKS, Psychology: A SAGE Full-Text Collection, and PsycINFO) spanning the years 1986 to 2009 was searched. The term *consultation* was combined with the following words using the "and" Boolean search operator to capture any relevant articles (number in parenthesis identifies the number of abstracts obtained in the search): *behavioral* (13,776), *behavior* (19,002), *behaviors* (8,133), *problem solving* (3,651), *mental health* (16,648), *instructional* (1,762), *conjoint*

behavior (4), *conjoint behavioral* (134), *school based* (2,414), *team* (8,728), *assistance* (5,113), *collaboration* (5,653), *academics* (353), *social-emotional* (570), *social skills* (1,213), *achievement* (3,952), *teacher skill* (5), *teacher attitudes* (316), *teacher knowledge* (38), *system* (19,195), *referrals* (3,965), and *special education placement* (68).

Recent meta-analyses and vote counting studies. Second, vote counting studies and meta-analyses conducted between 1986 and 2009 were examined. The vote counting narrative reviews included: (a) Fuchs, Fuchs, Dulan, et al. (1992); (b) Hughes et al. (2008); and (c) Sheridan et al. (1996). The meta-analyses reviewed included Guli (2005) and Reddy et al. (2000). The meta-analyses and vote counting search yielded 37 articles that were retrieved for further review.

School psychology journals. Third, a hand search of journals similar to the Hughes et al. (2008) study was conducted. Hughes et al. reviewed *School Psychology Review, School Psychology Quarterly*, *Journal of Educational and Psychological Consultation*, and *Journal of School Psychology* since these journals published the majority of school-based problem-solving consultation research. However, for the current meta-analysis, the journals reviewed by Hughes et al. were reviewed plus the following journals: (a) *Professional School Psychology*, (b) *Journal of Applied School Psychology*, (c) *Canadian Journal of School Psychology*, (d) *California School Psychologist*, (e) *Psychology in the Schools*, and (f) *School Psychology International*. The addition of these extra journals provided a more in-depth examination of the current school-based problem-solving consultation literature including studies from other

countries besides the United States of America. The following were the number of articles obtained from each journal search (number in parenthesis identifies the number of abstracts obtained in the search): (a) *Psychology in the Schools* (1,282), (b) *School Psychology International* (962), (c) *School Psychology Review* (920), (d) *Journal of School Psychology* (728), (e) *Canadian Journal of School Psychology* (141), (f) *School Psychology Quarterly* (567), (g) *Journal of Educational and Psychological Consultation* (431), (h) *Journal of Applied School Psychology* (177), (i) *California School Psychologist* (91), and (j) *Professional School Psychology* (146).

Ancestral search. Finally, an ancestral search of the reference sections of studies meeting eligibility criteria were searched for any relevant articles not identified by the previous methods. There were no articles found using this study retrieval technique.

After all duplicate articles were removed, the above four methods yielded a subgroup of 115 studies. Of the 115 articles collected for full review, 19 studies met all inclusion criteria. Of the 96 studies excluded, 47.92% (n = 46) used a single-n or case study methodology, 20.83% (n = 20) focused on consultant and consultee outcomes, 20.83% (n = 20) did not have school-based problem-solving consultation as the primary intervention, 4.17% (n = 4) did not provide sufficient data to calculate an effect size, 4.17% (n = 4) used a within-study design, and 2.09% (n = 2) were removed due to the issue of statistical dependency (Cooper & Hedges, 1994).

Study Coding

After the studies meeting inclusion criteria were retrieved, the school-based problem-solving consultation coding protocol (Appendix A) and school-based problem solving consultation coding manual definitions (Appendix B) were developed. The coding protocol contained the coding dimensions and categories that were coded for each study (e.g., grade level). In total, there were 23 dimensions. These 23 dimensions were (a) study year, (b) journal name, (c) student total N, (d) student grade, (e) student gender, (f) student sample ethnicity, (g) parent total N, (h) teacher total N, (i) teacher gender, (j) teacher type of class, (k) consultant N, (l) consultant type, (m) consultant gender, (n) school type, (o) referral source, (p) referral reason, (q) consultation model, (r) comparison group, (s) intervention type, (t) design quality, (u) outcome measured, (v) data type, and (w) page where effect size data was found.

Two school psychology doctoral students independently read and coded all 19 school-based problem-solving consultation articles that were included in the current meta-analysis. After coding a set of articles, the two school psychology students met to compare their codes. During the meetings, the coders compared their responses on each dimension. When a disagreement occurred, the two coders discussed the disagreement to determine the agreed upon answer. The inter-rater reliability of the six sessions ranged from 93.84% to 99.32%, with a mean of 98.49%. In addition to calculating inter-rater reliability for all questions, Cohen's kappa was calculated for the 12 categorical dimensions. Cohen's kappa was calculated because it takes into account chance

agreement (Cohen, 1960). Cohen's kappa was 73.62%, which demonstrated good agreement beyond what would be expected by chance (Watkins & Pacheco, 2000).

Data Analysis

The Comprehensive Meta-Analysis (CMA) program was used (Borenstein, Hedges, Higgins, & Rothstein, 2005) to examine publication bias and calculate all effect sizes. Publication bias was examined using the Classic fail-safe N and Orwin fail-safe N in order to determine the number of non-significant studies needed to nullify the significant effect size (Borenstein, Hedges, Higgins, & Rothstein, 2005). While the Classic fail-safe N relied on the *p*-value, the Orwin fail-safe N examined publication bias using Hedges's g (Orwin, 1983). The CMA program was used to calculate effect sizes because it has the capacity to convert 100 different data formats such as (a) mean and standard deviation using post-test data only, (b) mean and standard deviation using pre- and post-test data standardized using post score standard deviations, (c) frequencies or proportions, or (d) *t* or *F* statistic data into the same effect size metric. With the CMA program, more studies can be included in the meta-analysis because the retrieved studies do not have to rely on the standard effect size computation of using means and standard deviations. Even though effect sizes can be calculated from a variety of formats, 91% of the effect sizes were based on means and standard deviations.

When using the CMA program, effect sizes can be calculated from each outcome measure within a study; thus, treating each outcome as independent of each other (Borenstein et al., 2005). However, since these outcomes with each study used the same sample, it was unlikely that the outcomes would be independent of each other

(Borenstein et al., 2005). This issue was resolved by calculating a mean effect size for each study. The mean effect size per study combined the multiple effect size within one study into a singular effect size. Once the mean effect for each study was calculated, an omnibus mean effect size for the meta-analysis was computed from the 19 individual mean study effect sizes.

After effect size information was entered in the CMA program, all effect sizes were converted to Hedges's g. Hedges's was used because it is a more conservative estimate of Cohen's d and it corrects for sample size bias (Hedges, 1981). Hedges's g was calculated from Cohen's d by multiplying Cohen's d by J, where = 1 - (3/ (4 x df – 1)), where df = N_{total} – 2 (Hedges, 1981).

The current study used a random-effects model with 95% confidence intervals to analyze the data instead of the traditional fixed-effect model. The author hypothesized that the random-effects model provided a better interpretation of the data for several reasons. The reasons included: (a) the studies originated from several authors and samples (Borenstein, Hedges, Higgins, & Rothstein, 2009), (b) the goal was to generalize the results to a larger population (Hedges & Vevea, 1998), and (c) both between- and within-study error was believed to influence the omnibus mean effect size (Field, 2003). In order to test this hypothesis, a test of homogeneity was conducted by analyzing the Q-within statistic and its *p*-value. The use of a random-effects model changed how the overall effect size was interpreted and how studies were weighted (Borenstein et al., 2009).

In a fixed-effect model, the omnibus effect size is known as the one true effect size where greater weighting was applied to the larger-n studies and smaller-n studies were largely ignored. However, with a random-effects model, the overall effect size can be interpreted as an estimate of the mean of a distribution of effects (i.e., effect size can vary from study to study but within a distribution) where studies were more equally weighted which allowed all studies to influence the omnibus effect size (Borenstein et al., 2009). After the omnibus mean effect size was computed, I^2 was analyzed to determine the amount of true variance and if further moderator analysis was required.

Moderator Analyses

Moderator analyses were conducted to examine for potential statistical differences between categories underlying dimensions coded (e.g., effect size statistical differences between grade levels). Not all analyses were possible because categories underlying several coded dimensions had to be combined so each category contained at minimum two studies (Borenstein et al., 2009). However, the new categories were not a random combination of the categories with the lowest number of studies. Instead, a category with fewer studies was combined with another category only if it made theoretical or conceptual sense. To determine if there was a statistically significant difference between or among categories underlying dimensions, the $Q_{between}$ and its *p*-value were used. If the *p*-value was less or equal to 0.05, then the null stating that the groups were homogenous was rejected. When this analysis indicated a statistically significant difference between the categories, an additional analysis using the CMA software was conducted to determine which categories were statistically different from

each other. In order to determine which categories within a coded dimension were statistically different from one another, only two categories within each moderator were compared at a time using a *p*-value less than or equal to 0.05 (Borenstein et al., 2009). The dimensions (i.e., possible moderators of effect size magnitude) and underlying categories used in the current study were (a) student grade, (b) teacher type of class, (c) consultant type, (d) school type, (e) referral source, (f) referral reason, (g) consultation model, (h) comparison group, (i) intervention type, (j) design quality, (k) outcome measured, (l) and data type. These 12 out of the total 23 dimensions were chosen for further moderator analysis as these were categorical variables; whereas, the other 11 dimensions did not form categorical variables but instead focused on article information (study year and journal name), client demographics (number of students in the study, and student gender and ethnicity), consultee demographics (number of parent consultees, number of teacher consultees, and consultee gender), consultant demographics (number of consultants and consultant gender), and location of the data used to calculate the effect size(s). Due to the nature and purpose of these 11 dimensions, these data did not form categorical variables and therefore these dimensions could not be analyzed using a moderator analysis (Borenstein et al., 2009).

Student grade. Student grade referred to grade of the sample at the beginning of the intervention. The "Preschool/Head Start" category was for studies that contained students who were attending preschool or head start. The "Elementary (K-6)" category was for studies that contained students who were in the grade kindergarten to the sixth grade. The "Mixed" category was for studies that used a combination a of student

grades such as pre-k and elementary or elementary, middle, and high school. The "Other/Not Specified" category was for studies that used a sample that did not provide information about student grade. All four original categories ("Preschool/Head Start," "Elementary (K-6)," "Mixed," and "Other/Not Specified") were analyzed for this moderator.

Teacher type of class. Teacher type of class referred to the type of students the teacher instructed. Initially, the question consisted of three categories: "General Education," "Special Education," and "Did Not Specify/Mixed/Other." The "Special Education" category was for studies that used students who were receiving special education services. The "General Education" category was for studies that used students who did not receive special education services. The" Did Not Specify/Mixed/Other" category was for studies that used students who were in general and special education settings as well as studies that did not specify the teachers' type of class. However, prior to analysis, the one special education study was added to the "Did Not Specify/Mixed/Other" category since the "Did Not Specify/Mixed/Other" category contained samples that used a portion of special education students in their sample. Therefore, only the "General Education" and "Special Education/Did Not Specify/Mixed/Other" categories were analyzed for this moderator.

Consultant type. Consultant type referred to the consultant's level of training. The "Graduate Student" category was for studies that used consultants who were still receiving master's- or doctoral-level training. The "School Psychology Professional" category was for studies that used consultants that were employed in the school district

as a school psychology professional. The "Non-School Psychology Professional" category was for studies that used consultants that were employed in the school districts but not as school psychologists (e.g., learning disability specialist, teacher). The "Team" category was for studies that used a team approach (e.g., school based multidisciplinary team comprised of teachers, school psychologists, and school administrators) to identify and ameliorate student difficulties. The "Did Not Specify/Mixed/Other" category was for studies that did not fit the other categories or when the consultant type was not specified or identifiable. Due to the low number of studies using non-school psychology professionals and school psychology professionals, these groups were combined to create a group known as "School-Related Professional". This new grouping was defined as people who work for the school district and were no longer taking college courses. Since the "School Psychology Professional" and "Non-School Psychology Professional" categories were combined. Therefore, only the "Did Not Specify/Mixed/Other," "Team," "Graduate Student," and "School-Related Professional" categories were analyzed for this moderator.

School type. School type referred to the school setting. The "Public School" category was for studies that used a sample containing students who attended a public school including head start. The "Mixed" category was for studies that used a sample containing a mixture of public and private school students. The "Did Not Say" category was for studies that did not provide this information. If the study did not explicitly state that public or private school students were used, the "Did Not Say" category was

endorsed. Because no private school students were included in the sample, only the "Did Not Say" and "Public" categories were analyzed for this moderator.

Referral source. Referral source was defined as the person or group that made the referral for the student to receive school-based problem-solving consultation services. The "Teacher" category was for studies that relied on teacher referrals. The "Team" category was for studies that used a team (e.g., school based multidisciplinary team comprised of teachers, school psychologists, and school administrators) approach to make referrals. The "Mixed" category was for studies that relied on teacher and team-based referrals. The "Did Not Specify/Other" category was for studies that did not provide a referral source or provided another referral source (e.g. parents). Due to the low number of "Mixed" studies, the "Mixed" category was combined with "Did Not Specify/Other" and became "Mixed/Other." This category was defined as referrals coming from a combination of teacher and team-based referrals, referral source not identified, or referrals made by another referral source (e.g., parents). Therefore, only the "Teacher" and "Mixed/Other" categories were analyzed for this moderator.

Referral reason. Referral reason was defined as the reason for referral to school-based problem-solving consultation services. The "Behavior" category was for studies that based referrals on behavioral issues. The "Academic" category was for studies that based referrals on academic issues. The "Mixed" category was for studies that based referrals on a mixture of behavioral, academic, emotional, or social issues. The "Did Not Specify/Other" category was for studies that based referrals on reasons other than a behavioral or an academic concern. All four original categories

("Behavior," "Academic," "Mixed," and "Did Not Specify/Other") were analyzed for this moderator.

Consultation model. Consultation model was defined as the theory of school-based problem-solving consultation that the consultant used to identify and decrease the area of concern as identified in the study. The "Behavioral Consultation" category was for studies that relied on a behavioral consultation model. The "Instructional Consultation" category was for studies that relied on an instructional consultation model. The "Mental Health Consultation" category was for studies that relied on a mental health consultation model. The "Did Not Specify/Other" category was for studies that described another consultation model or did not define the consultation model used. Since none of the studies used MHC, the "Mental Health Consultation" category was removed from the analysis and moderator was analyzed using the other three categories ("Behavioral Consultation," "Instructional Consultation," and "Did Not Specify/Other").

Comparison group. Comparison group was defined as the group that was compared to the school-based problem-solving consultation group. The "Practice As Usual" category was for studies that compared typical service to problem-solving consultation. The "Alternative Treatment" category was for studies that compared another treatment (inside and outside school) to school-based problem-solving consultation. The "Other" category was for studies that used a comparison group that was not related to either of the first two comparison groups. Although three groups were initially created, a fourth category, "Mixed," was created during the initial data analysis. This category was created to reflect studies that compared school-based problem-solving

consultation to an alternative treatment as well as a practice as usual condition. After the initial analysis, it was discovered that one study compared school-based problem-solving consultation to both an alternative treatment and a practice as usual condition. This new category was combined with "Other" to create the new category: "Mixed/Other." The new category was used for studies that did not compare school-based problem-solving consultation to either an alternative treatment or practice as usual, or compared school-based problem-solving consultation to an alternative treatment as well as a practice as usual condition. Therefore, the "Alternative Treatment," "Practice As Usual," and "Mixed/Other" categories were analyzed for this moderator.

Intervention type. Intervention type was defined as the type of intervention that was implemented as a result of the school-based problem-solving consultation process. The "Academic" category was for studies that used an academic intervention (e.g., peer assisted learning) to decrease the area of concern. The "Behavioral/Social" category was for studies that used a behavioral or social intervention (e.g., social skills) to decrease the area of concern. The "Mixed/Other" category was for studies that used a combination of academic and behavioral interventions as well as another intervention (e.g., emotional, systemic) to decrease the problem. All three original categories ("Academic," "Behavioral/Social," and "Mixed/Other") were analyzed for this moderator.

Design quality. Design quality was defined as the ability to evaluate research using Gersten, Fuchs, Compton, Coyne, Greenwood, and Innocenti's (2005) quality indicators. The "Low Quality" category was defined as meeting less than nine essential indicators on the school-based problem-solving consultation quality indicators protocol.

The "Medium Quality" category was defined as meeting nine or more of the ten essential indicators and between one to three desirable indicators. The "High Quality" category was defined as meeting nine or more of the ten essential indicators and four or more desirable indicators. Due to the number of indicators required to identify a study as medium or high quality from a low quality study, medium and high quality studies were combined into one group ("Medium/High Quality"). Therefore, only the "Low Quality" and "Medium/High Quality" categories were analyzed for this moderator.

Since the design quality question on the school-based problem-solving consultation coding protocol was comprised of 19 questions, the school-based problem-solving consultation quality indicators coding protocol (Appendix C) and school-based problem-solving consultation quality indicators manual definitions (Appendix D) were created. The school-based problem-solving consultation quality indicators coding protocol and quality indicator definitions were created using suggestions from Gersten et al. (2005); however, questions were modified and added to reflect quality issues important to school-based problem-solving consultation. Because a number of identified qualities were required to differentiate low quality from medium as well as high quality studies, two school psychology doctoral students read 13 experimental and quasi-experimental school psychology-related articles over four sessions to establish the inter-rater reliability of the school-based problem-solving consultation quality definitions. Inter-rater reliability was computed by having two school psychology doctoral students compare their responses on each item. When a disagreement occurred, the two coders discussed the disagreement to determine the agreed-upon answer. Percentage of

agreement was determined by dividing the number of agreements by the number of agreements plus disagreements and then multiplying by 100. The inter-rater reliability of the school-based problem-solving consultation quality indicators over four sessions ranged from 77.19% (first session) to 91.23% (fourth session) with a mean of 85.43%.

Outcome measured. Outcome measured was defined as the method used to measure client-related dependent variables. The "Standardized and Available Commercially or Publically" category was for studies that used instruments that were standardized on a larger population and the information was published in a manual. The "Researcher Developed" category was for studies that used measures that were created by the author and were therefore only available from the study or by contacting the author. The "CBM" category was for studies that used a curriculum-based measurement (e.g., progress monitoring tools) to document student progress. The "SPED Referrals/Placement" was for studies that measured the number of students who were referred for special education testing and special education placement. The "Direct Observation" category was for studies that measured student progress using direct observations. The "Other" category was for studies that used another type of measure to document progress (e.g., teacher-created tests, Office Discipline Referrals). Initially six categories were created; however, a seventh category, "Mixed," was created during the initial review. This category was created to reflect studies that measured outcomes using several different methods. After the initial analysis, it was discovered that the "Other" category was not used and only one study measured all outcomes using a CBM. Since CBM was used as the only outcome measure in one study, it was combined with

"Researcher Developed." Therefore, only the "Standardized and Available Commercially or Publically," "Researcher Developed," "SPED Referrals/Placements," and "Mixed" categories were analyzed for this moderator.

Data type. Data type examined how effect sizes were created. The "Mean and Standard Deviation (Post-test Only)" category was for studies that provided only post-test means and standard deviations. The "Mean and Standard Deviation (Pre- and Post-test)" category was for studies that provided only pre- and post-test means and standard deviations. The "Frequencies or Proportions" category was for studies that provided outcomes using frequencies or proportions. The "t-value/F-value" category was for studies that provided outcomes using a t-test or F-test. The "Effect Size Provided" category was for studies that did not need an effect size calculated because the effect size was already calculated. Initially five categories were created, but a sixth category, "Mixed," was created during the initial data analysis. This category was created to reflect studies that calculated effect sizes using a variety of methods. After the initial analysis, it was discovered that the "Effect Size Provided" category was not used. For the final analysis, only the "Mean and Standard Deviation (Pre- and Post-test)" category, "Frequencies or Proportions," "t-value/F-value," and "Mixed" categories were analyzed.

The primary purpose of the current study was to examine the overall effectiveness of school-based problem-solving consultation. In addition, a secondary goal was to conduct additional analyses to examine potential independent variables that could moderate the effectiveness of school-based problem-solving consultation. To

accomplish this secondary goal, 12 moderator analyses were conducted. Therefore, two research questions guided this meta-analysis.

1. What is the overall effectiveness of school-based problem-solving consultation?
2. How is the effectiveness of school-based problem-solving consultation moderated by (a) student grade, (b) teacher type of class, (c) consultant type, (d) school type, (e) referral source, (f) referral reason, (g) consultation model, (h) comparison group, (i) intervention type, (j) design quality, (k) outcome measured, and (l) data type?

CHAPTER IV

RESULTS

Study Information

The current meta-analysis analyzed 19 studies producing 205 effect sizes between 1986 and 2009. The studies came from several sources (Table 3) with most coming from *Exceptional Children*. In total, the sample consisted of 7,250 clients (Table 4), 471 consultees, who were all teachers, and 87 consultants (Table 5).

Table 3

Journals Used in the Meta-Analysis

Journal Name	Number of Studies Used from each Journal
Child and Family Behavior Therapy	1
Child Youth Care Forum	1
Clinical Child Psychology and Psychiatry	1
Educational Psychology	1
Exceptional Children	4
Journal of Abnormal Child Psychology	1
Journal of Applied School Psychology	1
Journal of Community Psychology	1
Journal of School Psychology	2
Psychology in the Schools	1
Remedial and Special Education	2
School Psychology Quarterly	2
School Psychology Review	1

Table 4

Client Demographics

Gender (7250)	Ethnicity (7250)
Female (300; 4.14%)	Caucasian (2210; 30.48%)
Male (696; 9.60%)	African American (2065; 28.48%)
Did not Specify (6254; 86.26%)	Hispanic (591; 8.15%)
	Mixed/Other (703; 9.70%)
	Did Not Specify (1681; 23.19%)

Table 5

Consultee & Consultant Demographics

Teacher Gender (471)	Consultant Gender (87)
Female (346; 73.46%)	Female (24; 27.59%)
Male (44; 9.34%)	Male (8; 9.20%)
Did not Say (81; 17.20%)	Did not Say (55; 63.22%)

Publication Bias

The current meta-analysis incorporated data from 19 studies with a 2-tailed p = 0.0013. For the current study, the Classic fail-safe N was 276. In order to exceed a p-value > 0.05, 276 null studies, or 14.5 null studies for every observed study would need to be located. In addition, the Orwin fail-safe N was 57. This means that 57 studies would need to be located with a mean Hedges's g of 0.00 to bring the combined Hedges's g under 0.10 (Borenstein et al., 2005).

Test of Homogeneity

The test of homogeneity ($Q_w(18) = 114.63$, $p < .000$, $I^2 = 84.30$) supported the random-effects hypothesis because the Q_{within} statistic and its p-value indicated the overall effect size was not identical across studies. In addition, to supporting the random-effects hypothesis, I^2 was 84.30 indicating that 84.30% of the variance was true and could be explained by further moderator analysis (Borenstein et al., 2005).

Omnibus Mean Effect Size

To examine the effectiveness of school-based problem-solving consultation, the omnibus mean effect size was calculated. The omnibus effect size was g = 0.42, SE = 0.13, CI_{95} = 0.16, 0.68, p = 0.0013. According to Cohen's (1988) metric, an effect size of g = 0.42 was in the moderate range. For the effect size and confidence intervals for each study, see Figure 1.

Study name	Outcome	Hedges's g	Standard error	Lower limit	Upper limit	p-Value
McDougal et al., 2000	Combined	0.26	0.09	0.10	0.43	0.002
Gravois & Rosenfield, 2002	Combined	1.52	0.12	1.28	1.76	0.000
Gravois & Rosenfield, 2006	Combined	0.16	0.23	-0.30	0.61	0.498
Murray et al., 2008	Combined	0.36	0.41	-0.45	1.17	0.381
Kratochwill et al., 2003	Combined	0.35	0.46	-0.56	1.25	0.453
Fazel et al., 2009	Combined	0.13	0.21	-0.27	0.54	0.512
DuPaul et al., 2006	Combined	-0.00	0.15	-0.30	0.30	0.993
Farmer-Dougan et al., 1999	Combined	1.27	0.55	0.18	2.36	0.022
Bramlett, 1994	Combined	0.09	0.10	-0.11	0.29	0.373
Dunson et al., 1994	Combined	0.88	0.46	-0.02	1.79	0.056
Evans et al., 1993	Combined	0.71	0.43	-0.13	1.56	0.099
Fuchs & Fuchs, 1989	Combined	0.69	0.41	-0.12	1.49	0.094
Fuchs, Fuchs, & Bahr, 1990	Combined	0.54	0.37	-0.18	1.26	0.143
Fuchs et al., 1992	Combined	0.28	0.31	-0.32	0.88	0.359
Fuchs et al., 1990	Combined	0.85	0.44	-0.00	1.70	0.051
King & Kirschenbaum, 1990	Combined	0.07	0.35	-0.61	0.74	0.850
Lochman et al., 1989	Combined	0.14	0.42	-0.68	0.96	0.737
Schulte et al., 1990	Combined	-0.01	0.34	-0.68	0.66	0.969
Welch et al., 1995	Combined	0.35	0.19	-0.02	0.72	0.061
		0.42	0.13	0.16	0.68	0.001

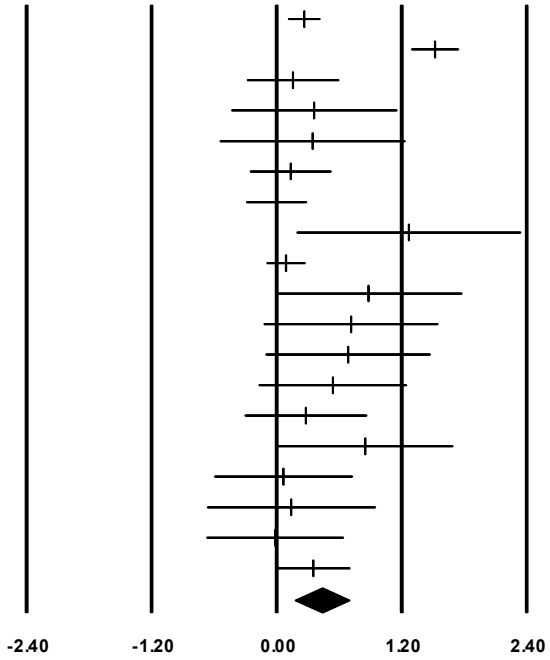

Figure 1. Forest plot of effect sizes (k = 19). The vertical hash mark represents each individual study and weight in comparison to the overall effect. The horizontal lines connected to each vertical hash mark illustrate the confidence interval. The diamond at the bottom represents the omnibus mean effect size.

Moderator Results

Student grade. The $Q_{between}$ statistic (Table 6) indicated a statistically significant difference between the four categories ($Q_b(3) = 7.81$, $p = 0.05$). Additional analyses indicated the statistically significant difference ($p = 0.01$) occurred between the "Other/Not Specified" and "Elementary (K-6)" categories. Of the four categories, "Other/Not Specified" produced the largest absolute effect size.

Table 6

Mean Effect Sizes for Student Grade

		Effect size and 95% CI			Heterogeneity	
	k	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						7.81*
Other/Not Specified	2	0.95	0.24	0.49, 1.42	27.20	
Preschool/Head Start	2	0.74	0.41	-0.06, 1.54	1.64	
Mixed	4	0.40	0.22	-0.03, 0.82	3.14	
Elementary (K-6)	11	0.25	0.12	0.01, 0.48	9.28	

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

Teacher type of class. The $Q_{between}$ statistic (Table 7) indicated school-based problem-solving consultation treatment effects did not differ between the two categories. Of the two categories, "General Education" produced the largest absolute effect size.

Table 7

Mean Effect Sizes for Teacher Type of Class

		Effect size and 95% CI			Heterogeneity	
	k	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						0.70
General Education	5	0.63	0.28	0.08, 1.12	2.18	
Special Education/	14	0.36	0.16	0.06, 0.67	111.67	
Did Not Specify/Mixed/Other						

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

Consultant type. The $Q_{between}$ statistic (Table 8) indicated school-based problem-solving consultation treatment effects did not differ between the four categories. Of the four categories, "Did Not Specify/Mixed/Other" produced the largest absolute effect size.

Table 8

Mean Effect Sizes for Consultant Type

		Effect size and 95% CI			Heterogeneity	
	k	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						1.22
Did Not Specify/Mixed/Other	8	0.55	0.24	0.08, 1.01	5.47	
Team	4	0.54	0.28	0.00, 1.08	81.16	
Graduate Student	4	0.32	0.31	-0.29, 0.94	3.83	
School-Related Professional	3	0.15	0.33	-0.49, 0.80	1.72	

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

School type. The $Q_{between}$ statistic (Table 9) indicated school-based problem-solving consultation treatment effects did not differ between the two categories. Of the two categories, "Did Not Specify" produced the largest absolute effect size.

Table 9

Mean Effect Sizes for School Type

		Effect size and 95% CI			Heterogeneity	
	k	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						0.12
Did Not Say	14	0.45	0.15	0.15, 0.75	104.44	
Public	5	0.34	0.28	-0.21, 0.89	5.47	

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

Referral source. The $Q_{between}$ statistic (Table 10) indicated school-based problem-solving consultation treatment effects did not differ between the two categories. Of the two categories, "Mixed/Other" produced the largest absolute effect size.

Table 10

Mean Effect Sizes for Referral Source

		Effect size and 95% CI			Heterogeneity	
	k	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						0.04
Mixed/Other	9	0.45	0.20	0.07, 0.84	94.82	
Teacher	10	0.40	0.19	0.03, 0.77	9.73	

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

Referral reason. The $Q_{between}$ statistic (Table 11) indicated school-based problem-solving consultation treatment effects did not differ between the four categories. Of the four categories, "Did Not Specify/Other" produced the largest absolute effect size.

Table 11

Mean Effect Sizes for Referral Reason

		Effect size and 95% CI			Heterogeneity	
	k	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						6.02
Did Not Specify/Other	4	0.87	0.22	0.44, 1.30	31.32	
Behavior	5	0.37	0.23	-0.08, 0.83	2.52	
Mixed	7	0.32	0.16	0.01, 0.64	7.16	
Academic	3	0.16	0.22	-0.28, 0.59	1.72	

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

Consultation model. The $Q_{between}$ statistic for type of consultation (Table 12) indicated school-based problem-solving consultation treatment effects did not differ between the three categories. Of the three categories, "Instructional Consultation" produced the largest absolute effect size.

Table 12

Mean Effect Sizes for Consultation Model

		Effect size and 95% CI			Heterogeneity	
	k	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						2.86
Instructional Consultation	3	0.76	0.23	.31, 1.21	35.68	
Behavioral Consultation	9	0.34	0.15	0.05, 0.63	11.91	
Did Not Specify/Other	7	0.31	0.18	-0.04, 0.67	4.39	

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

Comparison group. The $Q_{between}$ statistic (Table 13) indicated school-based problem-solving consultation treatment effects did not differ between the three categories. Of the three categories, "Alternative Treatment" produced the largest absolute effect size.

Table 13

Mean Effect Sizes for Comparison Group

		Effect size and 95% CI			Heterogeneity	
	k	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						0.94
Alternative Treatment	2	0.76	0.50	-0.22, 1.75	1.64	
Practice As Usual	15	0.43	0.15	0.14, 0.72	110.05	
Mixed/Other	2	0.14	0.41	-0.67, 0.95	0	

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

Intervention type. The $Q_{between}$ statistic (Table 14) indicated school-based problem-solving consultation treatment effects did not differ between the three categories. Of the three categories, "Other" produced the largest absolute effect size.

Table 14

Mean Effect Sizes for Intervention Type

		Effect size and 95%CI			Heterogeneity	
	k	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						2.19
Other	6	0.60	0.23	0.16, 1.04	78.76	
Behavioral/Social	8	0.50	0.22	0.06, 0.93	6.29	
Academic	5	0.14	0.24	-0.32, 0.60	2.66	

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

Design quality. The $Q_{between}$ statistic (Table 15) indicated school-based problem-solving consultation treatment effects did not differ between the two categories. Of the two categories, "Low Quality" produced the largest absolute effect size.

Table 15

Mean Effect Sizes for Design Quality

		Effect size and 95% CI			Heterogeneity	
	k	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						0.08
Low Quality	16	0.44	0.15	0.15, 0.73	106.3	
Medium/High Quality	3	0.34	0.35	-0.35, 1.02	3.68	

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

Outcome measured. The $Q_{between}$ statistic (Table 16) indicated school-based problem-solving consultation treatment effects did not differ between the four categories. Of the four categories, "SPED Referrals/Placements" produced the largest absolute effect size.

Table 16

Mean Effect Sizes for Outcome Measured

		Effect size and 95% CI			Heterogeneity	
	k	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						1.02
SPED Referrals/Placements	4	0.67	0.29	0.11, 1.24	75.88	
Researcher Developed	4	0.41	0.31	-0.20, 1.02	0.69	
Standardized and Available Commercially or Publically	4	0.35	0.31	-0.26, 0.96	4.59	
Mixed	7	0.31	0.24	-0.16, 0.78	7.43	

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

Data type. The $Q_{between}$ statistic (Table 17) indicated school-based problem-solving consultation treatment effects did not differ between the four categories. Of the four categories, "t-value/F-value" produced the largest absolute effect size.

Table 17

Mean Effect Sizes for Data Type

		Effect size and 95% CI			Heterogeneity	
	K	g	SE	95% CI	Q_{within}[a]	$Q_{between}$[b]
						3.36
t-value/F-value	2	1.06	0.50	0.07, 2.05	0.29	
Frequencies or Proportions	4	0.67	0.28	0.13, 1.21	75.88	
Mean & SD (Pre- & Post-test)	10	0.30	0.19	-0.08, 0.67	6.56	
Mixed	3	0.19	0.33	-0.46, 0.84	1.53	

Note. *p = 0.05. [a]Q_{within} refers to homogeneity of each subgroup (df = k-1). [b]$Q_{between}$ refers to moderator contrasts (df = number of subgroups – 1).

CHAPTER V

SUMMARY

The present study examined the effects of school-based problem-solving consultation on client-level outcomes using meta-analysis as a data analytic strategy spanning the years 1986 to 2009. The primary goal of the current study was to assess the overall effectiveness of school-based problem-solving consultation as compared to a control/comparison group; while a secondary goal was to identify variables that moderated the effects of school-based problem-solving consultation. To identify these variables, moderator analyses were conducted using: (a) student grade, (b) teacher type of class, (c) consultant type, (d) school type, (e) referral source, (f) referral reason, (g) consultation model, (h) comparison group, (i) intervention type, (j) design quality, (k) outcome measured, and (l) data type.

School-Based Problem-Solving Consultation's Effects

The omnibus mean effect size from the 19 studies was g = 0.42, with a range of g = -0.01 to 1.52 demonstrating a medium-sized effect (Cohen, 1988). However, this was a conservative estimate as Hedges's g was calculated using a random-effects model. When the model, effect size estimate, and confidence intervals were all taken into account, the results indicated that school-based problem-solving consultation positively impacted client-level outcomes. This overall effect size suggested that when using school-based problem-solving consultation school psychologists can expect client improvement of approximately one-fourth of a standard deviation on the measured outcome (e.g., behavior, academic). This indicated that if a client was functioning at the

50th percentile on the outcome of interest prior to school-based problem-solving consultation then post school-based problem-solving consultation the client would be functioning at approximately the 66th percentile.

Even though the current meta-analysis, similar to the past meta-analyses (Busse, Kratochwill, & Elliott, 1985; Medway & Updyke, 1985; Reddy, Barboza-Whitehead, Files, & Rubel, 2000), produced a positive effect size, the current meta-analysis examined the school-based problem-solving consultation literature differently. First, to my knowledge, the current meta-analysis was the first school-based problem-solving consultation meta-analysis that started with a random-effects model rather than the traditional fixed-effect model. The random-effects model was used rather than the fixed effects model because the studies originated from several authors and samples (Borenstein, Hedges, Higgins, & Rothstein, 2009), the goal of the study was to generalize the results to a larger population (Hedges & Vevea, 1998), and both between- and within-study error were believed to influence the overall mean effect size (Field, 2003). By examining the between- and within-study errors within a random-effects model, the studies were more equally weighted; thus, leading to a more conservative estimate of school-based problem-solving consultation's effectiveness (Borenstein et al., 2009).

Second, the current meta-analysis focused only on client-level (e.g., child) outcomes; whereas, the Medway and Updyke (1985) and Reddy et al. (2000) meta-analyses examined, albeit in a limited way, the effects of school-based problem-solving consultation on consultant-, consultee-, client-, and system-level outcomes. The current

meta-analysis did not measure consultant- and consultee-level outcomes because the focus of this study was on the indirect, collaborative interaction between a help-giver (i.e., consultant) and a help-seeker (e.g., teacher) directed at improving the learning, behavior, or functioning of a student, group of students, or a system (Erchul & Martens, 2002; Erchul & Sheridan, 2008) and not the outcomes (e.g., satisfaction) of the "direct" relationship between the consultant and consultee.

Finally, the current meta-analysis only included between-group studies. By only including between-group studies, the current meta-analysis solely focused on determining the effects of school-based problem-solving consultation when compared to a control/comparison group-a more rigorous examination the state of school-based problem-solving consultation literature. This led to the exclusion of within-group and single-n studies. Within-group studies were excluded because all participants are exposed to the intervention; therefore, these studies cannot experimentally determine the effectiveness of school-based problem-solving consultation, thus limiting their generalizability. In addition, single-n studies were not included in the current meta-analysis as single-n studies using traditional effect size metrics tend to produce unreliable effect sizes that violate at least one assumption of parametric statistics (Parker, 2006; Parker, Vannest, & Brown, 2009). The parametric statistic assumptions of normality, equal variance, and serial independence are usually violated when calculating large-n effect sizes from single-n data because the data were from a single individual and the individuals were not randomly selected (Parker, 2006). Although the current meta-analysis examined the school-based problem-solving consultation literature

differently than the previous school-based problem-solving meta-analyses, the results appeared to be consistent with effects found in previous, older meta-analyses (e.g., Medway and Updyke's (1985) meta-analysis produced a client-level effect size outcome of 0.39). The summative effect size was, however, not as informative as the moderator analyses that attempted to answer for whom and under which circumstances school-based problem-solving consultation was most effective.

Moderator Summary

Student grade. Grade level effect sizes ranged from $g = 0.25$ to 0.95. This was the only moderator analysis that produced a statistically significant ($p = 0.05$) difference between the four categories ("Other/Not Specified," "Preschool/Head Start," "Mixed," and "Elementary (K-6)"). Further analysis indicated the statistically significant difference ($p = 0.01$) occurred between the "Other/Not Specified" ($g = 0.95$) and "Elementary (K-6)" ($g = 0.25$) categories. In addition to demonstrating a statistically significant difference between the "Other/Not Specified" and "Elementary (K-6)" categories, the moderator analysis provided some speculative information about which group of students benefited, in the absolute sense, the most from school-based problem-solving consultation.

An examination of the differences between the three defined categories ("Preschool/Head Start," "Mixed," and "Elementary (K-6)") indicated the greatest effect, in the absolute sense, of school-based problem-solving consultation research occurred for participants in preschool/head start classrooms. Although purely speculative, it appeared that these younger students benefited more from school-based

problem-solving consultation as preschool/head start classes tend to have a smaller class size, which would allow for easier and better implementation of the intervention (Reynolds, Magnuson, Ou, 2010). This finding was encouraging given the call within school psychology for more evidenced-based research in early childhood (VanDerHeyden & Snyder, 2006).

The finding for the promise of school-based problem-solving consultation in preschool/ head start classes must, however, be interpreted with caution given that the "Preschool/Head Start" category contained only two studies and the 95% confidence interval included zero. The larger number of studies found using elementary students was consistent with the previous reviews (Alpert & Yammer, 1983; Fuchs, Fuchs, Dulan, Roberts, & Fernstrom, 1992; Gresham & Noell, 1993; Reddy et al., 2000) and studies showing that school psychologists do indeed spend most of their time in elementary schools (Duncan & Pryzwansky, 1988).

Teacher type of class. For the teacher type moderator, there were only two categories. The "General Education" category produced an effect size of $g = 0.63$ while the "Special Education/Did Not Specify/Mixed/Other" category produced an effect size of $g = 0.36$. Even though there was no statistically significant difference between the two categories, it was useful to examine the absolute means. The results indicated that most studies do not provide sufficient information about class type, but when provided, researchers typically employed general education teachers. In the present study, general education students appeared to benefit more than special education students by an effect size margin of 0.27 or slightly more than one-fourth of a standard deviation. This

continued use of general education teachers was consistent with past reviews (Alpert & Yammer, 1983; Kratochwill, Sheridan, & VanSomeren, 1988; West & Idol, 1987). Although purely speculative, it was reasonable to assume when looking at the absolute means between the "General Education" and "Special Education/Did Not Specify/Mixed/Other" categories that general education students benefited more from interventions arising from school-based problem-solving consultation than their special education counterparts. Special education students appeared to require a more targeted, intensive and sustained intervention beyond what was currently available from a school-based problem-solving consultation model (Gresham & Project REACH, 2005).

Consultant type. The consultant type effect sizes ranged from $g = 0.15$ to 0.55; however, the difference between the four categories was not statistically significant. Although the differences between the means were not statistically significant, a comparison of the "Team," "Graduate Student," and "School-Related Professional" means provided some support consistent with previous reviews showing that a team-based approach was more effective than relying on a single consultant (Gravois & Rosenfield, 2002; Gresham & Kendell, 1987; Lewis & Newcomer, 2002; McDougal, Natasi, & Chafouleas, 2005). Although a definitive statement cannot be made due to the lack of significance, it has been suggested that the use of a team-based model likely improved school-based problem-solving consultation outcomes because of a greater level of teacher accountability via follow through with the intervention (Erchul & Martens, 2002). Further, the client's problem can be examined from several different

perspectives, which may lead to a higher quality intervention (Lewis & Newcomer, 2002).

In addition, the absolute magnitude in difference between means of the "Graduate Student" (g = 0.32) and "School-Related Professional" (*g* = 0.15) categories provided some support that school-based problem-solving consultations occurring within an analog (i.e., delivered by school psychology graduate students rather than working school psychologists) environment may lead to better outcomes (Kratochwill & VanSomeren, 1985; Mautone, DuPaul, Jitendra, Tresco, Junod, & Volpe, 2009). Even though both scores were lower than the mean effect size, the difference between these two categories may suggest that the higher "Graduate Student" ratings may reflect teacher's increased effort to implement the intervention in order to help the graduate student obtain better results.

School type. For the school moderator, there were only two categories. The "Did Not Say" category produced an effect size of *g* = 0.45 while the "Public" category produced an effect size of *g* = 0.34; however, the difference between the categories was not statistically different. Overall, most studies did not provide sufficient school demographics making it difficult to code this category (i.e., 74% of the studies were coded as "Did not Say"). In fact, this lack of information was consistent with previous reviews that stated that school-based problem-solving consultation studies provide unclear details (Gresham & Kendell, 1987; Noell, 2008).

Referral source. For the referral source moderator, there were only two categories. The "Mixed/Other" category produced an effect size of *g* = 0.45 while the

"Teacher" category produced an effect size of $g = 0.40$. The lack of statistical significance combined with the minimal absolute difference between effect sizes indicated that referral source made no difference in outcomes; it was equally effective for both. As previously noted, however, insufficient information was provided in the studies to code beyond "Mixed/Other" limiting the understanding of this important moderator (Gresham & Kendell, 1987; Noell, 2008).

Referral reason. The effect sizes ranged from $g = 0.16$ to 0.87, but the mean effect size differences between the "Did Not Specify/Other," "Behavior," "Mixed," and "Academic" categories were not statistically significant. However, when comparing the absolute means, the "Did Not Specify/Other" category produced the largest mean. This category included studies that did not provide sufficient information to code.

Although the largest effect size was produced from the "Did Not Specify/Other", examining the absolute number of studies in the other three categories ("Behavior," "Mixed," and "Academic") provided some insight into the state of the current literature on school-based problem-solving consultation empirical studies. For example, most of the studies targeted behavior rather than academic and achievement outcomes. One hypothesis was that most previous researchers have demonstrated more successes when targeting behavioral concerns rather than academic concerns (Busse et al., 1995; Medway & Updyke, 1985; Sheridan, Welch, et al., 1996; West & Idol, 1987).

Consultation model. The effect sizes ranged from $g = 0.31$ to 0.76; however, the mean effect size differences between the "Instructional Consultation," "Behavioral Consultation," and "Did Not Specify/Other" categories were not statistically significant.

While there was no statistically significant difference between consultation models, it was useful to take a closer look. If only the absolute mean differences were considered, it appeared that there was still a bias against Mental Health Consultation (MHC) as it was not employed by any of the school-based problem-solving consultants. One can reasonably conjecture that this bias has emerged from the psychodynamic nature of MHC (Alpert & Yammer, 1983; Gresham & Kendell, 1987) and difficulty in defining measureable goals for this model (Mannino & Shore, 1975). The larger quantity of Behavioral Consultation (BC) studies suggested that researchers lean towards BC due to its well-defined and operationalized stages (Alpert & Yammer, 1983; Fuchs, Fuchs, Dulan, et al., 1992; Medway, 1982; Sheridan, Welch, et al., 1996). However, in the absolute sense, the results of the current study indicated that Instructional Consultation (IC) and not BC produced the largest effects. IC may have produced the largest effect sizes due to its alignment with Response to Intervention (RTI; Knotek, 2007) and its use of discrete probes (e.g., frequencies); an easily measured and quantified outcome; whereas, BC focused both on standardized (normative scores) and non-standardized measure.

Comparison group. The effect sizes ranged from $g = 0.14$ to 0.76; however, the difference between the "Alternative Treatment," "Practice As Usual," and "Mixed/Other" categories was not statistically significant. While there was no statistically significant difference between the absolute means, the current study suggested one important methodological change in the way researchers conducted their studies; both alternative treatments and practice as usual, when examined more closely

involved more active components- a departure from the single focus on no treatment controls found in previous meta-analyses (Duncan & Pryzwansky, 1988; Gresham & Kendell, 1987).

Even though in the absolute mean sense there was no difference, the results hinted that when compared to an alternative treatment, school-based problem-solving consultation groups demonstrated greater gains; however, this must be interpreted with caution. As noted previously, studies provided insufficient detail on the exact services rendered (Gersten, Fuchs, Compton, Coyne, Greenwood, and Innocenti, 2005). By providing the exact services rendered to the control/comparison group, future school-based problem-solving consultation studies and meta-analyses will be able to document the specific control/comparison conditions where school-based problem-solving consultation produced the best outcomes.

Intervention type. The effect sizes ranged from $g = 0.14$ to 0.60; however, the difference between the "Other," "Behavioral/Social," and "Academic" categories was not statistically significant. Again as noted earlier, an examination of the each categories absolute means indicated that intervention descriptions were vague, requiring the need to collapse discrete categories into broad categories (Duncan & Pryzwansky, 1988; Gresham & Kendell, 1987; Pryzwansky, 1986). However, this finding was not unique as past research has stated that intervention variables were not always adequately defined (Noell, 2008).

Although, three broad categories were created, the absolute mean results showed that both "Other" and "Behavioral/Social" produced larger effect sizes than "Academic."

Erchul and Martens (2002) indicated that behavior-based interventions tend to be associated with better outcomes due to the ease of implementation. They stated that it was easier to implement a behavioral intervention as a consultant can teach a consultee how to explicitly change client behavior by modifying behavioral antecedents and consequences (Erchul & Martens, 2002). Whereas, with academic interventions, the consultant may have to work with the teacher to change the lesson, teaching style, client work load, and assist the teacher to re-teach certain academic areas that the client lacked.

Design quality. For the design quality moderator, there were only two categories. The "Low Quality" category produced an effect size of $g = 0.44$ while the "Medium/High Quality" category produced an effect size of $g = 0.34$. Even though there was not a statistically significant difference between the two mean effect sizes, lower quality studies produced higher effect sizes when the two absolute mean effect sizes were compared. However, the results were not unexpected as past research has indicated that studies not controlling for most internal and external validity issues tend to inflate results (Gersten et al., 2005; Simmerman & Swanson, 2001). In addition, the lack of medium and high quality school-based problem-solving consultation studies was consistent with previous reviews stating that most school-based problem-solving consultation articles were of lower quality (Gresham & Kendell, 1987; Medway, 1982; Medway & Updyke, 1985) because researchers cannot agree on consultation procedures, goals, and key variables (Gutkin, 1993; Gresham & Kendell, 1987; Medway, 1982; Reddy et al., 2000).

Outcome measured. The effect sizes ranged from $g = 0.31$ to 0.67; however, the difference between the "SPED Referrals/Placements," "Researcher Developed," "Standardized," and "Mixed" categories was not statistically significant. When the absolute mean differences were examined, the use of SPED referrals/placements produced the largest effect size. This may have resulted as this particular category relied on frequencies as the measurement data point (instead of standardized and researcher-developed measures which would yield smaller effect sizes) thus inflating the effects for "SPED referral/placements."

The results of the current meta-analysis also reflected a well-documented finding when comparing standardized to researcher-developed measures. In the current study, researcher-developed measures produced an effect size of $g = 0.41$, and standardized measures produced an effect size of $g = 0.35$. Although there was not a statistically significant difference between the "Researcher Developed" and "Standardized" categories, this difference was expected as researcher developed measures tend to produce larger effect sizes than standardized measures (Simmerman & Swanson, 2001).

Data type. The effect sizes ranged from $g = 0.19$ to 1.06; however, the difference between the "t-value/F-value," "Frequencies or Proportions," "Mean & SD (Pre- & Post-test)," and "Mixed" categories was not statistically significant. While there was no statistically significant difference between the four categories, the results indicated that both the "t-value/F-value" ($g = 1.06$) and "Frequencies or Proportions" ($g = 0.67$) categories produced the largest absolute effect sizes. However, the results of these two categories need to be interpreted with caution. These two categories appeared

to inflate the effect size as these two categories are not traditional effect size metrics and must be converted to Hedges's g using additional formulas (Borenstein, Hedges, Higgins, & Rothstein, 2005). However, the smaller outcome obtained from the "Mean and Standard Deviation (Pre- and Post-test)" category was expected because these studies typically used standardized measures. This finding was similar to Simmerman and Swanson's (2001) study that demonstrated that standardized measures tend to show a smaller difference between groups; thus, producing a smaller effect size.

In summary, with the exception of student grade as a moderator, none of the other moderators were statistically significant limiting our understanding of moderators of school-based problem-solving consultation outcomes. Notwithstanding the lack of statistical significance, examining the absolute mean differences between and among means provided some insight into two decades of recent school-based problem-solving consultation literature. While purely speculative, school-based problem-solving consultation seemed to be more effective for general education students demonstrating behavioral problems with IC producing higher effects when compared to alternative treatments.

Limitations

There were several limitations to this study. First, the primary limitation was the same as all other meta-analyses. Only information retrieved and examined could be discussed. Due to this limitation, the current meta-analysis only described the impact of school-based problem-solving consultation on client-level outcomes that were conducted using a between-study design and reported in peer-reviewed journals. This focus on a

specific outcome and study type prohibited the current study from discussing how school-based problem solving consultation influenced consultant- or consultee-level outcomes, or how within-study or single-n designs impacted school-based problem-solving consultation outcomes. Second, the current meta-analysis could only discuss the information presented within each study. Due to the inability of researchers to agree on procedures, goals, and key variables (Gutkin, 1993; Gresham & Kendell, 1987; Medway, 1982; Reddy et al., 2000) as well as the lack of consultant-, consultee-, client-, and system-level descriptions, it was very difficult to create a coding sheet that captured categories for each potential moderator. Often it was necessary to collapse categories to form more omnibus categories for analysis. Moreover, most studies provided insufficient information in which to accurately identify the category of interest limiting their contribution to the understanding of school-based problem-solving consultation outcomes. Finally, at the broadest level, often there were an insufficient number of studies, a power issue, limiting the study's ability to detect statistical differences.

Implications for Practice and Future Research

Similar to previous meta-analyses (Busse, Kratochwill, & Elliott, 1985; Medway & Updyke, 1985; Reddy et al., 2000), in the present study the omnibus mean effect size of $g = 0.42$ continued to reflect that school-based problem-solving consultation was a moderately effective approach to addressing school-based academic and behavioral difficulties. However, this study noted many problems with the school-based problem-solving consultation empirical literature. Future studies should seek to refine their methodological sections by clearly operationalizing consultation model, outcomes,

sample descriptions, targeted academic or behavioral concerns, nature of control group and intervention to name a few.

Future school-based problem-solving consultation studies should also consider new variables in order to understand under what circumstances and for whom consultation is most effective. Some new variables might be (a) fidelity of implementation, (b) social validity, (c) follow-up and among others. The addition of follow-up will provide researchers with the opportunity to understand the durability of the effects of school-based problem-solving consultation (Duncan & Pryzwansky, 1988; Gresham & Kendell, 1987; Pryzwansky, 1986). In addition, the literature on school-based problem-solving consultation might consider (a) more studies on academic issues, (b) clearly identifying the grade of the targeted population, (c) clarifying the referral source, (d) greater focus on special education students, (e) providing more detail in services provided for the control/comparison condition, (f) and improving design quality (Duncan & Pryzwansky, 1988; Gersten et al., 2005; Gresham & Kendell, 1987; Hughes, Loyd, & Buss, 2009; Sheridan, Welch, et al., 1996). From this study, one can reasonably conclude that there is work to be done in terms of methodological sophistication of school-based problem-solving consultation studies. Increasing the level of design quality may be the most important issue for school-based problem-solving consultation research (Gersten et al., 2005; Simmerman & Swanson, 2001).

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APPENDIX A

SCHOOL-BASED PROBLEM-SOLVING CONSULTATION CODING PROTOCOL

Publication Reference:

_____ Study ID Number

Journal

1. **Study Year**: _____
2. **Journal Name**: _____

Client

3. **Student Total N**: _____
4. **Student Grade**: _____
    1. Preschool/Head Start
    2. Elementary (K-6)
    3. Mixed
    4. Other/Not Specified
5. **Student Gender**
    - _____% Female
    - _____% Male
    - _____% Does Not Say
6. **Student Sample Ethnicity**
    - _____% Caucasian
    - _____% African American
    - _____% Hispanic
    - _____% Mixed/Other
    - _____% Does Not Say

Consultee

7. **Parent Total N**: _____

8. **Teacher Total N**: _____

9. **Teacher Gender**:
   _____% Female
   _____% Male
   _____% Does Not Say

10. **Teacher Type of Class**: _____
    1. Special Education
    2. General Education
    3. Did Not Specify/Mixed/Other

Consultant

11. **Consultant N**: _____

12. **Consultant Type**: _____
    1. Graduate Student
    2. School Psychology Professional
    3. Non School Psychology Professional
    4. Team
    5. Did Not Specify/Mixed/Other

13. **Consultant Gender**
    _____% Female
    _____% Male
    _____% Does Not Say

Study

14. School Type: _____
1. Public
2. Mixed
3. Did Not Say

15. Referral Source: _____
1. Teacher
2. Team
3. Mixed
4. Did Not Specify/Other

16. Referral Reason: _____
1. Behavior
2. Academic
3. Mixed
4. Did Not Specify/Other (e.g., Social)

17. Consultation Model: _____
1. Behavioral Consultation
2. Instructional Consultation
3. Mental Health Consultation
4. Did Not Specify/Other

18. Comparison Group: _____
1. Practice As Usual
2. Alternative Treatment
3. Other

19. Intervention Type: _____
1. Academic
2. Behavioral/Social
3. Mixed/Other (e.g., emotional, systemic)

Design Quality

STOP: GO TO QUALITY INDICATORS SHEET FOR QUESTION 20.

20. Design Quality: _____
1. Low Quality
2. Medium Quality
3. High Quality

Effect Size (Please Use one sheet per Dependent Variable)

21. Outcome measured: _____

1. Standardized and available commercially or publicly
2. Researcher Developed
3. CBM
4. SPED Referrals/Placements
5. Direct Observations
6. Other

22. Data Type: _____

1. Mean and Standard Deviation (Post-test only)
2. Mean and Standard Deviation (Pre- and Post-test)
3. Frequencies or proportions
4. t-value/F-value
5. Effect Size Provided

23. Page where effect size data found? _____

23a. **Post-test Only**

Please fill in Names of the Groups					
Sample Size					
Mean					
Standard Deviation					

23b. Pre- & Post-test

Please fill in the Names of The Groups								
	Pretest	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Sample Size								
Mean								
Standard Deviation								

23c. Frequencies or proportions

Control		Treatment	
Control School Population	Control – Number of Referrals/Placements	Treatment School Population	Treatment – Number of Referrals/Placements

23d. Significant Tests

Sample Size	t-value	*F-value (df must equal 1)*

23e. Effect Size Provided:_____

If Effect Size provided, please state comparison groups (Control vs. Intervention1):

_____

APPENDIX B

SCHOOL-BASED PROBLEM-SOLVING CONSULTATION CODING MANUAL DEFINITIONS

Publication Reference: Write a complete citation in APA format

_____ Study ID Number: All articles included in the meta-analysis have been given a study ID number; however, if a report presents two independent studies (i.e., two independent outcome studies with **different participants**), then add a decimal to the study ID number to distinguish each study within a report and code each independent study separately.

Journal

1. **Study Year**: Provide the year of the study

2. **Journal Name**: Provide the name of the journal

Client

3. **Student Total N**: Provide the total number of students in the sample at the start of the study

4. **Student Grade**: Select the code that best describes the approximate or exact grade of the sample at the beginning of the intervention. If the sample covers multiple grades, then enter "3" for *mixed*. If information about student grade is not provided or the entire sample is comprised of middle or high school students, then enter "4" for *other/not specified.*
    1. Preschool/Head Start
    2. Elementary (K-6)
    3. Mixed
    4. Other/Not Specified

5. **Student Gender**: Specify the exact percentage (2 decimal places) reported for student gender (can extrapolate if only one given) or "Does not Say."
    _____% Female
    _____% Male
    _____% Does Not Say

6. **Student Sample Ethnicity**: Specify the exact percentage (2 decimal places) reported for each ethnicity listed. Percentage for an ethnicity that is not listed should be entered under "Mixed/Other." Use "Does Not Say" only when no ethnicities are reported. If the exact numbers of subjects are reported by ethnicity, convert the numbers into percentages.
   _____% Caucasian
   _____% African American
   _____% Hispanic
   _____% Mixed/Other
   _____% Does Not Say

Consultee

7. **Parent Total N**: Provide the number of parents in the total sample (If provided). Must provide number; do not code this variable if only a percentage is given.

8. **Teacher Total N**: Provide the number of teachers in the total sample (if provided). Must provide number; do not code this variable if only a percentage is given.

9. **Teacher Gender**: Specify the exact percentage (2 decimal places) reported for teacher gender (can extrapolate if only one given) or "Does not Say."
   _____% Female
   _____% Male
   _____% Does Not Say

10. **Teacher Type of Class**: Select the code that best describes the teacher's type of class. If the sample contains only students receiving special education services, select "1." If the sample contains students that do not receive special education services, select "2." If the sample contains students in special and general education, select "3."
    1. Special Education
    2. General Education
    3. Did Not Specify/Mixed/Other

Consultant

11. **Consultant N**: Provide the number of consultants in the total sample (if provided)

12. **Consultant Type**: Select the code that best describes the consultant's level of training. If the study contains consultants who are still receiving master's- or doctoral-level training, select "1." If the study contains consultants who are employed in the school district as school psychology professionals, select "2." If the study contains consultants who are employed in the school districts but not as school psychologists, select "3." If the study contains consultants who are a part of a team, select "4." If the consultant does not fit the other 4 categories, comes from several of the categories, or is not specified, select "5."
    1. Graduate Student
    2. School Psychology Professional
    3. Non School Psychology Professional
    4. Team
    5. Did Not Specify/Mixed/Other

13. **Consultant Gender**: Specify the exact percentage (2 decimal places) reported for consultant gender (can extrapolate if only one given) or "Does not Say."
    _____% Female
    _____% Male
    _____% Does Not Say

Study

14. **School Type**: Select the code that best describes the type of school. If the study uses a sample of students from a public school (**must explicitly state**) including Head Start, select "1." If the study uses a mixture of public and private school students, select "2." If the study does not provide this information, select "3."
    1. Public
    2. Mixed
    3. Did Not Say

15. **Referral Source**: Select the code that best describes who referred the student(s) for consultation. If the study relied on teacher referrals, select "1." If the study relied on team-based referrals, select "2." If the study relied on both teacher and team-based referrals, select "3." If the study did not provide referral source or specified another referral source (e.g. School Administration, Parents), select "4."
    1. Teacher
    2. Team
    3. Mixed
    4. Did Not Specify/Other

16. Referral Reason: Select the code that best describes why students were referred. If the students were referred for behavioral reasons, select "1." Must explicitly state the behavioral concern. It is also acceptable for the researchers to state that the students in the sample displayed "behavioral concerns." If the students were referred for academic reasons, select "2." Must explicitly state the academic concern. It is also acceptable for the researchers to state that the students in the sample displayed "academic concerns." If the students were referred for a mixture of behavior, academic, emotional, and social concerns, select "3." If the study did not state the reason for referral or a reason besides behavior or academics, select "4."

1. Behavior
2. Academic
3. Mixed
4. Did Not Specify/Other (e.g., Social)

17. Consultation Model: Select the code that best describes what theory of consultation was used by the consultant/team. Select "1" for Behavioral Consultation. Behavioral Consultation is a problem solving approach characterized by two identifiable features: (a) indirect service delivery, and (b) a heuristic multi-step series of problem solving steps and related assessment activities between a consultant and a consultee to address a work related problem of concern to a teacher. Select "2" for Instructional Consultation. Instructional Consultation is a form of consultee-centered consultation that seeks to improve, enhance and increase student achievement through improving, enhancing and increasing teacher's performance. It is the explicit emphasis on supporting teachers' professional capacity to develop and deliver effective instruction within general education. Select "3" for Mental Health Consultation. Mental Health Consultation is a service provided to care giving professionals such as teachers to assist them in dealing with the psychological aspects of a current work related problem and most importantly to deal more effectively with similar problems in the future. Assists consultee in "reframing" prior conceptualization of work problem by pinpointing critical information and then consider other ways of viewing. Select "4" if the study did not state the consultation model or defines a consultation model that was not previously defined (e.g., Conjoint Behavioral Consultation).

1. Behavioral Consultation
2. Instructional Consultation
3. Mental Health Consultation
4. Did Not Specify/Other

18. Comparison Group: Select the code that best describes the type of comparison group. Select "1"if the comparison group describes typical service. Select "2" if the comparison group describes an alternative intervention (treatments inside and outside of school). Select "3" if the comparison group was not related to either of the first two comparison group definitions.

1. Practice As Usual
2. Alternative Treatment
3. Other

19. Intervention Type: Select the code that best describes the type of intervention that was used in conjunction with consultation. If the study described an intervention that was related to academic skills (math; peer assisted learning), select "1." If the study described an intervention related to behavioral or social functioning (social skills), select "2." If the study described an intervention not commensurate with the first two definitions, select "3."

1. Academic
2. Behavioral/Social
3. Mixed/Other (e.g., emotional, systemic)

Design Quality

STOP: GO TO QUALITY INDICATORS SHEET FOR QUESTION 20.

20. Design Quality: Select the code that best describes the level of design quality. Use the Quality Index Sheet to determine the level of design quality.

1. Low Quality
2. Medium Quality
3. High Quality

Effect Size (Please Use one sheet per Dependent Variable)

21. **Outcome measured**: Select the code that best describes how the researchers measured the outcome. Select "1" if the measure's information is published in a manual. Select "2" if the measure's information can only be found in an article. Select "3" if the study used a curriculum-based measurement (e.g., progress monitoring tools) to document student progress. Select "4" if the study measured the number of students who were referred for special education testing and special education placement. Select "5" if the study measured student progress using direct observations. Select "6" if the study measured outcomes using another type of measure to document progress (e.g., teacher-created tests, Office Discipline Referrals).
    1. Standardized and available commercially or publicly
    2. Researcher Developed
    3. CBM
    4. SPED Referrals/Placements
    5. Direct Observations
    6. Other

22. **Data Type**: Select the code that best describes the data that was used to calculate effect sizes.
    1. Mean and Standard Deviation (Post-test only)
    2. Mean and Standard Deviation (Pre- and Post-test)
    3. Frequencies or proportions
    4. t-value/F-value
    5. Effect Size Provided

23. **Page where effect size data found**? _____

23a. **Post-test Only**

Please fill in the Names of the Groups					
Sample Size					
Mean					
Standard Deviation					

23b. Pre- & Post-test

Please fill in the Names of the Groups								
	Pretest	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Sample Size								
Mean								
Standard Deviation								

23c. Frequencies or proportions

Control		Treatment	
Control School Population	Control – Number of Referrals/Placements	Treatment School Population	Treatment – Number of Referrals/Placements

23d. Significant Tests

Sample Size	t-value	*F-value (df must equal 1)*

23e. Effect Size Provided:_____

If Effect Size provided, please state comparison groups (Control vs. Intervention1):

_____

APPENDIX C

SCHOOL-BASED PROBLEM-SOLVING CONSULTATION QUALITY INDICATORS CODING PROTOCOL

Essential Qualities (1-10)

1. **Did the study explain how students were selected for the study? _____**
   0. No
   1. Yes

2. **Were students/schools/teachers randomly assigned? _____**
   0. No
   1. Yes

3. **Were teachers/schools comparable across the conditions?_____**
   0. No
   1. Yes

4. **Was the intervention clearly described and specified? _____**
   0. No
   1. Yes

5. **Was treatment integrity/fidelity of implementation monitored**? **_____**
   0. No
   1. Yes

6. **Did the researchers name or briefly describe the comparison/control condition(s)? ___**
   0. No
   1. Yes

7. **Were multiple measures used to assess performance? _____**
   0. No
   1. Yes

8. **Was the data collected at multiple times (i.e., pre-test, multiple post-tests)? _____**
   0. No
   1. Yes

9. **Did the researchers provide a rationale for statistical analysis?_____**
   0. No
   1. Yes

10. Did the research report include not only inferential statistics but also effect size calculations? _____

0. No
1. Yes

Desirable Qualities (11-19)

11. Was data available on attrition rates among intervention samples? _____

0. No
1. Yes

12. Did the study provide not only internal consistency reliability but also test-retest reliability, alternate-forms reliability, or inter-rater reliability (when appropriate) for outcome measures? _____

0. No
1. Yes

13. Was follow-up assessed? _____

0. No
1. Yes

14. Did researchers provide validity (criterion-related, concurrent, or construct) information for at least one measure? _____

0. No
1. Yes

15. Did the researchers examine the quality of implementation? _____

0. No
1. Yes

16. Did the researchers clearly describe and specify what occurred in the control/comparison condition? _____

0. No
1. Yes

17. Was interview fidelity measured? _____

0. No
1. Yes

18. Was treatment acceptability measured? _____

0. No
1. Yes

19. Was social validity measured? _____

0. No
1. Yes

ADD up number "YES" for Essential Indicators: _____
ADD up number "YES" for Desirable Indicators: _____

Circle Low, Medium, or High Quality. Then answer question 20.

Low Quality

Less than 9 Essential Indicators

Medium quality

1. 9 out of 10 of the Essential Indicators
2. 1 to 3 of the 9 Desirable Indicators

High Quality

1. 9 out of 10 of the Essential Indicators
2. 4 plus of the 9 Desirable Indicators

APPENDIX D

SCHOOL-BASED PROBLEM-SOLVING CONSULTATION QUALITY INDICATORS MANUAL DEFINITIONS

Essential Qualities (1-10)

1. **Did the study explain how students were selected for the study?**

2. **Were students/schools/teachers randomly assigned?** Code as "yes" if the researchers used random assignment to assign students, schools, or teachers to study conditions (this includes studies that match participants prior to randomization).

3. **Were teachers/schools comparable across the conditions?** Code as "yes" if the researchers conducted a statistical analysis prior to the intervention to determine there were no differences between the groups (e.g., chi square, t-test) and provided a direct statement/information about the equality of the groups. If the researchers did not provide a statement about equality, code as "no."

4. **Was the intervention clearly described and specified?**

5. **Was treatment integrity/fidelity of implementation monitored?** Code as "yes" if the researchers provided information related to how well the intervention was implemented (this can include a brief overview of the implementation process). Researchers need to state whether treatment fidelity was measured.

6. **Did the researchers name or briefly describe the comparison/control condition(s)?** Code as "yes" if the researchers named or provided a brief description/definition of the comparison and/or control condition(s). Code as "yes" if the researchers used a "Wait List" control. Code as "no" if the researchers described the control/comparison as "Business as Usual."

7. **Were multiple measures used to assess performance?** Code as "yes" if the researchers used several measures to assess performance (measures can examine different constructs).

8. **Was the data collected at multiple times (i.e., pre-test, multiple post-tests)?** Code as "yes" if the researchers collected data at multiple times.

9. **Did the researchers provide a rationale for statistical analysis?** Code as "yes" if the researchers stated why certain statistical analyses were included and excluded (e.g., ANOVA was used because, or researchers describe the data analysis steps).

10. **Did the research report include not only inferential statistics but also effect size calculations?** Code as "yes" if the researchers provided outcomes using effect sizes.

Desirable Qualities (11-19)

11. **Was data available on attrition rates among intervention samples?** Code as "yes" if the researchers documented overall attrition rates and ensured that attrition rates were equal between the intervention and comparison groups. In order to document attrition rates, the researchers must provide a statistical analysis and explanation using demographics and pre-test information of the participants who left the study.

12. **Did the study provide not only internal consistency reliability but also test-retest reliability, alternate-forms reliability, or inter-rater reliability (when appropriate) for outcome measures?** Code as "yes" if the researchers provided reliability information on the measures used (researchers must provide more than internal consistency measures).

13. **Was follow-up assessed?** Code as "yes" if the researchers measured outcomes beyond an immediate post-test.

14. **Did researchers provide validity (criterion-related, concurrent, or construct) information for at least one measure?** Code as "yes" if the researchers provided validity information for at least one measures (e.g., described how a measure correlated/compared to another measure).

15. **Did the researchers examine the quality of implementation?** Code as "yes" if the researchers tied quality of implementation to the outcomes or provided a statistical analysis examining quality of implementation. Code as "no" if the researchers provided only general implementation information (e.g., number of sessions, minutes allocated).

16. **Did the researchers clearly describe and specify what occurred in the control/comparison condition?** Code as "yes" if the researchers clearly described and specified what occurred in the control/comparison conditions. This description will be similar to an intervention description. Code as "yes" if the researchers used a "Wait List" control. Code as "no" if the researchers described the control/comparison as "Business as Usual."

17. **Was interview fidelity measured**? Code as "yes" if the researchers recorded the consultation processes in order to ensure that all questions and stages were met.

18. **Was treatment acceptability measured**? Code as "yes" if the researchers evaluated the students/teachers/parents perception of the treatment (participant perception of the intervention/outcomes).

19. Was social validity measured? Code as "yes" if the researchers assessed the clinical significance of the treatment effects by the individuals who interacted with the client or the individuals who received the treatment (class perception of participants).

ADD up number "YES" for Essential Indicators: _____
ADD up number "YES" for Desirable Indicators: _____

Circle Low, Medium, Or High Quality. Then answer question 20.

Low Quality
Less than 9 Essential Indicators
Medium quality
1. 9 out of 10 of the Essential Indicators
2. 1 to 3 of the 9 Desirable Indicators

High Quality
1. 9 out of 10 of the Essential Indicators
2. 4 plus of the 9 Desirable Indicators

VITA

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